
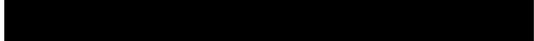


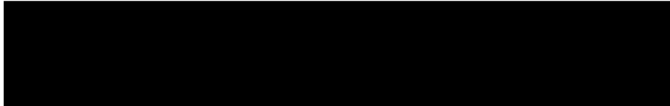
最 終 報 告 書

ジメチルスルフィドのラットを用いた
90日間反復経口投与毒性試験

試験番号： 

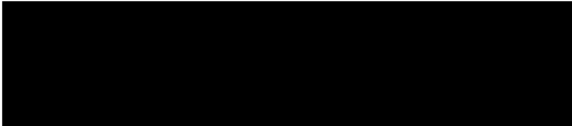
試験期間： 

試験施設



試験委託者

国立医薬品食品衛生研究所





1. 陳述書

試験番号

:



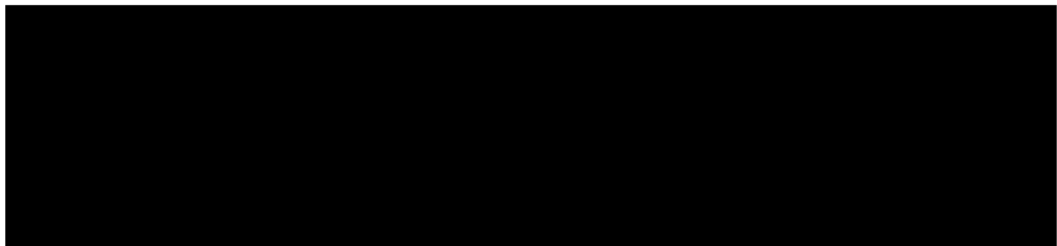
試験表題

:

ジメチルスルフィドのラットを用いた 90 日間反復
経口投与毒性試験

本試験は以下に示す GLP 基準を遵守して実施したものであります。

- 「新規化学物質等に係る試験を実施する試験施設に関する基準」
(平成 23 年 3 月 31 日：薬食発 0331 第 8 号、平成 23・03・29 製局第 6 号、
環保企発第 110331010 号)



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3. 試験実施概要

3.1 試験番号

■■■■■

3.2 試験表題

ジメチルスルフィドのラットを用いた 90 日間反復経口投与毒性試験

3.3 試験目的

被験物質をラットに 91 日間反復経口投与し、明らかな毒性変化を惹起する用量とその変化の内容及び毒性変化の認められない用量を求める。

3.4 試験委託者

国立医薬品食品衛生研究所

■■■■■

担当者： 国立医薬品食品衛生研究所 安全性生物試験研究センター ■■■■■

■■■■■

3.5 試験受託者

■■■■■

3.6 試験実施施設

■■■■■

3.7 試験日程

試験開始日	:	■■■■■
被験物質受領日 ^注	:	■■■■■
被験物質配布日	:	■■■■■
動物入荷日（実験開始日）	:	■■■■■
投与開始日	:	■■■■■
投与終了日	:	■■■■■
投与終了剖検日	:	■■■■■
実験終了日	:	■■■■■
試験終了日	:	■■■■■

^注： 被験物質受領から配布までの期間は、被験物質保存責任者が保存・管理した。

3.8 試験責任者

3.9 試験担当者

被験物質保存責任者 :
試験主担当者 :
臨床検査責任者 :
病理検査責任者 :
化学分析責任者 :
統計解析責任者 :

3.10 試験成績の信頼性に影響を及ぼしたと思われる環境要因

試験計画書では動物試験終了後の被験物質の残余は分析用に小分けした分を除いて供給元に返却すると規定していたが、実際には分析用に小分けした分を含めて供給元に返却した。しかし、動物試験終了後の被験物質の処理に関する逸脱であることから、これが試験成績の信頼性に影響を及ぼすことはないと判断した。

3.11 資料保存

試験計画書原本、記録文書、生データ、報告書類（最終報告書の原本を含む）及び標本（被験物質保存サンプルを含む）はの資料保存施設に保存する。なお、その期間は最終報告書提出後5年間とする。期間終了後の保存については、国立医薬品食品衛生研究所と間で協議し、その処置を決定する。ただし、長期保存に耐えられない生体試料（尿、血漿）については、試験終了後に廃棄する。

3.12 試験責任者の署名又は記名・押印

4. 要約

ジメチルスルフィドをラットに 90 日間反復投与した時の毒性を検討した。投与量は、0（媒体対照群：3 w/v%エタノール含有コーン油）、0（陰性対照群：コーン油）、5、15 及び 50mg/kg/日とし、Sprague-Dawley 系 SPF ラット〔CrI:CD(SD)、10 匹/性/群、投与開始時 6 週齢〕に 91 日間強制経口投与した。

一般状態、体重、摂餌量、眼科学検査、尿検査、血液・血液化学検査、器官重量、剖検及び病理組織学検査のいずれにおいても、雌雄ともに被験物質投与の影響はみられなかった。

以上より、ジメチルスルフィドを 5、15 及び 50 mg/kg/日の用量でラットに 90 日間反復投与した結果、いずれの群にも被験物質投与に起因した変化はみられず、本試験条件下における無毒性量は雌雄とも 50 mg/kg/日と判断した。

5. 緒言

食品添加物である「ジメチルスルフィド」の安全性評価のため、90日間反復経口投与毒性試験を実施したので、その成績を報告する。当試験は国立医薬品食品衛生研究所の依頼により、XXXXXXXXXXで実施した。遵守した基準及び準拠したガイドラインなどは以下の通りである。

1) GLP

- 「新規化学物質等に係る試験を実施する試験施設に関する基準」
(平成 23 年 3 月 31 日：薬食発 0331 第 8 号、平成 23・03・29 製局第 6 号、
環企発第 110331010 号)

2) 毒性試験ガイドライン

- 「食品添加物の指定及び使用基準改正に関する指針について」
(衛化第 29 号：平成 8 年 3 月 22 日付厚生省生活衛生局長通知)

3) 動物の福祉

- 「動物の愛護及び管理に関する法律」
(昭和 48 年 10 月 1 日法律第 105 号)
- 「実験動物の飼養及び保管並びに苦痛の軽減に関する基準」
(平成 18 年 4 月 28 日環境省告示第 88 号)
- 「動物実験の適正な実施に向けたガイドライン」
(日本学術会議、平成 18 年 6 月 1 日)

なお、本試験は、XXXXXXXXXX動物実験委員会の承認を受けて実施した(承認番号：G150353)。

6.2.2 媒体の調製

被験液調製日の被験物質を取り扱う前に、適量のコーン油に最終濃度が 3 w/v%となる量（重量と比重から算出した用量）のエタノールを加えて混和し、さらにコーン油を加えて規定量とした。この一部を媒体対照群用投与液として 1 日必要分ずつ褐色ガラス瓶に分注し、被験液と同じ条件で保存した。残りの媒体は被験液調製に使用した。

6.2.3 被験液の調製

6.2.3.1 調製方法

高用量群液（10 mg/mL 溶液）の調製に必要な量（重量と比重から算出した容量）の被験物質を採取し、コーン油に溶解した後、更にコーン油を加えて規定量とした。中及び低用量群液（3 及び 1 mg/mL 溶液）は、高用量群液を媒体で段階的に希釈して調製した。

6.2.3.2 調製頻度

最大 7 日分を一括して調製し、調製後 7 日以内に使用した。

6.2.3.3 被験液の保存方法

1 日必要分ずつ褐色ガラス瓶に分注し、冷蔵保存した（許容範囲：1°C~10°C、実測値：4°C~8°C）。

6.2.3.4 被験液の安定性

ジメチルスルフィドの 1 及び 10 mg/mL 溶液（媒体：3 w/v%エタノール含有コーン油）は褐色ガラス瓶に入れて冷所（冷蔵庫内、許容範囲：1°C~10°C）8 日後、室温 24 時間保存した時の安定性が、XXXXXXXXXX で確認されている（試験番号：XXXXXXXXXX、Attached Data 1）。

6.2.3.5 被験液の濃度確認

投与 1 週及び 13 週の投与に用いる各濃度の被験液について、その濃度をXXXXXXXXXX XXXXXXXXXX で GC 法を用いて確認した。その結果、表示値に対する割合は 96.1%~106.0%（許容範囲：表示値に対する割合 100 ± 10%以内）であり、許容範囲内であった（Attached Data 2）。分析法の概略を次に示す。

1 濃度当たりの採取本数及び採取量

	:	各濃度 1 本、任意の 1 点から約 10 mL 採取
測定対象物質	:	ジメチルスルフィド
標準物質	:	
名称	:	ジメチルスルフィド
ロット番号	:	XXXXXXXXXX

保存条件 : 冷蔵 (許容範囲 : 1°C~10°C、実測値 : 2°C~8°C)

保存場所 :

測定実測試料の調製 : 各測定試料を n=1 で採取し、以下に示すように測定実測試料を用時調製した。

被験液濃度 (mg/mL)	1次希釈		2次希釈		希釈率
	採取量 (mL)	定容量 (mL)	1次希釈液採取量 (mL)	定容量 (mL)	
1	1	50	-	-	50
3	1	50	10	30	150
10	1	50	1	10	500

溶媒 : エタノール

GC システム

GC : HP6890N (Agilent Technologies Inc.)

インジェクタ : G2613A (Agilent Technologies Inc.)

オートサンプラトレイ

: G2614A (Agilent Technologies Inc.)

データ処理ソフト

: GC ChemStation G2070AJ (Agilent Technologies Inc.)

GC 測定条件

カラム : DB-WAX (0.25 mm I.D.×30 m、膜厚 0.25 μm、Agilent Technologies Inc.)

キャリアガス : He

流量モード : コンスタントフローモード

流量 : 1.0 mL/min

注入口 : スプリット注入口

スプリット比 : 2:1

注入口温度 : 150°C

検出器 : Flame ionization detector (FID)

検出器温度 : 250°C

H₂ 流量 : 45 mL/min

Air 流量 : 450 mL/min

メイクアップガス (N₂) 流量

: 30 mL/min

オープン温度 : 35°C (Hold 3分) → 50°C (10°C/min、Hold 0分) → 120°C (40°C/min、Hold 2.75分)

注入量 : 1 μL

6.3 試験動物種及び系統の選択理由

毒性試験ガイドラインによりげっ歯類を用いた試験が必要とされている。ラットは医薬品などの安全性試験に広く用いられており、この試験に使用される系統のラットは特性がよく知られ、背景資料が豊富であることから選択した。

6.4 試験動物及び群分け

Sprague-Dawley 系 SPF ラット [CrI:CD(SD)、日本チャールス・リバー (株)、厚木飼育センター] 雌雄各 62 匹を 5 週齢で入手し、当所で 9 日間検疫・馴化飼育した。この間、体外表、栄養状態、姿勢、行動及び排泄物などの一般状態の観察 (1 日 1 回) と体重測定 (3 回) を行った。その結果、いずれの動物にも異常はみられなかった。さらに、全例について眼科学検査を実施し、成績評価に悪影響を及ぼす可能性のある異常がみられた動物は群構成から除外した (詳細は 6.10.4 眼科学検査参照)。これらの結果に基づいて、健康と思われる動物を選び、6 週齢で試験に供した。

動物は、体重増加 (検疫初回の体重~群分け時の体重) が順調な個体を群分け日 (投与開始の 2 日前) の体重に基づいて、各群の平均体重ができるだけ均等となるよう各群を構成した。動物の割付けはコンピュータを用いたブロック配置法及び無作為抽出法の組合せ (ブロック配置法で必要な群を構成し、試験群及び群内の個体番号を無作為に割当てた) により行い、雌雄各 50 匹を使用した。投与開始時の体重範囲は、雄で 200~232 g (平均値 215 g)、雌で 148~184 g (平均値 163 g) で平均値 \pm 20%以内であった。

群分け後の余剰動物は、投与 5 日に当試験から除外し、動物管理部門に移管した。

6.5 飼育条件

温度 $23 \pm 3^{\circ}\text{C}$ (実測値: 23°C)、相対湿度 $50 \pm 20\%$ (実測値: 45%~58%)、換気回数 1 時間 10~15 回、照明 1 日 12 時間 (07:00~19:00) の動物飼育室 () で、床敷 (アルファドライ: ALPHA-dri, Shepherd Specialty Papers, Inc.、ロット番号:) を入れたプラスチックケージ (W 440 × D 275 × H 180 mm: 株式会社羽生精密) に同性 2 匹ずつ収容した。固形飼料 CR-LPF (放射線滅菌、オリエンタル酵母工業株式会社、ロット番号:) をステンレス製給餌器用いて、飲料水は 水道水を自動給水装置を用いて自由に摂取させた。なお、環境エンリッチメントとして 7979C.CS certified/irradiated Diamond Twists (Envigo RMS, Inc.、ロット番号:) を毎週 1 回与えた。

6.6 飼料、床敷及び飲料水中の混入物質

飼料中及び床敷中の混入物質に関しては使用ロットについてそれぞれ Eurofins Food and Product Testing 及び N.P Analytical Laboratories で分析を行い、また、飲料水については芝浦セムテック株式会社で水道法に準拠した水質検査を定期的に (年 4

回) 行った。これらの分析報告書を入手し、基準内であることを確認した後、写しを保存した。

6.7 動物の識別

動物は入所時に小動物用耳標を装着して個体識別を行った。群分け後は、試験群、性別及び群内の個体番号が区別できるよう 4 桁の数字を割り当てた（「6.9 投与量及びその設定根拠並びに群構成」の群構成表参照）。各飼育ケージに投与量（群）ごとに色分けしたケージラベルをつけ、試験番号、投与物質名、投与経路、投与量、性、動物番号、耳標番号及び剖検予定日を明記した。また、同一ケージ内の動物の識別を容易にするため、尾に油性インクでマーキングを施し、補助識別とした。

6.8 投与経路、投与期間、投与方法、投与回数及びそれらの選択理由

本被験物質は食品添加物として使用されていることから、毒性試験における投与方法は混餌投与による経口投与が望ましい。しかし、被験物質に不快臭を有する揮発性物質であることから、げっ歯類の毒性試験における一般的な投与方法である強制経口投与を選択した。投与期間は 13 週間（91 日間）とした。投与回数は反復投与試験で一般的に行われている 1 日 1 回（7 回/週）とした。投与容量は 5 mL/kg 体重とし、フレキシブル胃ゾンデを用いて強制経口投与した（8:40~12:20 の間）。媒体対照群には媒体（3 w/v% エタノール含有コーン油）を、陰性対照群にはコーン油を同様に投与した。動物ごとの投与液量は最新の体重に基づいて算出した（表示単位：0.1 mL）。

6.9 投与量及びその設定根拠並びに群構成

本被験物質は不快臭を有する。また、引火性が高く火災・爆発の恐れがあるため重量比で 75% のエタノールを含有した製品として販売されている。予備検討の結果、10 mg/mL 溶液までは作業者が取り扱う上で支障がない臭気であった。また、10 mg/mL 溶液は 30 mg/mL のエタノールを含むことから、これ以上被験液濃度を上げると、被験液中のエタノールが試験成績に影響を及ぼすことが懸念された。この状況を考慮して [REDACTED] で実施したジメチルスルフィドのラットを用いた 14 日間反復経口投与毒性試験（予備試験、試験番号：[REDACTED]、投与量：5、15、50 mg/kg/日）¹⁾において、被験物質投与による重篤な影響はみられなかった。以上より、取扱い可能な最高濃度の被験液を投与した時の用量である 50 mg/kg/日を高用量とし、以下公比約 3 で除して 15 及び 5 mg/kg/日の中及び低用量に設定した。これに媒体対照群及び陰性対照群を加え、計 5 群を設けた。1 群当たりの動物は雌雄各 10 匹とした。群構成表を次に示す。

群構成表

試験群	投与量 (mg/kg/日)	濃度 (mg/mL)	投与容量 (mL/kg/日)	性	動物数	動物番号
媒体対照群 ^{a)}	0	0	5	雄	10	1001~1010
				雌	10	1101~1110
陰性対照群 ^{b)}	0	0	5	雄	10	2001~2010
				雌	10	2101~2110
低用量群	5	1	5	雄	10	3001~3010
				雌	10	3101~3110
中用量群	15	3	5	雄	10	4001~4010
				雌	10	4101~4110
高用量群	50	10	5	雄	10	5001~5010
				雌	10	5101~5110

a) 3 w/v%エタノール含有コーン油を投与

b) コーン油を投与

6.10 観察及び検査の方法

投与期間中、試験群の全動物について次の観察及び検査を行った。試験日の起算については以下の通りである。

投与1日 (Day 1 of administration) : 投与開始日

投与1週 (Week 1 of administration) : 投与1日から投与7日

6.10.1 一般状態の観察

全動物について、体外表、栄養状態、姿勢、行動及び排泄物の異常などの一般状態を毎日3回（投与前、投与直後及び投与1~3時間後、ただし、投与1週の土曜を除く土曜及び休日は投与前と投与直後の2回）観察した。

6.10.2 体重測定

全動物について、投与1週は3回（投与1、4及び7日）、それ以降は3又は4日ごとに毎週2回、測定当日の投与前に体重を測定した（8:37~11:30の間）。剖検日には相対器官重量算出のため、前日から約16時間絶食させた後の体重を測定した。

6.10.3 摂餌量測定

全ケージについて、投与1週は2回（投与1及び7日）、それ以降は毎週1回、測定当日の投与前に摂餌量を測定した（9:03~11:20の間）。投与開始日の測定は前日からの1日量を、投与7日は投与1日からの6日間の累積摂取量を、その後は7日ごとに7日間の累積摂取量をそれぞれ測定当日の投与前に測定し、1匹1日量をケージごとに算出した。

6.10.4 眼科学検査

投与開始前（馴化期間中、投与開始の4日前）には全動物について検査を実施し、

成績評価に悪影響を及ぼす可能性のある異常がみられた動物は群構成から除外した^注。

投与期間中は、投与 13 週（投与 88 日）に各群の雌雄各 5 匹（動物番号の小さい順に選択）について検査当日の投与後に検査を実施した。

前眼部以下の観察に先立って、ミドリン P 点眼液（参天製薬（株）、ロット番号：[REDACTED]）を点眼した後、前眼部、中間透光体及び眼底について倒像検眼鏡（オメガ 200: HEINE Optotechnik GmbH & Co. KG）を用いて検査した。

注： 投与開始前の眼科学検査で異常（虹彩出血、虹彩癒着、瞳孔膜遺残、網膜ひだ、眼底反射性亢進及びコロボーマ）がみられた動物（雄 8 例、雌 5 例）は群構成から除外した。

6.10.5 尿検査

投与 13 週（投与 89~90 日）に検査を実施した。

全動物について、検査当日の投与後にそれぞれ採尿器をセットしたケージに収容し、絶食・自由摂水下で 4 時間尿を、次いで自由摂食・自由摂水下でその後の 20 時間尿を採取し、次に示す項目について検査した。4 時間尿は、pH、タンパク質、ケトン体、グルコース、潜血、ビリルビン、ウロビリノーゲン、比重、色調、沈渣及び尿量に、20 時間尿は尿量及び電解質濃度測定に使用した。なお、尿沈渣は 4 時間尿を遠心分離（設定：1,500 rpm、5 分間）して得られた沈渣物を未固定、未染色の条件で鏡検した。24 時間尿量は、4 時間尿と 20 時間尿を合計して算出した。電解質については、1 日排泄量を濃度と 24 時間尿量から算出した。

尿検査の項目、測定法及び使用機器など

検査項目	測定方法
pH	マルティスティックス SG 試験紙 ^{a)}
タンパク質	マルティスティックス SG 試験紙 ^{a)}
ケトン体	マルティスティックス SG 試験紙 ^{a)}
グルコース	マルティスティックス SG 試験紙 ^{a)}
潜血	マルティスティックス SG 試験紙 ^{a)}
ビリルビン	マルティスティックス SG 試験紙 ^{a)}
ウロビリノーゲン	マルティスティックス SG 試験紙 ^{a)}
比重	マルティスティックス SG 試験紙 ^{a)}
色調	肉眼観察
沈渣	鏡検法
尿量（24 時間）	容量測定（単位：mL/24h）
ナトリウム	イオン選択電極法 ^{b)} （単位：mmol/24h）
カリウム	イオン選択電極法 ^{b)} （単位：mmol/24h）
塩素	イオン選択電極法 ^{b)} （単位：mmol/24h）

使用測定機器
a)：尿自動分析装置 クリニテック 500（Siemens Healthcare Diagnostics Inc.）
b)：臨床化学自動分析装置 TBA-120FR 形（東芝メディカルシステムズ（株））

6.10.6 血液学検査

投与期間終了の翌日の計画剖検時に、前日から一夜（約 16~21 時間）絶食させた全動物についてイソフルラン麻酔下に開腹し、腹大動脈から EDTA-2K 加採血瓶

(SB-41：シスメックス(株))に血液(約1 mL)を採取した。得られた血液について次に示す項目 1)について検査した。また、血液(0.9 mL)を3.8%クエン酸ナトリウム溶液加試験管(血液9容に対し1容の割合)に採取し、遠心分離(設定:3,100 rpm、1,690×g、12分間)して得られた血漿について次に示す項目 2)について検査した。なお、鏡検による確認に備え、全例について May-Grünwald-Giemsa 染色法による血液塗抹標本を作製した(観察は実施しなかった)。

血液学検査の項目、測定法及び使用機器など

1) EDTA-2K 加血液についての検査		
検査項目	測定方法	単位
赤血球数 (RBC)	2 角度レーザーフローサイトメトリー法 ^{a)}	10 ⁴ (E4)/μL
ヘモグロビン量 (HGB)	シアンメトヘモグロビン変法 ^{a)}	g/dL
ヘマトクリット値 (HCT)	赤血球数及び平均赤血球容積から算出 ^{a)}	%
平均赤血球容積 (MCV)	2 角度レーザーフローサイトメトリー法 ^{a)}	fL
平均赤血球血色素量 (MCH)	赤血球数及びヘモグロビン量から算出 ^{a)}	pg
平均赤血球血色素濃度 (MCHC)	ヘモグロビン量及びヘマトクリット値から算出 ^{a)}	g/dL
網赤血球数 (Retic)	RNA 染色によるレーザーフローサイトメトリー法で求めた網赤血球率及び赤血球数から算出 ^{a)}	10 ⁹ (E9)/L
血小板数 (PLT)	2 角度レーザーフローサイトメトリー法 ^{a)}	10 ⁴ (E4)/μL
白血球数 (WBC)	2 角度レーザーフローサイトメトリー法 ^{a)}	10 ² (E2)/μL
白血球分類 ^注	ペルオキシダーゼ染色によるフローサイトメトリー法 +2 角度レーザーフローサイトメトリー法で求めた百分率及び白血球数から算出 ^{a)}	10 ² (E2)/μL
2) クエン酸ナトリウム加血液から分離した血漿についての検査		
検査項目	測定方法	単位
プロトロンビン時間 (PT)	クロット法 ^{b)}	s
活性化部分トロンボプラスチン時間 (APTT)	クロット法 ^{b)}	s
フィブリノゲン量 (FIB)	トロンボプラスチン法 ^{b)}	mg/dL
使用測定機器		
a) : 総合血液学検査装置 アドヴィア 120 (Siemens Healthcare Diagnostics Inc.)		
b) : 血液凝固自動分析装置 ACL Elite Pro (Instrumentation Laboratory)		

注： リンパ球 (LYMP)、好中球 (NEUT)、好酸球 (EOS)、好塩基球 (BASO)、単球 (MONO) 及び大型非染色球 (LUC)

6.10.7 血液化学検査

血液学検査用試料と同時に採取した血液(約4 mL)をヘパリン加試験管(ベノジエクト II ヘパリンナトリウム、5 mL 採血用：テルモ(株))に取り、遠心分離(設定:3,100 rpm、1,690×g、12分間)した。得られた上清を同じ条件で更に遠心して得られた血漿を用いて次に示す項目について検査した。

血液化学検査の項目、測定法及び使用機器など

検査項目	測定方法	単位
AST	UV-rate 法 ^{a)}	IU/L
ALT	UV-rate 法 ^{a)}	IU/L
LDH	UV-rate 法 ^{a)}	IU/L
γ-GTP	L-γ-グルタミル-3-カルボキシ-4-ニトロアニリド法 ^{a)}	IU/L
ALP	Bessey-Lowry 法 ^{a)}	IU/L
骨 ALP (BALP) 注	Bessey-Lowry 法 ^{a)}	IU/L
肝 ALP (LALP) 注	Bessey-Lowry 法 ^{a)}	IU/L
小腸 ALP (IALP) 注	Bessey-Lowry 法 ^{a)}	IU/L
総コレステロール (T-CHO)	CEH-COD-POD 法 ^{a)}	mg/dL
トリグリセライド (TG)	LPL-GK-GPO-POD 法 ^{a)}	mg/dL
リン脂質 (PL)	PLD-ChOD-POD 法 ^{a)}	mg/dL
総ビリルビン (T-BIL)	ビリルビンオキシダーゼ法 ^{a)}	mg/dL
グルコース (GLU)	グルコースデヒドロゲナーゼ法 ^{a)}	mg/dL
尿素窒素 (BUN)	Urease-LEDH 法 ^{a)}	mg/dL
クレアチニン (CRNN)	Creatininase-creatinase-sarcosine oxidase-POD 法 ^{a)}	mg/dL
ナトリウム (Na)	イオン選択電極法 ^{a)}	mmol/L
カリウム (K)	イオン選択電極法 ^{a)}	mmol/L
塩素 (Cl)	イオン選択電極法 ^{a)}	mmol/L
カルシウム (Ca)	OCPC 法 ^{a)}	mg/dL
無機リン (P)	PNP-XOD-POD 法 ^{a)}	mg/dL
総タンパク質 (TP)	Biuret 法 ^{a)}	g/dL
アルブミン (ALB)	BCG 法 ^{a)}	g/dL
A/G 比 (A/G)	総タンパク質及びアルブミンから算出	
使用測定機器		
a) : 臨床化学自動分析装置 TBA-120FR 形 (東芝メディカルシステムズ (株))		

注 : 媒体対照群及び高用量群の雌雄全例について実施した (引用文献 : Hoffmann WE, Everds N, Pignatello M, Solter PF, Automated and semiautomated analysis of rat alkaline phosphatase isoenzymes. Toxicol Pathol. 1994;22:633-8.)。

6.10.8 病理学検査

6.10.8.1 剖検

全ての計画剖検動物について、イソフルラン麻酔下で採血した後、腹大動脈切断により放血致死させた。次いで体外表・頭部・胸部・腹部を含む全身の器官・組織の肉眼による詳細な観察 (病理解剖) を行った。

6.10.8.2 器官重量測定

全ての計画剖検動物について、次に示す器官の重量 (絶対重量) を測定するとともに、絶対重量と剖検時の体重から体重 100 g 当たりの相対重量を算出した。なお、*印を付した両側性の器官については左右別々に測定し、その合計値で評価した。

脳、下垂体、甲状腺 (上皮小体を含む) *、副腎*、胸腺、脾臓、心臓、肺 (気管支を含む)、唾液腺 (顎下腺及び舌下腺) *、肝臓、腎臓*、精巣*、卵巣*、子宮、前立腺及び精囊

6.10.8.3 病理組織学検査

全動物から以下に示す全器官/組織を摘出し、リン酸緩衝 10%ホルマリン液で固定した。ただし、眼球、視神経は 3%グルタルアルデヒド・2.5%ホルマリン液で、また、精巢及び精巢上部はブアン液でそれぞれ固定したのち、リン酸緩衝 10%ホルマリン液に保存した。全動物の全器官/組織をパラフィン包埋後切片とし、H・E 染色標本を作製した。このうち、媒体対照群、陰性対照群及び高用量群の全ての器官/組織について鏡検した。その結果、高用量群で被験物質投与の影響が疑われた器官/組織はなかったため、低及び中用量群は鏡検しなかった。なお、*で示した両側性器官については両側を摘出したが、鏡検は片側のみ行った。

大脳、小脳、脊髄（胸部）、坐骨神経*、眼球*、視神経*、ハーダー腺*、下垂体、甲状腺*、上皮小体*、副腎*、胸腺、脾臓、顎下リンパ節、腸間膜リンパ節、心臓、胸大動脈、気管、肺（気管支を含む）、舌、食道、胃、十二指腸、空腸、回腸（パイエル板を含む）、盲腸、結腸、直腸、顎下腺*、舌下腺*、肝臓、膵臓、腎臓*、膀胱、精巢*、精巢上部*、前立腺、精囊*、卵巣*、子宮*、膣、卵管*、乳腺（鼠径部）*、胸骨（骨髄を含む）、大腿骨（骨髄を含む）*、大腿部骨格筋*、皮膚（鼠径部）*、鼻腔、ジンバル腺*

他に、喉頭及び個体識別部位（耳標を装着した耳介）を保存した。

6.11 データ採取に使用したコンピュータシステム

MiTOX-BOZO システム（Version 7.6.1、三井造船システム技研(株)）

Pathos5 システム（Version 5, Pathology Operating Systems Ltd.）

6.12 統計解析

体重、摂餌量、尿検査の定量的項目、血液学検査、血液化学検査（骨 ALP、肝 ALP、小腸 ALP を除く）及び器官重量データについて、媒体対照群と被験物質投与群との間で統計解析を行った。まず、Bartlett 法²⁾により分散性の検定を行った（有意水準：1%）。分散が等しい場合は Dunnett 法^{3),4)}を用いて、不等分散の場合は Steel の検定⁵⁾を用いて、媒体対照群と被験物質投与群との間で検定を行った（有意水準：5 及び 1%、両側）。さらに、媒体対照群と陰性対照群の間並びに骨 ALP、肝 ALP 及び小腸 ALP については F 検定²⁾により分散性の検定を行い（有意水準：5%）、分散が等しい場合は Student の t 検定²⁾を用いて、不当分散の場合は Aspin-Welch の t 検定²⁾を用いて検定を行った（有意水準：5 及び 1%、両側）。検定には、統計パッケージ SAS Release Ver. 9.1.3（SAS Institute Inc.）を使用した。

7. 試験結果

7.1 一般状態

成績を Table 1-1 及び 1-2 並びに Appendix 1-1~1-10 に示す。

投与期間を通じて、雌雄いずれの投与群にも死亡はなく、被験物質投与に起因すると考えられる異常はみられなかった。

なお、切歯破損が 50 mg/kg 投与群の雄 1 例で投与 8~9 週にみられたが、当該系統のラットで時折見られる変化であり、その発生状況からも偶発性の変化と判断した。

7.2 体重

成績を Fig. 1-1 及び 1-2、Table 2-1~2-6 並びに Appendix 2-1~2-20 に示す。

各投与群の体重は、雌雄ともに媒体対照群と同様に推移した。

7.3 摂餌量

成績を Fig. 2-1 及び 2-2、Table 3-1~3-4 並びに Appendix 3-1~3-10 に示す。

各投与群の摂餌量は、雌雄ともに媒体対照群と同様に推移した。

なお、陰性対照群の雄の摂餌量は投与 28 日から 63 日のほとんどの測定時点で有意な高値を示したが、投与液の違い（3 w/v%エタノール含有コーン油とコーン油）による差と考えられ、特記すべき変化ではないと判断した。

7.4 眼科学検査

成績を Table 4-1 及び 4-2 並びに Appendix 4-1~4-10 に示す。

雌雄いずれの投与群においても、被験物質投与に起因すると考えられる異常所見はみられなかった。

なお、15 mg/kg 投与群の雄 1 例で限局性の眼底反射性亢進がみられたが、同週齢の SD ラットで自然発生性に認められる所見であることから、偶発性の変化と判断した。

7.5 尿検査

成績を Table 5-1~5-18 及び Appendix 5-1~5-30 に示す。また、その総括を次の表 1 に示す。

表 1. 尿検査の総括

性	雄					雌				
	0 ^{a)}	0 ^{b)}	5	15	50	0 ^{a)}	0 ^{b)}	5	15	50
投与量 (mg/kg/日)										
動物数	10	10	10	10	10	10	10	10	10	10
尿量 (mL/24h)	7.4	8.2	11.3	8.7	9.0	5.7	4.9	6.6	10.3	9.8* (+72%)
カリウム排泄量 (mmol/24h)	2.8	2.9	3.2	3.2	3.0	1.8	1.4	1.5	1.9	2.4* (+33%)

表中の値は群平均、括弧内の値は媒体対照群平均に対する増減率 (+: 増加)

a): 3 w/v%エタノール含有コーン油 (媒体) を投与

b): コーン油を投与

*: $p < 0.05$ (媒体対照群と比べて有意差あり)

いずれの項目においても、5 及び 15 mg/kg 投与群の雌雄と媒体対照群の間で差はみられなかった。

50 mg/kg 投与群では、尿量とカリウムの 1 日排泄量の有意な増加が雌にみられた。しかし、いずれも軽度な変化であり、血中の電解質バランスには変化がないことから特記すべき変化ではないと判断した。

他に、陰性対照群の雌で塩素の 1 日排泄量の有意な減少がみられたが、投与液の違い (3 w/v%エタノール含有コーン油とコーン油) による差と考えられ、特記すべき変化ではないと判断した。

7.6 血液学検査

成績を Table 6-1~6-6 及び Appendix 6-1~6-20 に示す。

いずれの項目においても、雌雄の各投与群と媒体対照群の間で差はみられなかった。

なお、陰性対照群において平均赤血球容積の有意な増加が雄に、網赤血球数の有意な減少が雌にみられたが、投与液の違い (3 w/v%エタノール含有コーン油とコーン油) による差と考えられ、特記すべき変化ではないと判断した。

7.7 血液化学検査

成績を Table 7-1~7-6 及び Appendix 7-1~7-30 に示す。

いずれの項目においても、雌雄ともに被験物質投与によると考えられる変化はみられなかった。

なお、カルシウムの有意な減少が 5 mg/kg 投与群の雌にみられたが、用量に応じた変化ではないことから偶発性の変化と判断した。また、陰性対照群においてリン脂質の有意な減少と尿素窒素の有意な増加が雄に、ALT 活性の有意な増加が雌にみられたが、投与液の違い (3 w/v%エタノール含有コーン油とコーン油) による差と考えられ、

特記すべき変化ではないと判断した。

7.8 器官重量

成績を Table 8-1~8-4 (絶対重量) 及び Table 9-1~9-4 (相対重量)、Appendix 8-1~8-30 (絶対重量) 及び Appendix 9-1~9-30 (相対重量) に示す。

いずれの項目においても、雌雄の各投与群と媒体対照群の間で差はみられなかった。

なお、陰性対照群において唾液線の絶対重量の有意な増加が雄に、卵巣の絶対重量の有意な減少が雌にみられたが、投与液の違い (3 w/v% エタノール含有コーン油とコーン油) による差と考えられ、特記すべき変化ではないと判断した。

7.9 剖検

成績を Table 10-1 及び 10-2 並びに Appendix 10-1~10-100 に示した。

被験物質投与に起因する変化はみられなかった。

なお、以下の所見がみられたが、その病理学的性状及び発現状況からいずれも偶発所見と考えられた。

- 腎臓 : のう胞 (片側性) が 50 mg/kg 投与群の雌 1 例にみられた。
- 脾臓 : のう胞が陰性対照群の雄 1 例にみられた。
- 胃 : 腺胃の暗赤色巣が媒体対照群の雄 1 例と雌 2 例、陰性対照群の雄 2 例と雌 1 例、5 mg/kg 投与群の雄 2 例と雌 1 例、15 mg/kg 投与群の雄 4 例及び 50 mg/kg 投与群の雌雄各 1 例にみられた。

7.10 病理組織学検査

成績を Table 11-1~11-8 及び Appendix 10-1~10-100 に示す。

被験物質投与に起因する変化はみられなかった。

なお、Table 及び Appendix に示した所見は、出現状況及び病理組織学的性状からいずれも偶発所見と判断した。

8. 考察

ジメチルスルフィドをラットに 90 日間反復投与した時の毒性を検討した。投与量は、0 (媒体対照群：3 w/v%エタノール含有コーン油)、0 (陰性対照群：コーン油)、5、15 及び 50 mg/kg/日とし、Sprague-Dawley 系 SPF ラット [CrI:CD(SD)、10 匹/性/群、投与開始時 6 週齢] に 91 日間強制経口投与した。

投与期間を通じて雌雄いずれの群にも死亡及び被験物質投与に起因すると考えられる一般状態の異常はみられなかった。また、体重、摂餌量、眼科学検査、尿検査、血液・血液化学検査、器官重量、剖検及び病理組織学検査においても雌雄ともに被験物質投与に起因すると考えられる変化はみられなかった。

以上より、ジメチルスルフィドを 5、15 及び 50 mg/kg/日の用量でラットに 90 日間反復投与した結果、いずれの群にも被験物質投与に起因した変化はみられず、本試験条件下における無毒性量は雌雄とも 50 mg/kg/日と判断した。

9. 文献

- 1) ジメチルスルフィドのラットを用いた 14 日間反復経口投与毒性試験 (予備試験) ([REDACTED]、試験番号： [REDACTED]、2015 年)
- 2) Snedecor GW, Cochran WG. Statistical methods. 8th ed. Ames: Iowa State University Press; 1989.
- 3) Dunnett CW. A multiple comparison procedure for comparing several treatments with a control. J Am Stat Assoc 1955; 50: 1096-121.
- 4) Dunnett, CW. New tables for multiple comparisons with a control. Biometrics 1964; 20: 482-91.
- 5) Steel RGD. A multiple comparison rank sum test: Treatments versus control. Biometrics 1959; 15: 560-72.

試験番号： [REDACTED]

試験成績書
(被験液中ジメチルスルフィドの安定性)

被験物質 : ジメチルスルフィド (ロット番号: [REDACTED])
媒体 : 3 w/v%エタノール含有コーン油
形態 : 溶液
測定対象物質 : ジメチルスルフィド

保存条件 : 褐色ガラス瓶に入れ、室温保存又は冷所 (冷蔵庫内、
許容値: 1~10°C) で保存した後に室温保存
保存期間 : 室温 24 時間保存
冷所で 8 日間保存した後、室温 24 時間保存

評価基準
安定性 : 残存率 {調製日の測定濃度の平均値 (100) に対する
保存後の測定濃度の平均値の割合} が 100.0±10.0%以
内。

結果 :

調製濃度 (mg/mL)	測定濃度 (mg/mL)		
	調製日	室温 24 時間保存後	冷所 8 日間+ 室温 24 時間保存後
1.00	1.07	1.11	1.03
	1.02	1.10	1.02
	1.04	1.11	1.04
平均値	1.04	1.11	1.03
残存率 (%)	100	106.7	99.0
10.0	10.1	11.1	10.3
	10.5	11.2	10.2
	10.6	11.1	9.93
平均値	10.4	11.1	10.1
残存率 (%)	100	106.7	97.1

判定 : 適

基準 : 「新規化学物質等に係る試験を実施する試験施設に関
する基準」 (平成 23 年 3 月 31 日: 薬食発 0331 第 8
号、平成 23・03・29 製局第 6 号、環保企発第 110331010
号)

分析結果

試験番号 : [REDACTED]
測定項目 : 濃度
ステージ : 投与 1 週
分析日 : [REDACTED]

測定試料

被験物質 : ジメチルスルフィド (Lot No. ; [REDACTED])
形態 (媒体) : 溶液 (3 w/v%エタノール含有コーン油)
調製日 : [REDACTED]

測定対象物質 : ジメチルスルフィド

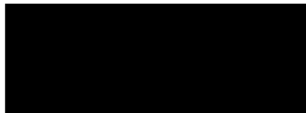
評価基準

濃度 : 表示値に対する割合 ; 100±10%



結果 :

表示値 (mg/mL)	測定濃度 (mg/mL)	表示値に対する割合 (%)
1	0.961	96.1
3	3.04	101.3
10	10.1	101.0



判定 : 適



分析結果

試験番号 : 
測定項目 : 濃度
ステージ : 投与 13 週
分析日 : 

測定試料

被験物質 : ジメチルスルフィド (Lot No. ; 
形態 (媒体) : 溶液 (3 w/v%エタノール含有コーン油)
調製日 : 

測定対象物質 : ジメチルスルフィド

評価基準

濃度 : 表示値に対する割合 ; 100±10%

結果 :

表示値 (mg/mL)	測定濃度 (mg/mL)	表示値に対する割合 (%)
1	0.977	97.7
3	2.99	99.7
10	10.6	106.0

判定 : 適

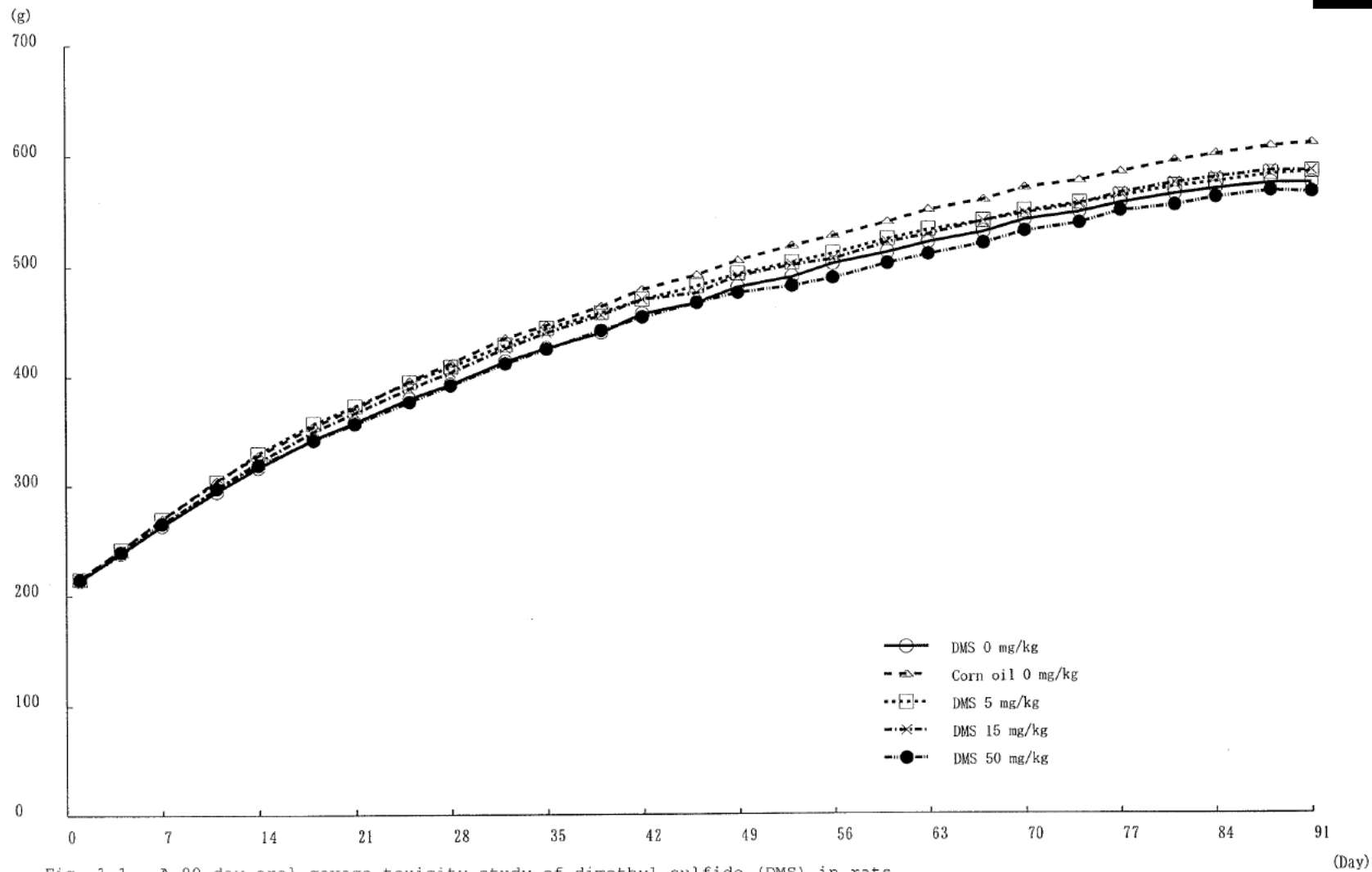


Fig. 1-1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Body weight - Male

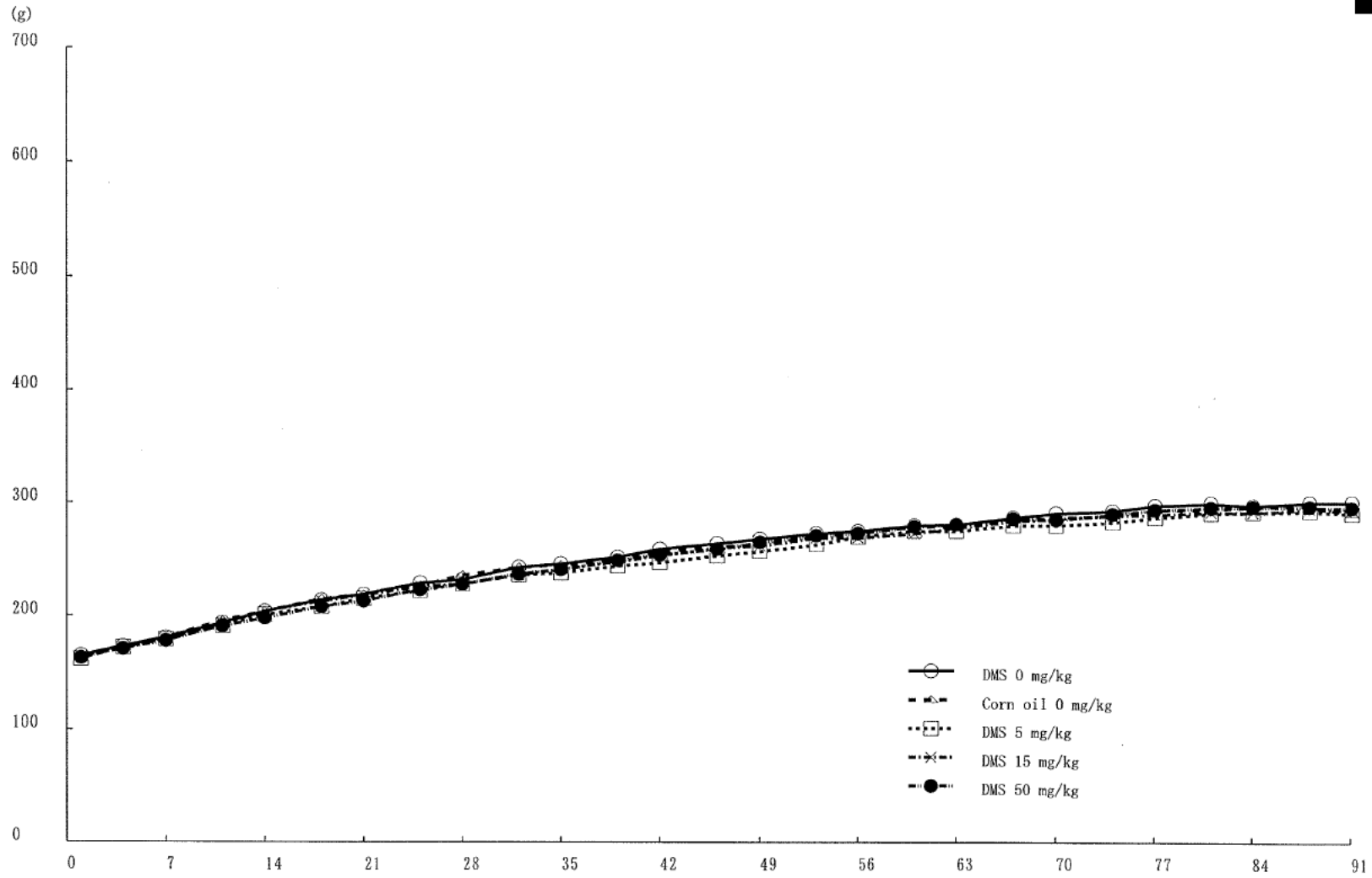


Fig. 1-2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

(Day)

Body weight - Female

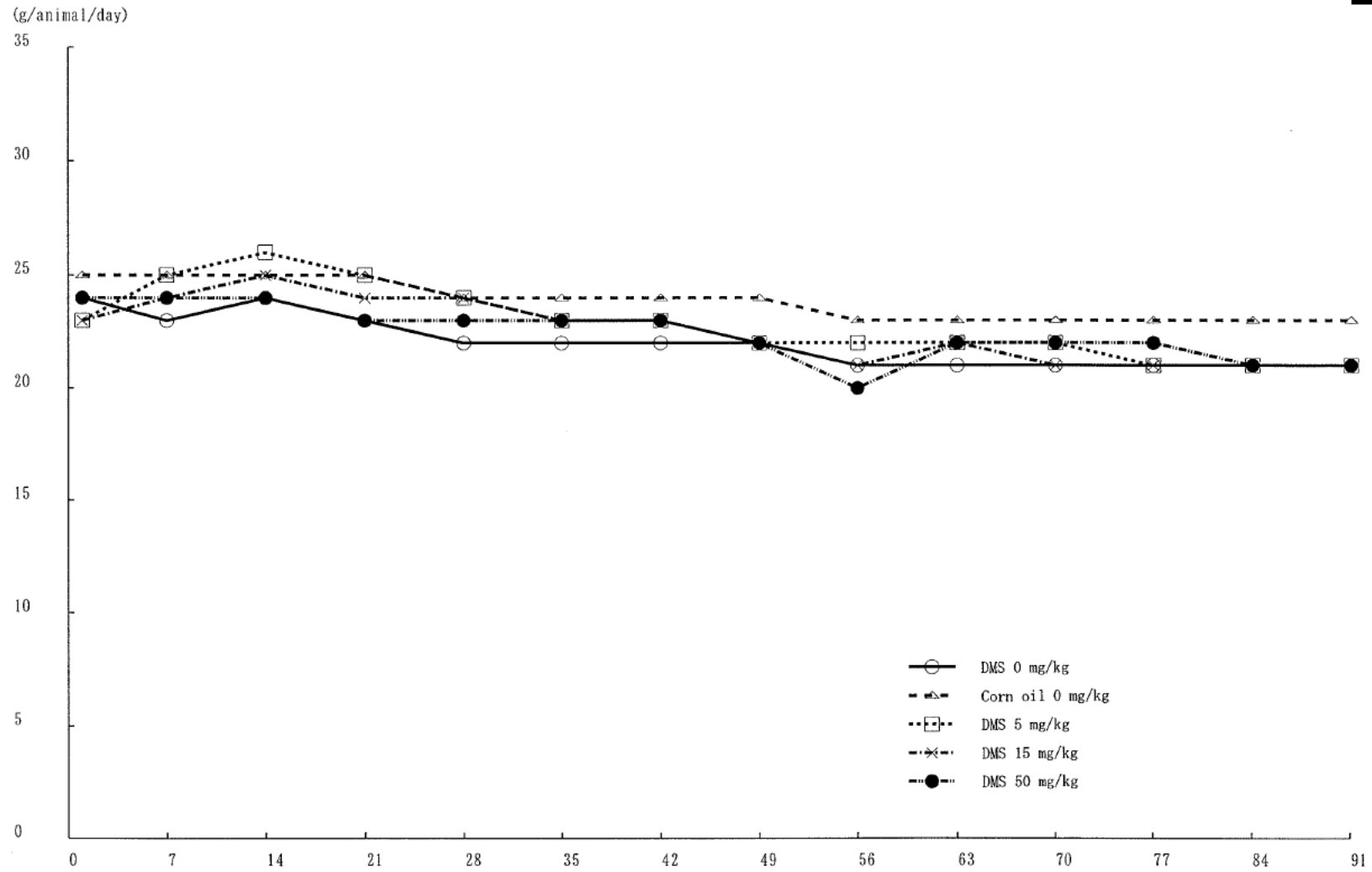


Fig. 2-1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

(Day)

Food consumption - Male

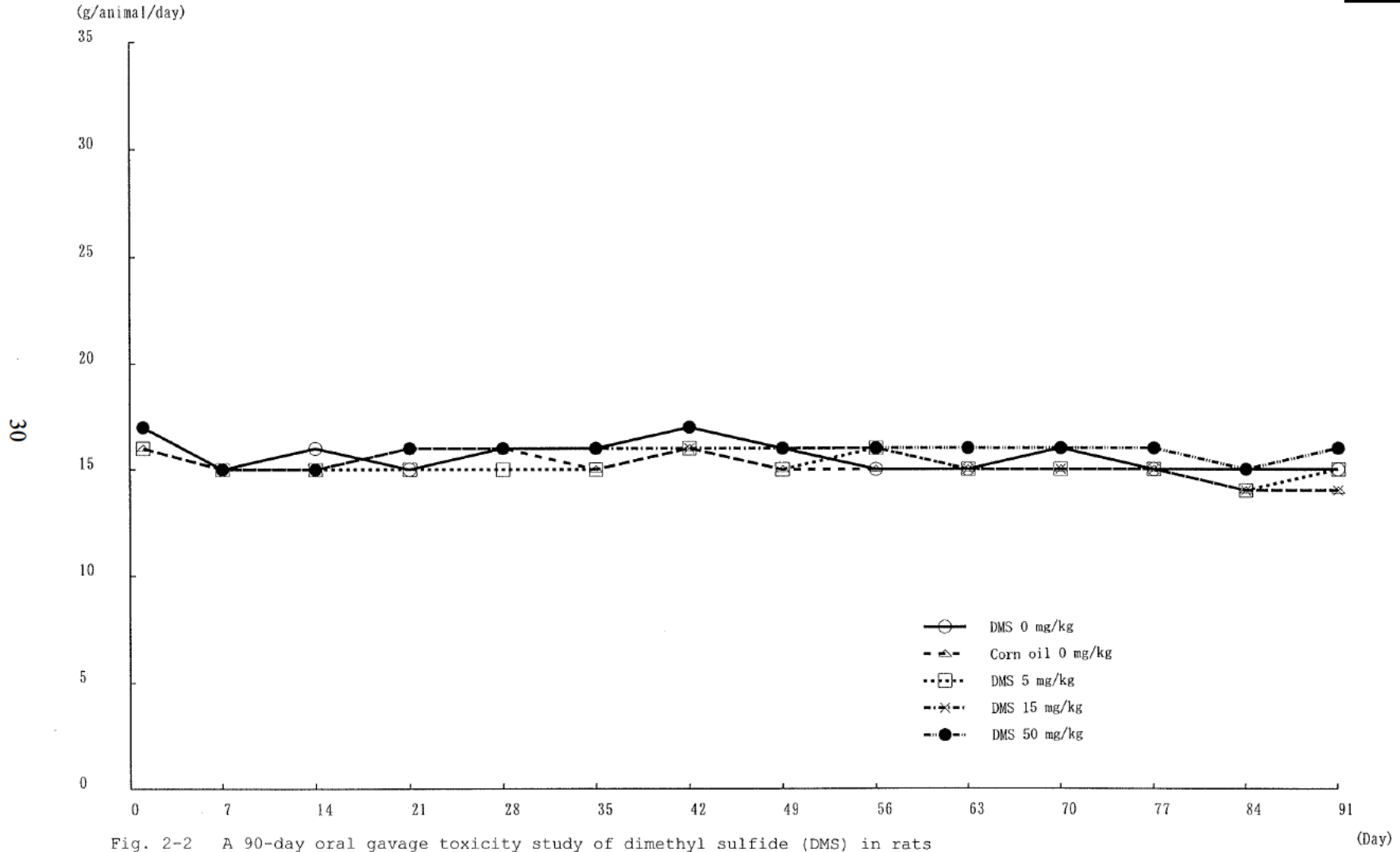


Fig. 2-2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Food consumption - Female

Table 1-1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Clinical signs
Male

Dose mg/kg/day	Findings	Week of administration													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14a)
DMS	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
0	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Corn oil	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
0	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10
DMS	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
5	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10
DMS	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
15	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10
DMS	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
50	No abnormal findings	10	10	10	10	10	10	10	9	9	10	10	10	10	10
	Fracture, incisors	0	0	0	0	0	0	0	1	1	0	0	0	0	0

a):Clinical signs on the day of necropsy

Table 1-2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Clinical signs
Female

Dose mg/kg/day	Findings	Week of administration													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14a)
DMS	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
0	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Corn oil	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
0	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10
DMS	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
5	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10
DMS	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
15	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10
DMS	n	10	10	10	10	10	10	10	10	10	10	10	10	10	10
50	No abnormal findings	10	10	10	10	10	10	10	10	10	10	10	10	10	10

a):Clinical signs on the day of necropsy

Table 2 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Body weight
Sex : Male

Unit : g

Test Article	Day	1	4	7	11	14	18	21	25	28
DMS 0 mg/kg	Mean	214	239	264	295	317	343	358	380	393
	S.D.	8	9	10	11	13	15	17	21	22
	n	10	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	216	242	270	305	328	355	371	396	412
	S.D.	8	9	12	17	21	26	29	30	33
	n	10	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	215	242	270	304	330	357	373	395	409
	S.D.	8	10	11	13	15	17	20	26	29
	n	10	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	215	238	265	298	322	350	367	389	404
	S.D.	10	12	16	20	23	27	29	32	34
	n	10	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	215	240	266	298	319	342	357	377	392
	S.D.	9	12	17	24	30	35	37	42	44
	n	10	10	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 2 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Body weight
Sex : Male

Unit : g

Test Article	Day	32	35	39	42	46	49	53	56	60
DMS 0 mg/kg	Mean	414	426	440	457	467	481	490	502	512
	S.D.	22	24	27	26	27	29	30	31	30
	n	10	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	435	447	464	479	492	505	518	527	539
	S.D.	36	37	39	42	43	44	44	47	48
	n	10	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	429	444	458	470	482	493	503	511	524
	S.D.	34	35	39	40	44	46	49	51	52
	n	10	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	426	440	456	470	476	491	501	506	521
	S.D.	36	38	41	43	47	46	47	47	49
	n	10	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	412	425	442	454	467	476	482	489	502
	S.D.	47	49	52	54	55	56	61	63	62
	n	10	10	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 2 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Body weight
Sex : Male

Unit : g

Test Article	Day	63	67	70	74	77	81	84	88	91
DMS 0 mg/kg	Mean	521	530	541	548	556	564	569	574	574
	S.D.	31	31	32	33	32	34	33	34	34
	n	10	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	550	559	570	576	584	594	600	607	610
	S.D.	53	54	56	58	57	60	62	64	63
	n	10	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	532	540	549	556	562	571	575	582	584
	S.D.	53	53	55	56	55	59	61	62	62
	n	10	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	528	540	547	555	565	574	579	585	585
	S.D.	50	52	53	54	57	58	61	62	63
	n	10	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	510	520	531	538	549	554	561	567	566
	S.D.	61	62	64	63	62	63	62	63	63
	n	10	10	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 2 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Body weight
Sex : Female

Unit : g

Test Article	Day	1	4	7	11	14	18	21	25	28
Dose										
DMS 0 mg/kg	Mean	165	173	181	194	204	214	219	229	232
	S.D.	8	9	10	13	17	19	19	20	20
	n	10	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	162	172	181	196	204	215	219	227	236
	S.D.	7	10	13	15	16	17	15	18	22
	n	10	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	162	172	179	191	201	208	215	222	228
	S.D.	11	11	12	13	13	15	16	19	20
	n	10	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	164	171	179	193	204	213	218	226	228
	S.D.	9	10	11	12	14	15	16	17	19
	n	10	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	163	171	178	191	198	208	213	223	228
	S.D.	9	9	11	11	13	14	14	18	19
	n	10	10	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 2 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Body weight
Sex : Female

Unit : g

Test Article	Day	32	35	39	42	46	49	53	56	60
DMS 0 mg/kg	Mean	243	246	252	259	264	268	273	275	280
	S.D.	22	23	23	26	28	26	27	27	27
	n	10	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	243	245	249	257	261	264	270	274	279
	S.D.	22	26	28	26	26	23	26	28	27
	n	10	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	236	238	244	247	253	257	263	270	275
	S.D.	22	23	25	25	26	27	29	30	30
	n	10	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	236	241	248	253	260	262	269	269	273
	S.D.	20	17	16	17	18	17	17	22	20
	n	10	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	237	241	249	254	259	265	271	273	279
	S.D.	19	21	24	26	25	27	27	27	29
	n	10	10	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 2 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Body weight
Sex : Female

Unit : g

Test Article	Day	63	67	70	74	77	81	84	88	91
DMS 0 mg/kg	Mean	281	287	291	293	298	300	298	301	301
	S.D.	28	28	33	32	29	31	30	31	32
	n	10	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	279	285	287	289	294	295	297	298	291
	S.D.	29	28	24	25	27	27	27	28	27
	n	10	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	275	280	280	283	287	291	292	293	291
	S.D.	32	31	31	32	33	32	33	34	36
	n	10	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	278	284	286	289	290	292	292	295	294
	S.D.	18	18	19	19	22	22	22	20	16
	n	10	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	281	286	285	290	294	296	297	297	296
	S.D.	31	32	33	31	31	32	30	28	33
	n	10	10	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 3 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Food consumption
Sex : Male

Unit : g/animal/day

Test Article	Day	1	7	14	21	28	35	42	49	56
DMS 0 mg/kg	Mean	24	23	24	23	22	22	22	22	21
	S.D.	1	1	1	1	1	1	1	1	1
	n	5	5	5	5	5	5	5	5	5
Corn oil 0 mg/kg	Mean	25	25	25	25	24 T2*	24 T2*	24 T2*	24	23 T2*
	S.D.	2	2	2	2	1	1	2	2	2
	n	5	5	5	5	5	5	5	5	5
DMS 5 mg/kg	Mean	23	25	26	25	24	23	23	22	22
	S.D.	2	1	1	1	1	1	1	2	2
	n	5	5	5	5	5	5	5	5	5
DMS 15 mg/kg	Mean	23	24	25	24	24	23	23	22	21
	S.D.	0	1	1	1	1	2	1	2	1
	n	5	5	5	5	5	5	5	5	5
DMS 50 mg/kg	Mean	24	24	24	23	23	23	23	22	20
	S.D.	1	2	3	3	2	2	2	1	5
	n	5	5	5	5	5	5	5	5	5

Significantly different from control : * P<0.05
T2:t Test Two-Side

Table 3 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Food consumption
Sex : Male

Unit : g/animal/day

Test Article	Day	63	70	77	84	91
DMS	Mean	21	21	21	21	21
0 mg/kg	S.D.	1	1	1	1	1
	n	5	5	5	5	5
Corn oil	Mean	23 T2*	23	23	23	23
0 mg/kg	S.D.	2	2	3	3	2
	n	5	5	5	5	5
DMS	Mean	22	22	21	21	21
5 mg/kg	S.D.	2	2	2	1	2
	n	5	5	5	5	5
DMS	Mean	22	21	21	21	21
15 mg/kg	S.D.	1	2	1	2	1
	n	5	5	5	5	5
DMS	Mean	22	22	22	21	21
50 mg/kg	S.D.	1	2	1	1	1
	n	5	5	5	5	5

Significantly different from control : * P<0.05
T2:t Test Two-Side

Table 3 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Food consumption
Sex : Female

Unit : g/animal/day

Test Article	Day	1	7	14	21	28	35	42	49	56
DMS 0 mg/kg	Mean	17	15	16	15	16	16	17	16	15
	S.D.	2	1	1	1	2	2	1	1	1
	n	5	5	5	5	5	5	5	5	5
Corn oil 0 mg/kg	Mean	16	15	15	16	16	15	16	15	15
	S.D.	1	1	1	1	1	1	1	1	1
	n	5	5	5	5	5	5	5	5	5
DMS 5 mg/kg	Mean	16	15	15	15	15	15	16	15	16
	S.D.	2	1	1	2	1	1	1	1	1
	n	5	5	5	5	5	5	5	5	5
DMS 15 mg/kg	Mean	17	15	15	16	16	16	16	16	16
	S.D.	2	1	1	1	1	1	1	1	1
	n	5	5	5	5	5	5	5	5	5
DMS 50 mg/kg	Mean	17	15	15	16	16	16	17	16	16
	S.D.	1	1	1	1	1	2	1	1	1
	n	5	5	5	5	5	5	5	5	5

No significant difference in any treated groups from control group.

Table 3 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Food consumption
Sex : Female

Unit : g/animal/day

Test Article	Day	63	70	77	84	91
DMS	Mean	15	16	15	15	15
0 mg/kg	S.D.	1	1	1	1	2
	n	5	5	5	5	5
Corn oil	Mean	15	15	15	14	14
0 mg/kg	S.D.	1	1	1	1	1
	n	5	5	5	5	5
DMS	Mean	15	15	15	14	15
5 mg/kg	S.D.	1	1	2	1	2
	n	5	5	5	5	5
DMS	Mean	15	15	15	14	14
15 mg/kg	S.D.	2	1	1	1	1
	n	5	5	5	5	5
DMS	Mean	16	16	16	15	16
50 mg/kg	S.D.	1	1	2	1	1
	n	5	5	5	5	5

No significant difference in any treated groups from control group.

Table 4 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Ophthalmology (Week 13)
Sex : Male

Findings	Test article	DMS	Corn oil	DMS	DMS	DMS
	Dose (mg/kg)	0	0	5	15	50
	No. of animals	5	5	5	5	5
Ophthalmoscopy						
No abnormality		5	5	5	4	5
Fundus oculi						
Hyperreflectivity in fundus, focal		0	0	0	1	0

Table 4 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Ophthalmology (Week 13)
 Sex : Female

Test article		DMS	Corn oil	DMS	DMS	DMS
Findings	Dose (mg/kg)	0	0	5	15	50
	No. of animals	5	5	5	5	5
Ophthalmoscopy						
No abnormality		5	5	5	5	5

Table 5 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article	Dose	pH	Protein										-	+/-	1+	2+	3+
			5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0≤						
DMS	Mean											10	0	2	4	4	0
0 mg/kg	S.D.											10	0	2	4	4	0
	n	10	0	0	0	1	0	0	0	6	3	10	0	2	4	4	0
Corn oil	Mean											10	1	0	4	5	0
0 mg/kg	S.D.											10	1	0	4	5	0
	n	10	0	0	0	0	1	1	1	5	2	10	1	0	4	5	0
DMS	Mean											10	0	2	4	3	1
5 mg/kg	S.D.											10	0	2	4	3	1
	n	10	0	0	0	0	1	0	0	4	5	10	0	2	4	3	1
DMS	Mean											10	0	2	2	5	1
15 mg/kg	S.D.											10	0	2	2	5	1
	n	10	0	0	0	1	1	2	2	4	0	10	0	2	2	5	1
DMS	Mean											10	0	2	1	5	2
50 mg/kg	S.D.											10	0	2	1	5	2
	n	10	0	0	0	1	1	0	0	5	3	10	0	2	1	5	2

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL

Table 5 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article	Dose	Ketones	Ketones					Glucose	Glucose					
			-	+/-	1+	2+	3+		-	1+	2+	3+	4+	
DMS	Mean													
0 mg/kg	S.D.													
	n	10	0	1	4	5	0	10	8	2	0	0	0	0
Corn oil	Mean													
0 mg/kg	S.D.													
	n	10	0	1	6	3	0	10	10	0	0	0	0	0
DMS	Mean													
5 mg/kg	S.D.													
	n	10	0	4	3	3	0	10	10	0	0	0	0	0
DMS	Mean													
15 mg/kg	S.D.													
	n	10	0	1	4	5	0	10	8	2	0	0	0	0
DMS	Mean													
50 mg/kg	S.D.													
	n	10	0	2	4	4	0	10	8	2	0	0	0	0

Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL

Table 5 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article	Dose	Oc.Blood	Urobili.					Bilirubin										
			-	+/-	1+	2+	3+		-	1+	2+	3+						
DMS	Mean																	
0 mg/kg	S.D.																	
	n	10	3	6	0	1	0	10	10	0	0	0	10	9	1	0	0	
Corn oil	Mean																	
0 mg/kg	S.D.																	
	n	10	3	6	1	0	0	10	10	0	0	0	10	8	2	0	0	
DMS	Mean																	
5 mg/kg	S.D.																	
	n	10	7	3	0	0	0	10	10	0	0	0	10	8	2	0	0	
DMS	Mean																	
15 mg/kg	S.D.																	
	n	10	5	4	1	0	0	10	10	0	0	0	10	10	0	0	0	
DMS	Mean																	
50 mg/kg	S.D.																	
	n	10	5	5	0	0	0	10	10	0	0	0	10	6	4	0	0	

Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL

Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL

Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL

Oc.Blood : Occult blood Urobili. : Urobilinogen

Table 5 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article		S.G.	≤1.005	1.010	1.015	1.020	1.025	1.030≤
Dose								
DMS	Mean							
0 mg/kg	S.D.							
	n	10	1	3	2	2	1	1
Corn oil	Mean							
0 mg/kg	S.D.							
	n	10	0	5	1	2	2	0
DMS	Mean							
5 mg/kg	S.D.							
	n	10	0	4	2	4	0	0
DMS	Mean							
15 mg/kg	S.D.							
	n	10	0	2	3	1	4	0
DMS	Mean							
50 mg/kg	S.D.							
	n	10	1	4	0	3	0	2

S.G. : Specific gravity

Table 5 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article	Dose	Color	Color				RBC	RBC					
			LY	Y	DY	Other		-	+/-	1+	2+	3+	
DMS	Mean												
0 mg/kg	S.D.												
	n	10	0	10	0	0	10	9	1	0	0	0	0
Corn oil	Mean												
0 mg/kg	S.D.												
	n	10	0	10	0	0	10	10	0	0	0	0	0
DMS	Mean												
5 mg/kg	S.D.												
	n	10	0	10	0	0	10	10	0	0	0	0	0
DMS	Mean												
15 mg/kg	S.D.												
	n	10	0	10	0	0	10	9	1	0	0	0	0
DMS	Mean												
50 mg/kg	S.D.												
	n	10	0	10	0	0	10	10	0	0	0	0	0

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Table 5 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article	Dose	WBC	WBC					Ep.SEC	Ep.SEC				
			-	+/-	1+	2+	3+		-	+/-	1+	2+	3+
DMS	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0
Corn oil	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0
DMS	Mean												
5 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0
DMS	Mean												
15 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0
DMS	Mean												
50 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0

WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
Ep.SEC : Squamous epithelial cells

Table 5 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article	Dose	Ep.SREC	Ep.SREC					Cast	Cast				
			-	+/-	1+	2+	3+		-	+/-	1+	2+	3+
DMS	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
Corn oil	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
DMS	Mean												
5 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
DMS	Mean												
15 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
DMS	Mean												
50 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0

Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC : Small round epithelial cells

Table 5 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article	Dose	Cr.PS	Cr.PS					Cr.CO	Cr.CO				
			-	+/-	1+	2+	3+		-	+/-	1+	2+	3+
DMS	Mean												
0 mg/kg	S.D.												
	n	10	7	3	0	0	0	10	10	0	0	0	0
Corn oil	Mean												
0 mg/kg	S.D.												
	n	10	7	3	0	0	0	10	10	0	0	0	0
DMS	Mean												
5 mg/kg	S.D.												
	n	10	4	6	0	0	0	10	10	0	0	0	0
DMS	Mean												
15 mg/kg	S.D.												
	n	10	6	4	0	0	0	10	10	0	0	0	0
DMS	Mean												
50 mg/kg	S.D.												
	n	10	5	5	0	0	0	10	9	1	0	0	0

Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS : Crystal phosphate salts Cr.CO : Crystal calcium oxalate

Table 5 - 9 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Male

Stage : Week 13

Test Article		Uri.Vol.	U-Na	U-K	U-Cl
Dose		mL/24h	mmol/24h	mmol/24h	mmol/24h
DMS 0 mg/kg	Mean	7.4	1.3	2.8	2.1
	S.D.	1.5	0.4	0.8	0.6
	n	10	10	10	10
Corn oil 0 mg/kg	Mean	8.2	1.3	2.9	2.3
	S.D.	3.2	0.4	0.7	0.5
	n	10	10	10	10
DMS 5 mg/kg	Mean	11.3	1.6	3.2	2.4
	S.D.	5.0	0.4	0.5	0.4
	n	10	10	10	10
DMS 15 mg/kg	Mean	8.7	1.7	3.2	2.5
	S.D.	2.1	0.6	0.8	0.7
	n	10	10	10	10
DMS 50 mg/kg	Mean	9.0	1.7	3.0	2.5
	S.D.	3.3	0.4	0.8	0.6
	n	10	10	10	10

No significant difference in any treated groups from control group.

Uri.Vol. : Urine volume

Table 5 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article	Dose	pH	pH									Protein	-	+/-	1+	2+	3+
			5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0≤						
DMS	Mean											10					
0 mg/kg	S.D.											10	2	3	5	0	0
	n	10	0	0	3	2	3	0	1	1	0	10	2	3	5	0	0
Corn oil	Mean											10					
0 mg/kg	S.D.											10	5	4	0	1	0
	n	10	0	0	1	4	2	2	0	1	0	10	5	4	0	1	0
DMS	Mean											10					
5 mg/kg	S.D.											10	6	2	1	1	0
	n	10	0	0	0	2	4	1	0	2	1	10	6	2	1	1	0
DMS	Mean											10					
15 mg/kg	S.D.											10	3	5	1	1	0
	n	10	0	0	1	3	5	1	0	0	0	10	3	5	1	1	0
DMS	Mean											10					
50 mg/kg	S.D.											10	6	4	0	0	0
	n	10	0	0	2	1	2	2	1	2	0	10	6	4	0	0	0

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL

Table 5 - 11 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article	Dose	Ketones	Ketones					Glucose	Glucose				
			-	+/-	1+	2+	3+		-	1+	2+	3+	4+
DMS	Mean												
0 mg/kg	S.D.												
	n	10	2	4	4	0	0	10	10	0	0	0	0
Corn oil	Mean												
0 mg/kg	S.D.												
	n	10	5	4	1	0	0	10	10	0	0	0	0
DMS	Mean												
5 mg/kg	S.D.												
	n	10	6	2	2	0	0	10	10	0	0	0	0
DMS	Mean												
15 mg/kg	S.D.												
	n	10	4	6	0	0	0	10	10	0	0	0	0
DMS	Mean												
50 mg/kg	S.D.												
	n	10	6	4	0	0	0	10	10	0	0	0	0

Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL

Table 5 - 12 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article	Dose	Oc.Blood	Urobili.					Bilirubin										
			-	+/-	1+	2+	3+		-	1+	2+	3+						
DMS	Mean																	
0 mg/kg	S.D.																	
	n	10	10	0	0	0	0	10	10	0	0	0	10	10	0	0	0	0
Corn oil	Mean																	
0 mg/kg	S.D.																	
	n	10	10	0	0	0	0	10	10	0	0	0	10	10	0	0	0	0
DMS	Mean																	
5 mg/kg	S.D.																	
	n	10	10	0	0	0	0	10	10	0	0	0	10	10	0	0	0	0
DMS	Mean																	
15 mg/kg	S.D.																	
	n	10	10	0	0	0	0	10	10	0	0	0	10	10	0	0	0	0
DMS	Mean																	
50 mg/kg	S.D.																	
	n	10	9	1	0	0	0	10	10	0	0	0	10	10	0	0	0	0

Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL

Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL

Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL

Oc.Blood : Occult blood Urobili. : Urobilinogen

Table 5 - 13 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article		S.G.	≤1.005	1.010	1.015	1.020	1.025	1.030≤
Dose								
DMS 0 mg/kg	Mean							
	S.D.							
	n	10	1	1	0	1	3	4
Corn oil 0 mg/kg	Mean							
	S.D.							
	n	10	1	4	2	0	2	1
DMS 5 mg/kg	Mean							
	S.D.							
	n	10	2	3	2	1	1	1
DMS 15 mg/kg	Mean							
	S.D.							
	n	10	2	1	1	2	3	1
DMS 50 mg/kg	Mean							
	S.D.							
	n	10	1	3	2	2	2	0

S.G. : Specific gravity

Table 5 - 14 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article	Dose	Color	Color				RBC	RBC					
			LY	Y	DY	Other		-	+/-	1+	2+	3+	
DMS	Mean												
0 mg/kg	S.D.	10	0	10	0	0	10	10	0	0	0	0	
	n												
Corn oil	Mean												
0 mg/kg	S.D.	10	0	10	0	0	10	10	0	0	0	0	
	n												
DMS	Mean												
5 mg/kg	S.D.	10	0	10	0	0	10	10	0	0	0	0	
	n												
DMS	Mean												
15 mg/kg	S.D.	10	0	10	0	0	10	10	0	0	0	0	
	n												
DMS	Mean												
50 mg/kg	S.D.	10	0	10	0	0	10	10	0	0	0	0	
	n												

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Table 5 - 15 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article	Dose	WBC	WBC					Ep.SEC	Ep.SEC				
			-	+/-	1+	2+	3+		-	+/-	1+	2+	3+
DMS	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0
Corn oil	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0
DMS	Mean												
5 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0
DMS	Mean												
15 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	0	10	0	0	0
DMS	Mean												
50 mg/kg	S.D.												
	n	10	9	1	0	0	0	10	0	10	0	0	0

WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
Ep.SEC : Squamous epithelial cells

Table 5 - 16 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article	Dose	Ep.SREC	Ep.SREC					Cast	Cast				
			-	+/-	1+	2+	3+		-	+/-	1+	2+	3+
DMS	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
Corn oil	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
DMS	Mean												
5 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
DMS	Mean												
15 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
DMS	Mean												
50 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0

Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC : Small round epithelial cells

Table 5 - 17 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article	Dose	Cr.PS	Cr.PS					Cr.CO	Cr.CO				
			-	+/-	1+	2+	3+		-	+/-	1+	2+	3+
DMS	Mean												
0 mg/kg	S.D.												
	n	10	10	0	0	0	0	10	10	0	0	0	0
Corn oil	Mean												
0 mg/kg	S.D.												
	n	10	8	2	0	0	0	10	10	0	0	0	0
DMS	Mean												
5 mg/kg	S.D.												
	n	10	7	3	0	0	0	10	10	0	0	0	0
DMS	Mean												
15 mg/kg	S.D.												
	n	10	9	1	0	0	0	10	10	0	0	0	0
DMS	Mean												
50 mg/kg	S.D.												
	n	10	9	1	0	0	0	10	10	0	0	0	0

Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS : Crystal phosphate salts Cr.CO : Crystal calcium oxalate

Table 5 - 18 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Urinalysis
Sex : Female

Stage : Week 13

Test Article		Uri.Vol.	U-Na	U-K	U-Cl
Dose		mL/24h	mmol/24h	mmol/24h	mmol/24h
DMS	Mean	5.7	0.9	1.8	1.4
0 mg/kg	S.D.	2.1	0.2	0.3	0.2
	n	10	10	10	10
Corn oil	Mean	4.9	0.7	1.4	1.0 A2*
0 mg/kg	S.D.	4.1	0.4	0.6	0.5
	n	10	10	10	10
DMS	Mean	6.6	0.8	1.5	1.1
5 mg/kg	S.D.	5.8	0.3	0.5	0.4
	n	10	10	10	10
DMS	Mean	10.3	1.1	1.9	1.6
15 mg/kg	S.D.	7.1	0.5	0.6	0.6
	n	10	10	10	10
DMS	Mean	9.8 S2*	1.2	2.4 D2*	1.8
50 mg/kg	S.D.	3.2	0.4	0.7	0.7
	n	10	10	10	10

Significantly different from control : * P<0.05
A2:Aspin-Welch Test Two-Side, D2:Dunnett Test Two-Side, S2:Steel Test Two-Side
Uri.Vol. : Urine volume

Table 6 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Hematology
Sex : Male

Stage : Week 13

Test Article		RBC	HGB	HCT	MCV	MCH	MCHC
Dose		10E4/ μ L	g/dL	%	fL	pg	g/dL
DMS 0 mg/kg	Mean	855	15.4	44.4	52.0	18.0	34.6
	S.D.	30	0.4	1.3	0.8	0.4	0.5
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	844	15.4	44.6	52.9 T2*	18.3	34.6
	S.D.	25	0.3	0.9	0.9	0.4	0.5
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	837	14.9	43.4	51.9	17.8	34.4
	S.D.	38	0.5	1.6	1.7	0.6	0.4
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	852	15.4	44.3	52.1	18.0	34.6
	S.D.	32	0.4	1.2	1.6	0.5	0.4
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	852	15.4	44.3	52.0	18.1	34.8
	S.D.	30	0.7	2.0	1.5	0.6	0.4
	n	10	10	10	10	10	10

Significantly different from control : * $P \leq 0.05$
T2:t Test Two-Side

Table 6 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Hematology
Sex : Male

Stage : Week 13

Test Article		Retic	PLT	WBC	LYMP	NEUT	EOS
Dose		10E9/L	10E4/ μ L	10E2/ μ L	10E2/ μ L	10E2/ μ L	10E2/ μ L
DMS 0 mg/kg	Mean	164.8	104.6	81.7	63.0	14.1	1.1
	S.D.	20.8	11.9	21.4	19.0	3.4	0.5
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	165.0	96.1	80.1	58.9	16.6	1.0
	S.D.	25.2	11.6	20.6	16.5	5.9	0.4
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	167.4	98.2	89.1	62.2	21.7	0.9
	S.D.	34.3	7.3	26.1	15.9	13.4	0.4
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	174.3	95.4	86.8	63.9	17.7	1.2
	S.D.	19.4	6.2	19.9	14.1	6.0	0.7
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	168.4	101.0	87.9	64.9	18.1	1.2
	S.D.	22.0	14.5	26.1	16.9	9.6	0.6
	n	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Retic : Reticulocyte

Table 6 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Hematology
Sex : Male

Stage : Week 13

Test Article		BASO	MONO	LUC	PT	APTT	FIB
Dose		10E2/ μ L	10E2/ μ L	10E2/ μ L	s	s	mg/dL
DMS 0 mg/kg	Mean	0.2	2.6	0.7	12.1	17.1	296
	S.D.	0.1	0.9	0.4	0.5	2.0	32
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	0.2	2.7	0.7	11.8	16.3	295
	S.D.	0.1	1.3	0.3	0.6	1.9	28
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	0.2	3.2	0.8	12.3	16.6	303
	S.D.	0.1	1.1	0.6	1.1	2.4	31
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	0.2	3.2	0.7	11.9	15.9	298
	S.D.	0.1	1.1	0.2	0.4	1.9	31
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	0.2	2.8	0.7	12.1	16.4	281
	S.D.	0.2	1.3	0.3	1.1	1.8	11
	n	10	10	10	10	10	10

No significant difference in any treated groups from control group.
LUC : Large unstained cells

Table 6 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Hematology
Sex : Female

Stage : Week 13

Test Article		RBC	HGB	HCT	MCV	MCH	MCHC
Dose		10E4/ μ L	g/dL	%	fL	pg	g/dL
DMS 0 mg/kg	Mean	776	14.7	41.8	54.1	19.0	35.1
	S.D.	28	0.3	1.1	2.5	0.8	0.3
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	773	14.6	41.6	53.9	18.9	35.1
	S.D.	31	0.5	1.2	1.2	0.4	0.4
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	776	14.6	41.6	53.6	18.8	35.0
	S.D.	26	0.5	1.4	1.6	0.6	0.5
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	764	14.6	41.7	54.6	19.1	35.0
	S.D.	34	0.5	1.1	1.7	0.5	0.4
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	761	14.4	41.3	54.3	18.9	34.9
	S.D.	19	0.4	1.3	1.3	0.5	0.5
	n	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 6 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Hematology
Sex : Female

Stage : Week 13

Test Article		Retic	PLT	WBC	LYMP	NEUT	EOS
Dose		10E9/L	10E4/ μ L	10E2/ μ L	10E2/ μ L	10E2/ μ L	10E2/ μ L
DMS 0 mg/kg	Mean	160.6	101.1	53.4	41.0	9.5	0.7
	S.D.	30.0	12.4	18.7	15.7	3.3	0.2
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	131.3 T2*	101.6	50.1	40.0	7.1	0.8
	S.D.	25.2	7.0	7.1	8.0	1.8	0.4
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	139.2	105.5	54.3	43.5	7.7	0.9
	S.D.	28.8	9.2	15.3	13.3	3.2	0.4
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	157.8	101.6	57.3	43.4	10.9	0.8
	S.D.	25.2	8.0	10.8	11.6	3.4	0.4
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	151.5	101.1	47.6	37.5	7.4	0.7
	S.D.	23.6	10.4	12.6	10.5	3.3	0.3
	n	10	10	10	10	10	10

Significantly different from control : * $P \leq 0.05$

T2:t Test Two-Side

Retic : Reticulocyte

Table 6 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Hematology
Sex : Female

Stage : Week 13

Test Article		BASO	MONO	LUC	PT	APTT	FIB
Dose		10E2/ μ L	10E2/ μ L	10E2/ μ L	s	s	mg/dL
DMS 0 mg/kg	Mean	0.1	1.5	0.5	11.4	14.2	213
	S.D.	0.1	0.4	0.3	0.5	1.6	19
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	0.1	1.6	0.4	11.5	15.1	217
	S.D.	0.0	0.6	0.1	0.6	1.6	27
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	0.1	1.6	0.5	11.3	14.1	211
	S.D.	0.0	1.0	0.4	0.7	1.4	19
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	0.1	1.6	0.5	11.4	13.8	207
	S.D.	0.0	0.5	0.2	0.5	1.2	23
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	0.1	1.5	0.4	11.1	13.7	208
	S.D.	0.1	0.7	0.3	0.5	1.9	15
	n	10	10	10	10	10	10

No significant difference in any treated groups from control group.

LUC : Large unstained cells

Table 7 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Blood chemistry
Sex : Male

Stage : Week 13

Test Article		AST	ALT	LDH	ALP	BALP	LALP	IALP	γ-GTP	T-CHO
Dose		IU/L	IU/L	IU/L	IU/L	IU/L	IU/L	IU/L	IU/L	mg/dL
DMS 0 mg/kg	Mean	56	36	52	378	95	86	198	1	69
	S.D.	8	5	21	105	23	19	132	0	11
	n	10	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	61	38	57	371				1	60
	S.D.	13	11	36	112				0	9
	n	10	10	10	10	0	0	0	10	10
DMS 5 mg/kg	Mean	57	36	43	375				1	62
	S.D.	9	8	11	64				1	10
	n	10	10	10	10	0	0	0	10	10
DMS 15 mg/kg	Mean	57	36	46	367				1	63
	S.D.	7	6	11	51				0	10
	n	10	10	10	10	0	0	0	10	10
DMS 50 mg/kg	Mean	61	34	62	410	105	77	228	1	62
	S.D.	11	6	59	93	21	16	107	1	11
	n	10	10	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Table 7 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Blood chemistry
Sex : Male

Stage : Week 13

Test Article		TG	PL	T-BIL	GLU	BUN	CRNN
Dose		mg/dL	mg/dL	mg/dL	mg/dL	mg/dL	mg/dL
DMS 0 mg/kg	Mean	68	113	0.1	148	12	0.25
	S.D.	26	15	0.0	19	2	0.05
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	53	98 T2*	0.1	145	14 T2*	0.25
	S.D.	26	14	0.0	25	2	0.04
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	64	101	0.1	137	12	0.23
	S.D.	38	14	0.0	20	2	0.04
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	53	103	0.1	145	12	0.23
	S.D.	21	12	0.0	20	2	0.03
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	56	100	0.1	143	12	0.24
	S.D.	17	13	0.0	19	3	0.05
	n	10	10	10	10	10	10

Significantly different from control : * P≤0.05
T2:t Test Two-Side

Table 7 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Blood chemistry
Sex : Male

Stage : Week 13

Test Article		Na	K	Cl	Ca	P	TP	ALB	A/G
Dose		mmol/L	mmol/L	mmol/L	mg/dL	mg/dL	g/dL	g/dL	
DMS 0 mg/kg	Mean	145	3.7	107	10.7	5.4	6.3	3.3	1.1
	S.D.	1	0.2	1	0.4	0.6	0.3	0.2	0.1
	n	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	145	3.8	108	10.5	5.3	6.3	3.2	1.0
	S.D.	1	0.3	1	0.2	0.5	0.2	0.1	0.1
	n	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	145	3.8	107	10.6	5.4	6.1	3.2	1.1
	S.D.	1	0.4	1	0.3	0.6	0.3	0.1	0.1
	n	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	144	3.6	107	10.6	5.1	6.2	3.2	1.1
	S.D.	1	0.2	1	0.2	0.3	0.2	0.1	0.1
	n	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	145	3.7	108	10.5	5.4	6.1	3.2	1.1
	S.D.	1	0.3	1	0.2	0.3	0.2	0.1	0.1
	n	10	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 7 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Blood chemistry
Sex : Female

Stage : Week 13

Test Article		AST	ALT	LDH	ALP	BALP	LALP	IALP	γ -GTP	T-CHO
Dose		IU/L	IU/L	IU/L	IU/L	IU/L	IU/L	IU/L	IU/L	mg/dL
DMS 0 mg/kg	Mean	54	30	30	191	75	14	101	1	66
	S.D.	3	6	8	47	24	4	37	0	9
	n	10	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	56	36 T2*	31	239				1	67
	S.D.	6	6	6	63				0	14
	n	10	10	10	10	0	0	0	10	10
DMS 5 mg/kg	Mean	57	38	34	231				1	63
	S.D.	5	10	11	76				0	11
	n	10	10	10	10	0	0	0	10	10
DMS 15 mg/kg	Mean	55	33	33	218				1	71
	S.D.	8	9	11	53				0	12
	n	10	10	10	10	0	0	0	10	10
DMS 50 mg/kg	Mean	59	33	29	209	84	16	111	1	60
	S.D.	9	9	3	79	29	5	61	1	10
	n	10	10	10	10	10	10	10	10	10

Significantly different from control : * $P \leq 0.05$

T2:t Test Two-Side

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Table 7 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Blood chemistry
Sex : Female

Stage : Week 13

Test Article		TG	PL	T-BIL	GLU	BUN	CRNN
Dose		mg/dL	mg/dL	mg/dL	mg/dL	mg/dL	mg/dL
DMS 0 mg/kg	Mean	34	131	0.1	122	14	0.29
	S.D.	25	19	0.0	12	3	0.05
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	26	132	0.1	112	15	0.29
	S.D.	17	23	0.0	14	2	0.03
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	27	128	0.1	119	14	0.30
	S.D.	15	21	0.0	12	5	0.04
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	41	142	0.1	126	12	0.27
	S.D.	35	22	0.0	10	5	0.04
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	31	125	0.1	122	14	0.30
	S.D.	15	14	0.0	9	2	0.03
	n	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 7 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Blood chemistry
Sex : Female

Stage : Week 13

Test Article		Na	K	Cl	Ca	P	TP	ALB	A/G
Dose		mmol/L	mmol/L	mmol/L	mg/dL	mg/dL	g/dL	g/dL	
DMS 0 mg/kg	Mean	144	3.3	109	10.6	4.1	6.6	3.7	1.3
	S.D.	1	0.2	1	0.2	1.0	0.3	0.2	0.1
	n	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	143	3.3	109	10.5	3.8	6.7	3.8	1.3
	S.D.	1	0.1	1	0.2	0.6	0.4	0.2	0.1
	n	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	143	3.4	109	10.3 D2*	3.7	6.5	3.7	1.3
	S.D.	1	0.1	1	0.3	0.7	0.2	0.3	0.2
	n	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	143	3.3	109	10.4	3.8	6.6	3.8	1.3
	S.D.	1	0.2	2	0.2	0.8	0.2	0.2	0.1
	n	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	144	3.3	109	10.5	3.9	6.6	3.7	1.3
	S.D.	1	0.2	1	0.3	0.8	0.2	0.2	0.1
	n	10	10	10	10	10	10	10	10

Significantly different from control : * P≤0.05
D2:Dunnett Test Two-Side

Table 8 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Absolute organ weight
Sex : Male

Stage : Week 13

Test Article		F.B.W.@@	Brain	Pituitary	Thyroid-RL	Sa.G. -RL	Thymus	Heart	Lung
Dose		g	g	mg	mg	mg	mg	g	g
DMS 0 mg/kg	Mean	562	2.22	13.0	23.1	705	255	1.57	1.55
	S.D.	36	0.08	1.4	4.5	76	47	0.16	0.08
	n	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	593	2.19	13.2	20.9	798 T2*	264	1.60	1.65
	S.D.	64	0.07	1.7	2.4	112	86	0.17	0.18
	n	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	569	2.21	13.5	26.3	716	265	1.59	1.60
	S.D.	59	0.15	1.9	3.6	86	72	0.14	0.14
	n	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	573	2.23	13.4	22.1	702	287	1.55	1.59
	S.D.	60	0.12	1.9	2.7	105	67	0.15	0.11
	n	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	553	2.25	13.4	21.2	735	309	1.50	1.58
	S.D.	63	0.12	2.3	2.0	82	89	0.14	0.17
	n	10	10	10	10	10	10	10	10

Statistical analysis was not done : @@
Significantly different from control : * P≤0.05
T2:t Test Two-Side
Sa.G. : Salivary gland

Table 8 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Absolute organ weight
Sex : Male

Stage : Week 13

Test Article		Liver	Spleen	Kidney-RL	Adrenal-RL	Testis-RL	Prostate	Sem.Ves.
Dose		g	g	g	mg	g	g	g
DMS 0 mg/kg	Mean	14.12	0.69	3.18	61	3.49	1.24	1.41
	S.D.	1.74	0.09	0.27	8	0.19	0.20	0.34
	n	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	15.32	0.76	3.45	62	3.73	1.29	1.44
	S.D.	2.09	0.16	0.37	5	0.35	0.16	0.28
	n	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	14.34	0.80	3.34	56	3.45	1.25	1.44
	S.D.	1.63	0.15	0.35	8	0.16	0.17	0.19
	n	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	14.50	0.76	3.37	54	3.59	1.20	1.46
	S.D.	2.18	0.14	0.26	8	0.27	0.17	0.24
	n	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	13.92	0.75	3.25	56	3.38	1.21	1.41
	S.D.	2.13	0.10	0.26	7	0.35	0.14	0.10
	n	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.
Sem.Ves. : Seminal vesicle

Table 8 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Absolute organ weight
Sex : Female

Stage : Week 13

Test Article		F.B.W.@@	Brain	Pituitary	Thyroid-RL	Sa.G. -RL	Thymus	Heart	Lung
Dose		g	g	mg	mg	mg	mg	g	g
DMS 0 mg/kg	Mean	293	2.01	15.5	21.3	476	276	0.96	1.15
	S.D.	31	0.12	2.4	5.8	51	74	0.06	0.09
	n	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	286	1.98	15.5	18.1	453	231	0.90	1.14
	S.D.	26	0.07	2.3	2.9	46	64	0.07	0.10
	n	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	284	2.02	14.7	17.0	446	233	0.90	1.08
	S.D.	35	0.09	1.7	2.5	35	40	0.10	0.07
	n	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	286	1.95	15.0	19.1	458	253	0.92	1.07
	S.D.	18	0.06	2.1	4.2	40	62	0.05	0.06
	n	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	289	2.03	15.5	17.2	463	267	0.97	1.12
	S.D.	28	0.11	2.1	3.4	40	108	0.08	0.09
	n	10	10	10	10	10	10	10	10

Statistical analysis was not done : @@
No significant difference in any treated groups from control group.
Sa.G. : Salivary gland

Table 8 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Absolute organ weight
Sex : Female

Stage : Week 13

Test Article		Liver	Spleen	Kidney-RL	Adrenal-RL	Ovary-RL	Uterus
Dose		g	g	g	mg	mg	mg
DMS 0 mg/kg	Mean	7.32	0.52	1.91	66	86.8	579
	S.D.	0.78	0.08	0.16	8	11.2	106
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	7.07	0.48	1.86	64	76.3 T2*	610
	S.D.	0.77	0.07	0.18	8	10.8	165
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	6.88	0.47	1.77	58	84.2	552
	S.D.	0.82	0.05	0.17	7	14.0	121
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	7.44	0.52	1.85	60	77.3	715
	S.D.	0.58	0.07	0.11	14	9.6	166
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	7.46	0.50	1.86	65	88.2	588
	S.D.	0.64	0.06	0.15	8	16.2	116
	n	10	10	10	10	10	10

Significantly different from control : * P≤0.05
T2:t Test Two-Side

Table 9 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Relative organ weight
Sex : Male

Stage : Week 13

Test Article		F.B.W.@@	Brain	Pituitary	Thyroid-RL	Sa.G. -RL	Thymus	Heart	Lung
Dose		g	g/100g	mg/100g	mg/100g	mg/100g	mg/100g	g/100g	g/100g
DMS 0 mg/kg	Mean	562	0.40	2.3	4.1	125	45	0.28	0.28
	S.D.	36	0.02	0.2	0.7	10	9	0.03	0.02
	n	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	593	0.37	2.3	3.6	135	46	0.27	0.28
	S.D.	64	0.03	0.2	0.5	14	18	0.01	0.02
	n	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	569	0.39	2.4	4.6	126	46	0.28	0.28
	S.D.	59	0.05	0.4	0.7	12	10	0.03	0.02
	n	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	573	0.39	2.4	3.9	123	51	0.27	0.28
	S.D.	60	0.04	0.3	0.5	20	15	0.02	0.03
	n	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	553	0.41	2.4	3.9	133	56	0.27	0.29
	S.D.	63	0.03	0.3	0.4	11	16	0.02	0.01
	n	10	10	10	10	10	10	10	10

Statistical analysis was not done : @@
No significant difference in any treated groups from control group.
Sa.G. : Salivary gland

Table 9 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Relative organ weight
Sex : Male

Stage : Week 13

Test Article		Liver	Spleen	Kidney-RL	Adrenal-RL	Testis-RL	Prostate	Sem.Ves.
Dose		g/100g	g/100g	g/100g	mg/100g	g/100g	g/100g	g/100g
DMS 0 mg/kg	Mean	2.51	0.12	0.57	11	0.62	0.22	0.25
	S.D.	0.26	0.01	0.04	2	0.04	0.03	0.05
	n	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	2.58	0.13	0.58	11	0.63	0.22	0.25
	S.D.	0.13	0.02	0.04	1	0.08	0.04	0.05
	n	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	2.52	0.14	0.59	10	0.61	0.22	0.25
	S.D.	0.13	0.02	0.05	2	0.06	0.03	0.03
	n	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	2.52	0.13	0.59	10	0.63	0.21	0.25
	S.D.	0.20	0.02	0.05	1	0.07	0.03	0.04
	n	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	2.51	0.14	0.59	10	0.61	0.22	0.26
	S.D.	0.18	0.02	0.06	1	0.07	0.03	0.05
	n	10	10	10	10	10	10	10

No significant difference in any treated groups from control group.
Sem.Ves. : Seminal vesicle

Table 9 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Relative organ weight
Sex : Female

Stage : Week 13

Test Article		F.B.W.@@	Brain	Pituitary	Thyroid-RL	Sa.G. -RL	Thymus	Heart	Lung
Dose		g	g/100g	mg/100g	mg/100g	mg/100g	mg/100g	g/100g	g/100g
DMS 0 mg/kg	Mean	293	0.69	5.4	7.2	164	94	0.33	0.40
	S.D.	31	0.05	1.1	1.7	25	22	0.04	0.04
	n	10	10	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	286	0.70	5.5	6.3	159	81	0.32	0.40
	S.D.	26	0.06	0.8	0.9	16	18	0.02	0.02
	n	10	10	10	10	10	10	10	10
DMS 5 mg/kg	Mean	284	0.72	5.2	6.0	159	84	0.32	0.39
	S.D.	35	0.07	0.5	0.7	16	20	0.03	0.04
	n	10	10	10	10	10	10	10	10
DMS 15 mg/kg	Mean	286	0.68	5.3	6.7	160	89	0.32	0.38
	S.D.	18	0.05	0.8	1.5	14	22	0.02	0.02
	n	10	10	10	10	10	10	10	10
DMS 50 mg/kg	Mean	289	0.71	5.4	6.0	161	92	0.33	0.39
	S.D.	28	0.07	1.0	1.4	12	31	0.02	0.03
	n	10	10	10	10	10	10	10	10

Statistical analysis was not done : @@
No significant difference in any treated groups from control group.
Sa.G. : Salivary gland

Table 9 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Item : Relative organ weight
Sex : Female

Stage : Week 13

Test Article		Liver	Spleen	Kidney-RL	Adrenal-RL	Ovary-RL	Uterus
Dose		g/100g	g/100g	g/100g	mg/100g	mg/100g	mg/100g
DMS 0 mg/kg	Mean	2.51	0.18	0.65	23	29.8	200
	S.D.	0.17	0.03	0.07	4	3.6	42
	n	10	10	10	10	10	10
Corn oil 0 mg/kg	Mean	2.47	0.17	0.65	22	26.7	215
	S.D.	0.11	0.02	0.06	3	3.1	60
	n	10	10	10	10	10	10
DMS 5 mg/kg	Mean	2.44	0.17	0.63	21	30.0	196
	S.D.	0.23	0.01	0.07	3	5.2	43
	n	10	10	10	10	10	10
DMS 15 mg/kg	Mean	2.61	0.18	0.65	21	27.1	253
	S.D.	0.18	0.02	0.04	5	3.5	73
	n	10	10	10	10	10	10
DMS 50 mg/kg	Mean	2.59	0.17	0.65	23	30.7	205
	S.D.	0.24	0.02	0.06	3	5.8	45
	n	10	10	10	10	10	10

No significant difference in any treated groups from control group.

Table 10-1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Gross pathological findings

Organs	Sex:	M	M	M	M	M
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
	Dose (mg/kg/day):	0	0	5	15	50
Findings	Number:	10	10	10	10	10
Spleen						
Cyst		0	1	0	0	0
Stomach						
Focus, dark red, glandular stomach		1	2	2	4	1

M : Male

Table 10-2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Gross pathological findings

Organs	Sex:	F	F	F	F	F
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
	Dose (mg/kg/day):	0	0	5	15	50
Findings	Number:	10	10	10	10	10
Kidney						
Cyst		0	0	0	0	1
Stomach						
Focus, dark red, glandular stomach		2	1	1	0	1

F : Female

Table 11-1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Histopathological findings

Organs	Sex:	M	M	M	M	M
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
Findings	Dose (mg/kg/day):	0	0	5	15	50
	Number:	10	10	10	10	10
Adrenal						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Aorta, thoracic						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Bone+Bone marrow, femoral						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Bone+Bone marrow, sternal						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Cerebellum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Cerebrum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Epididymis						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Esophagus						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Eye						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Harderian gland						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	9
Cell infiltration, interstitial		0	0	0	0	1
minimal		0	0	0	0	1
Heart						
Number examined		10	10	0	0	10
Not remarkable		9	8	0	0	9
Cell infiltration		1	2	0	0	1
minimal		1	2	0	0	1
Intestine, duodenum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Intestine, jejunum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Intestine, ileum (Peyer's patch)						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10

M : Male

Table 11-2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Histopathological findings

Organs	Sex:	M	M	M	M	M
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
	Dose (mg/kg/day) :	0	0	5	15	50
Findings	Number:	10	10	10	10	10
Intestine, cecum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	9
Cell infiltration, mucosal		0	0	0	0	1
minimal		0	0	0	0	1
Intestine, colon						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Intestine, rectum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Kidney						
Number examined		10	10	0	0	10
Not remarkable		8	9	0	0	5
Cyst		0	0	0	0	1
minimal		0	0	0	0	1
Basophilia, tubular		1	0	0	0	3
minimal		1	0	0	0	3
Urinary cast, hyaline		1	1	0	0	1
minimal		1	1	0	0	1
Liver						
Number examined		10	10	0	0	10
Not remarkable		5	5	0	0	7
Microgranuloma		5	5	0	0	3
minimal		5	5	0	0	3
Lung (bronchus)						
Number examined		10	10	0	0	10
Not remarkable		8	10	0	0	8
Aggregation, alveolar macrophage		2	0	0	0	2
minimal		2	0	0	0	2
Lymph node, mesenteric						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Lymph node, submandibular						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Mammary gland, inguinal						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Nasal cavity						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Optic nerve						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Pancreas						
Number examined		10	10	0	0	10
Not remarkable		9	8	0	0	10
Atrophy, acinar, focal		1	2	0	0	0
minimal		1	1	0	0	0
mild		0	1	0	0	0

M : Male

Table 11-3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Histopathological findings

Organs	Sex:	M	M	M	M	M
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
Findings	Dose (mg/kg/day):	0	0	5	15	50
	Number:	10	10	10	10	10
Pancreas (continued)						
Cell infiltration, interstitial		1	0	0	0	0
minimal		1	0	0	0	0
Parathyroid						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Pituitary						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Prostate						
Number examined		10	10	0	0	10
Not remarkable		4	6	0	0	3
Cell infiltration, interstitial		6	4	0	0	7
minimal		5	3	0	0	7
mild		1	1	0	0	0
Salivary gland, sublingual						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Salivary gland, submandibular						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Sciatic nerve						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Seminal vesicle						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Skeletal muscle, femoral						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Skin, inguinal						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Spinal cord, thoracic						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Spleen						
Number examined		10	10	0	0	10
Not remarkable		7	7	0	0	9
Hematopoiesis, extramedullary		3	2	0	0	1
minimal		3	2	0	0	1
Cyst, capsular		0	1	0	0	0
mild		0	1	0	0	0
Stomach						
Number examined		10	10	0	0	10
Not remarkable		9	8	0	0	9
Erosion/Ulcer, glandular stomach		1	2	0	0	1
minimal		1	2	0	0	1

M : Male

Table 11-4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Histopathological findings

Organs	Sex:	M	M	M	M	M
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
Findings	Dose (mg/kg/day):	0	0	5	15	50
	Number:	10	10	10	10	10
Testis						
Number examined		10	10	0	0	10
Not remarkable		9	10	0	0	10
Cell infiltration, interstitial		1	0	0	0	0
minimal		1	0	0	0	0
Thymus						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Thyroid						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Tongue						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Trachea						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Urinary bladder						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Zymbal gland						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10

M : Male

Table 11-5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Histopathological findings

Organs	Sex:	F	F	F	F	F
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
Findings	Dose (mg/kg/day):	0	0	5	15	50
	Number:	10	10	10	10	10
Adrenal						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Aorta, thoracic						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Bone+Bone marrow, femoral						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Bone+Bone marrow, sternal						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Cerebellum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Cerebrum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Esophagus						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Eye						
Number examined		10	10	0	0	10
Not remarkable		10	9	0	0	10
Dysplasia, retinal		0	1	0	0	0
minimal		0	1	0	0	0
Harderian gland						
Number examined		10	10	0	0	10
Not remarkable		9	10	0	0	10
Cell infiltration, interstitial		1	0	0	0	0
minimal		1	0	0	0	0
Heart						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Intestine, duodenum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Intestine, jejunum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Intestine, ileum (Peyer's patch)						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Intestine, cecum						
Number examined		10	10	0	0	10
Not remarkable		10	9	0	0	10
Cell infiltration, mucosal		0	1	0	0	0
minimal		0	1	0	0	0

F : Female

Table 11-6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Histopathological findings

Organs	Sex:	F	F	F	F	F
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
Findings	Dose (mg/kg/day):	0	0	5	15	50
	Number:	10	10	10	10	10
Intestine, colon						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Intestine, rectum						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Kidney						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	9
Cyst		0	0	0	0	1
mild		0	0	0	0	1
Liver						
Number examined		10	10	0	0	10
Not remarkable		7	7	0	0	9
Microgranuloma		3	3	0	0	1
minimal		3	3	0	0	1
Lung (bronchus)						
Number examined		10	10	0	0	10
Not remarkable		10	9	0	0	8
Aggregation, alveolar macrophage		0	1	0	0	2
minimal		0	1	0	0	2
Lymph node, mesenteric						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Lymph node, submandibular						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Mammary gland, inguinal						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Nasal cavity						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Optic nerve						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Ovary						
Number examined		10	10	0	0	10
Not remarkable		10	9	0	0	10
Atrophy		0	1	0	0	0
mild		0	1	0	0	0
Oviduct						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Pancreas						
Number examined		10	10	0	0	10
Not remarkable		9	10	0	0	10
Atrophy, acinar, focal		1	0	0	0	0
minimal		1	0	0	0	0

F : Female

Table 11-7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Histopathological findings

Organs	Sex:	F	F	F	F	F
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
Findings	Dose (mg/kg/day):	0	0	5	15	50
	Number:	10	10	10	10	10
Parathyroid						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Pituitary						
Number examined		10	10	0	0	10
Not remarkable		9	10	0	0	10
Aberrant craniopharyngeal tissue		1	0	0	0	0
minimal		1	0	0	0	0
Salivary gland, sublingual						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Salivary gland, submandibular						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Sciatic nerve						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Skeletal muscle, femoral						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Skin, inguinal						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Spinal cord, thoracic						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Spleen						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	9
Hematopoiesis, extramedullary		0	0	0	0	1
minimal		0	0	0	0	1
Stomach						
Number examined		10	10	0	0	10
Not remarkable		8	9	0	0	9
Erosion/Ulcer, glandular stomach		2	1	0	0	1
minimal		2	1	0	0	1
Thymus						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Thyroid						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Tongue						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10
Trachea						
Number examined		10	10	0	0	10
Not remarkable		10	10	0	0	10

F : Female

Table 11-8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats
Histopathological findings

Organs	Sex:	F	F	F	F	F
	Test Article:	DMS	Corn oil	DMS	DMS	DMS
	Dose (mg/kg/day):	0	0	5	15	50
Findings	Number:	10	10	10	10	10
Urinary bladder						
	Number examined	10	10	0	0	10
	Not remarkable	10	10	0	0	10
Uterus						
	Number examined	10	10	0	0	10
	Not remarkable	10	10	0	0	10
Vagina						
	Number examined	10	10	0	0	10
	Not remarkable	10	10	0	0	10
Zymbal gland						
	Number examined	10	10	0	0	10
	Not remarkable	10	10	0	0	10

F : Female

Appendix 1-1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Individual clinical signs

Dose (mg/kg/day) : DMS 0

Sex : Male

Animal No.	Week of administration													14a)
	1	2	3	4	5	6	7	8	9	10	11	12	13	
1001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1003	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1004	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1006	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1008	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1010	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-:No abnormal findings

Appendix 1-2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Individual clinical signs

Dose (mg/kg/day) : Corn oil 0

Sex : Male

Animal No.	Week of administration													14a)
	1	2	3	4	5	6	7	8	9	10	11	12	13	
2001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2006	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-.No abnormal findings

Appendix 1-3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Individual clinical signs

Dose (mg/kg/day) : DMS 5

Sex : Male

Animal No.	Week of administration													14a)
	1	2	3	4	5	6	7	8	9	10	11	12	13	
3001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3003	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3004	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3006	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3008	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3010	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-.No abnormal findings

Appendix 1-4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Individual clinical signs
Dose (mg/kg/day) : DMS 15

Sex : Male

Animal No.	Week of administration													14a)
	1	2	3	4	5	6	7	8	9	10	11	12	13	
4001	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4002	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4003	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4004	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4005	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4006	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4008	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4009	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4010	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-:No abnormal findings

Appendix 1-5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Individual clinical signs
 Dose (mg/kg/day) : DMS 50

Sex : Male

Animal No.	Week of administration													14a)	
	1	2	3	4	5	6	7	8	9	10	11	12	13		
5001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5006	-	-	-	-	-	-	-	A	A	-	-	-	-	-	-
5007	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-:No abnormal findings

A:Fracture, incisors



Individual clinical signs
 Dose (mg/kg/day) : DMS 0

Sex : Female

Animal No.	Week of administration													14a)
	1	2	3	4	5	6	7	8	9	10	11	12	13	
1101	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1102	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1103	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1104	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1105	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1106	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1107	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1108	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1110	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-:No abnormal findings



Individual clinical signs

Dose (mg/kg/day) : Corn oil 0

Sex : Female

Animal No.	Week of administration													14a)
	1	2	3	4	5	6	7	8	9	10	11	12	13	
2101	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2102	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2103	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2104	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2105	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2106	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2107	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2108	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2110	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-:No abnormal findings

Appendix 1-8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Individual clinical signs

Dose (mg/kg/day) : DMS 5

Sex : Female

Animal No.	Week of administration													14a)
	1	2	3	4	5	6	7	8	9	10	11	12	13	
3101	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3102	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3103	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3104	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3105	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3106	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3107	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3108	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3110	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-:No abnormal findings



Individual clinical signs
 Dose (mg/kg/day) : DMS 15

Sex : Female

Animal No.	Week of administration													14a)	
	1	2	3	4	5	6	7	8	9	10	11	12	13		
4101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4106	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-:No abnormal findings

Appendix 1-10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Individual clinical signs
Dose (mg/kg/day) : DMS 50

Sex : Female

Animal No.	Week of administration													14a)
	1	2	3	4	5	6	7	8	9	10	11	12	13	
5101	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5102	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5103	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5104	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5105	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5106	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5107	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5108	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5110	-	-	-	-	-	-	-	-	-	-	-	-	-	-

a):Clinical signs on the day of necropsy

-.No abnormal findings

Appendix 2 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight

Sex : Male

Test Article : DMS

Dose : 0 mg/kg

Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
1001		223	247	277	311	337	367	386	416	432	453	468	484	498	507	523	533
1002		201	221	243	267	287	313	328	349	366	393	407	420	439	457	467	478
1003		214	239	263	300	325	351	367	392	404	422	436	450	465	474	488	500
1004		220	246	268	303	324	358	375	400	415	442	458	475	498	504	522	528
1005		213	234	257	293	315	342	353	373	389	408	420	430	447	457	470	481
1006		226	256	279	300	312	333	344	363	372	394	403	406	431	427	438	447
1007		212	238	261	293	311	331	341	354	364	384	390	406	421	432	445	451
1008		206	232	261	298	319	351	369	394	407	427	437	453	465	476	493	509
1009		213	238	264	293	316	341	354	373	383	403	415	431	442	451	467	470
1010		209	236	263	294	319	343	363	382	394	413	430	447	462	480	493	503
Mean		214	239	264	295	317	343	358	380	393	414	426	440	457	467	481	490
S.D.		8	9	10	11	13	15	17	21	22	22	24	27	26	27	29	30
S.E.		2	3	3	4	4	5	6	7	7	7	8	8	8	9	9	9
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Male Test Article : DMS Dose : 0 mg/kg Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
1001		545	553	565	574	585	592	593	603	611	617	617
1002		492	503	511	518	527	528	526	538	543	553	541
1003		513	525	535	548	557	569	576	586	586	594	599
1004		539	548	552	559	577	583	590	595	599	600	598
1005		496	505	514	521	532	537	546	559	562	558	558
1006		453	468	471	482	496	507	520	526	531	536	538
1007		460	468	478	484	496	496	507	508	518	522	523
1008		519	530	542	553	568	572	585	592	603	608	609
1009		484	496	506	515	521	525	535	540	549	551	553
1010		514	524	535	548	554	566	579	589	590	604	601
Mean		502	512	521	530	541	548	556	564	569	574	574
S.D.		31	30	31	31	32	33	32	34	33	34	34
S.E.		10	9	10	10	10	11	10	11	10	11	11
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight

Sex : Male

Test Article : Corn oil

Dose : 0 mg/kg

Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
2001		220	251	281	326	355	392	414	446	466	494	501	524	542	548	568	574
2002		212	239	267	303	324	353	368	389	399	421	430	442	453	459	469	475
2003		218	243	270	307	332	363	380	398	421	445	460	478	496	506	525	533
2004		213	233	255	275	287	303	315	343	356	375	383	405	417	431	446	461
2005		210	237	264	294	321	348	361	384	402	430	443	460	472	487	493	513
2006		220	244	275	308	335	366	375	399	417	439	448	459	472	484	496	509
2007		206	231	256	286	306	325	339	360	367	382	396	409	420	431	442	455
2008		221	247	278	311	334	356	376	407	425	447	464	480	500	519	525	542
2009		208	234	264	301	326	361	377	404	419	444	457	470	485	505	515	528
2010		231	262	294	334	356	384	406	429	445	474	490	513	533	553	568	585
Mean		216	242	270	305	328	355	371	396	412	435	447	464	479	492	505	518
S.D.		8	9	12	17	21	26	29	30	33	36	37	39	42	43	44	44
S.E.		2	3	4	6	7	8	9	9	10	12	12	12	13	14	14	14
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight

Sex : Male

Test Article : Corn oil

Dose : 0 mg/kg

Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
2001		586	598	613	622	626	632	626	644	648	661	653
2002		481	486	490	495	510	506	516	515	516	520	521
2003		547	550	576	581	596	599	612	624	626	637	643
2004		471	488	492	509	518	528	538	547	552	555	561
2005		517	525	538	539	550	558	562	571	579	588	593
2006		510	531	538	536	544	547	554	561	565	574	574
2007		462	473	477	489	499	506	514	524	531	537	542
2008		554	573	578	594	603	609	619	630	636	643	647
2009		539	549	566	572	578	586	603	618	625	631	634
2010		602	616	636	650	675	684	693	706	718	727	731
Mean		527	539	550	559	570	576	584	594	600	607	610
S.D.		47	48	53	54	56	58	57	60	62	64	63
S.E.		15	15	17	17	18	18	18	19	20	20	20
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Male Test Article : DMS Dose : 5 mg/kg Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
3001		218	246	274	314	346	365	389	412	422	437	454	470	481	499	503	520
3002		220	247	277	316	343	374	396	420	434	456	476	487	505	515	533	541
3003		225	254	280	318	344	372	388	414	435	461	475	489	502	513	523	535
3004		202	228	253	285	307	326	335	346	354	366	380	380	391	388	397	396
3005		226	254	280	305	324	347	359	376	380	391	403	421	436	448	458	467
3006		222	253	283	321	347	381	400	433	451	481	493	517	536	546	565	579
3007		217	238	267	304	333	360	368	387	403	426	440	454	463	482	489	496
3008		210	236	262	298	321	350	370	399	412	437	453	460	469	488	500	506
3009		210	235	263	296	325	356	375	392	407	429	443	464	473	488	498	508
3010		204	232	257	285	311	337	354	374	389	408	420	435	447	452	464	479
Mean		215	242	270	304	330	357	373	395	409	429	444	458	470	482	493	503
S.D.		8	10	11	13	15	17	20	26	29	34	35	39	40	44	46	49
S.E.		3	3	3	4	5	5	6	8	9	11	11	12	13	14	15	16
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight

Sex : Male

Test Article : DMS

Dose : 5 mg/kg

Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
3001		525	537	546	553	556	558	563	569	571	575	572
3002		549	562	568	573	585	593	600	615	623	625	628
3003		539	552	559	568	572	577	585	597	600	610	613
3004		402	411	423	430	437	444	455	452	459	465	466
3005		475	486	487	493	503	506	510	517	515	518	526
3006		594	611	622	632	648	658	663	677	686	696	699
3007		502	511	523	529	536	549	554	555	561	569	571
3008		520	526	539	550	557	566	566	577	583	591	590
3009		517	532	544	551	564	575	581	591	592	602	601
3010		489	508	512	521	533	538	547	558	558	570	572
Mean		511	524	532	540	549	556	562	571	575	582	584
S.D.		51	52	53	53	55	56	55	59	61	62	62
S.E.		16	17	17	17	17	18	17	19	19	20	19
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight

Sex : Male

Test Article : DMS

Dose : 15 mg/kg

Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
4001		217	248	274	311	339	365	384	405	417	440	449	474	479	491	498	512
4002		232	255	282	311	333	369	386	417	429	452	468	483	494	504	514	524
4003		208	229	251	277	295	318	333	356	366	390	400	416	429	442	456	465
4004		224	254	291	335	365	401	425	454	477	503	525	547	565	577	596	610
4005		213	238	265	297	324	351	369	390	408	433	445	459	485	489	505	514
4006		224	243	279	310	336	362	378	397	411	432	447	463	476	477	492	501
4007		213	235	259	293	320	347	365	391	407	428	445	459	476	484	500	509
4008		200	218	241	268	287	309	328	350	366	389	405	422	437	448	458	469
4009		214	238	262	291	312	338	351	366	380	390	402	412	422	411	438	448
4010		203	224	249	284	308	338	348	367	381	401	414	423	432	432	448	457
Mean		215	238	265	298	322	350	367	389	404	426	440	456	470	476	491	501
S.D.		10	12	16	20	23	27	29	32	34	36	38	41	43	47	46	47
S.E.		3	4	5	6	7	8	9	10	11	11	12	13	14	15	14	15
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Male Test Article : DMS Dose : 15 mg/kg Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
4001		513	525	527	538	547	559	565	569	580	589	587
4002		531	546	552	568	564	574	580	596	594	596	593
4003		475	488	496	506	507	518	522	533	532	535	535
4004		617	635	647	660	676	683	704	710	721	737	738
4005		516	539	543	564	570	580	590	604	616	618	617
4006		504	518	530	547	550	560	567	580	584	590	592
4007		515	530	534	547	550	559	571	578	580	583	585
4008		473	490	499	506	518	519	531	542	544	553	553
4009		457	466	472	481	493	496	506	510	506	517	517
4010		463	473	478	484	493	503	511	516	530	535	530
Mean		506	521	528	540	547	555	565	574	579	585	585
S.D.		47	49	50	52	53	54	57	58	61	62	63
S.E.		15	15	16	17	17	17	18	18	19	20	20
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 9 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight

Sex : Male

Test Article : DMS

Dose : 50 mg/kg

Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
5001		218	244	268	300	322	345	354	378	394	422	431	453	464	477	489	502
5002		214	240	266	300	324	348	370	392	410	438	450	470	482	494	502	522
5003		210	232	256	284	302	322	334	350	364	382	394	408	412	430	436	449
5004		203	221	240	260	272	292	304	318	329	350	361	378	392	396	409	413
5005		217	248	276	312	339	367	383	409	425	448	464	479	487	498	506	517
5006		218	245	274	304	326	345	361	379	393	412	426	438	450	470	478	437
5007		211	236	266	301	334	361	378	400	418	444	455	472	490	502	513	524
5008		226	255	289	331	360	394	415	438	458	477	494	521	533	550	563	575
5009		228	258	287	323	344	366	380	401	412	426	443	458	473	485	494	508
5010		202	225	240	261	268	281	293	304	316	325	334	346	352	364	369	376
Mean		215	240	266	298	319	342	357	377	392	412	425	442	454	467	476	482
S.D.		9	12	17	24	30	35	37	42	44	47	49	52	54	55	56	61
S.E.		3	4	5	7	9	11	12	13	14	15	15	16	17	17	18	19
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight

Sex : Male

Test Article : DMS

Dose : 50 mg/kg

Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
5001		507	515	517	533	545	556	565	570	583	573	568
5002		528	541	548	553	567	580	583	592	593	603	605
5003		457	464	470	477	486	491	504	502	513	520	518
5004		421	431	443	451	462	466	479	484	493	496	495
5005		528	539	544	551	557	562	577	573	577	586	583
5006		431	467	485	495	511	520	527	537	543	552	559
5007		534	548	552	570	585	581	592	603	610	615	618
5008		586	600	604	618	628	636	644	656	662	670	666
5009		515	524	538	546	558	564	579	580	591	599	599
5010		385	394	397	409	412	425	436	445	449	453	452
Mean		489	502	510	520	531	538	549	554	561	567	566
S.D.		63	62	61	62	64	63	62	63	62	63	63
S.E.		20	20	19	20	20	20	19	20	20	20	20
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 11 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : DMS Dose : 0 mg/kg Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
1101		160	167	180	194	200	212	218	224	223	235	233	239	241	244	254	255
1102		160	170	171	182	196	206	211	220	224	228	229	232	249	251	259	259
1103		160	166	173	184	180	186	194	203	209	218	223	229	221	226	240	241
1104		153	161	162	172	181	187	192	199	201	209	209	215	224	223	230	235
1105		157	176	182	191	198	205	204	214	228	241	245	254	255	261	253	262
1106		170	168	181	195	210	223	222	240	239	257	271	276	284	291	294	300
1107		169	178	182	198	218	228	231	246	252	265	265	275	285	295	300	310
1108		163	169	184	198	210	222	224	231	225	231	242	249	253	260	262	264
1109		177	190	193	213	231	243	253	263	267	279	273	281	296	299	300	305
1110		177	184	198	211	220	231	236	246	249	262	268	273	279	288	290	295
Mean		165	173	181	194	204	214	219	229	232	243	246	252	259	264	268	273
S.D.		8	9	10	13	17	19	19	20	20	22	23	23	26	28	26	27
S.E.		3	3	3	4	5	6	6	6	6	7	7	7	8	9	8	9
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 12 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : DMS Dose : 0 mg/kg Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
1101		253	263	263	265	268	265	275	279	273	279	278
1102		261	267	258	267	272	274	281	280	270	270	277
1103		250	254	255	263	252	255	270	274	276	277	269
1104		237	244	242	242	248	253	261	261	263	265	258
1105		272	278	280	285	285	285	284	280	292	298	291
1106		300	307	312	316	323	326	328	330	328	327	333
1107		313	315	315	322	333	337	341	351	348	356	352
1108		259	260	271	281	278	287	288	290	282	288	291
1109		306	312	305	314	325	325	327	328	327	326	324
1110		296	303	313	317	325	324	327	327	324	326	332
Mean		275	280	281	287	291	293	298	300	298	301	301
S.D.		27	27	28	28	33	32	29	31	30	31	32
S.E.		8	8	9	9	10	10	9	10	10	10	10
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 13 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight

Sex : Female

Test Article : Corn oil

Dose : 0 mg/kg

Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
2101		152	153	167	183	180	196	208	213	218	231	229	227	243	248	250	256
2102		162	173	177	193	207	218	227	235	242	246	239	243	259	264	273	275
2103		154	174	183	199	208	217	223	232	250	255	261	264	269	271	267	276
2104		168	190	201	222	232	242	242	257	270	276	288	293	297	301	298	309
2105		172	177	183	190	201	208	211	211	221	230	232	232	236	235	244	247
2106		160	166	165	176	185	193	196	201	205	212	205	211	219	222	227	228
2107		168	171	192	211	221	237	234	244	262	271	277	290	295	295	293	304
2108		166	179	195	209	210	216	218	227	234	242	245	251	255	264	261	265
2109		161	174	180	198	211	224	232	244	247	252	257	261	270	273	282	287
2110		157	165	163	176	187	196	201	209	212	214	214	222	230	237	241	249
Mean		162	172	181	196	204	215	219	227	236	243	245	249	257	261	264	270
S.D.		7	10	13	15	16	17	15	18	22	22	26	28	26	26	23	26
S.E.		2	3	4	5	5	5	5	6	7	7	8	9	8	8	7	8
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 14 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : Corn oil Dose : 0 mg/kg Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
2101		251	259	272	269	276	279	279	282	274	273	281
2102		276	281	272	277	293	296	301	308	303	307	293
2103		283	286	288	291	289	292	291	290	297	296	292
2104		318	321	327	333	325	327	332	334	340	339	331
2105		251	254	255	263	261	262	267	267	270	268	260
2106		231	238	231	237	244	244	249	248	252	251	244
2107		312	318	317	320	315	315	332	330	333	334	329
2108		279	283	285	294	292	297	296	292	302	305	300
2109		289	291	290	295	302	303	310	309	310	313	302
2110		248	259	255	266	275	277	281	285	290	294	282
Mean		274	279	279	285	287	289	294	295	297	298	291
S.D.		28	27	29	28	24	25	27	27	27	28	27
S.E.		9	9	9	9	8	8	8	8	9	9	9
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 15 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : DMS Dose : 5 mg/kg Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
3101		158	171	178	191	203	213	219	231	233	243	239	249	260	262	265	267
3102		159	171	183	195	205	212	209	220	235	244	253	256	256	262	255	257
3103		154	153	165	178	192	212	222	216	210	213	218	223	226	228	226	230
3104		174	181	181	196	214	223	230	241	241	252	247	255	271	279	283	289
3105		153	165	168	179	183	185	192	197	208	214	218	219	217	223	232	238
3106		148	167	173	185	199	207	212	224	235	240	244	251	253	259	261	273
3107		158	166	168	179	190	194	198	201	203	207	206	206	214	219	225	231
3108		167	175	185	198	205	210	220	231	239	248	253	263	266	275	285	296
3109		184	194	206	221	228	233	247	257	266	276	284	291	287	291	302	310
3110		164	172	179	192	189	191	201	206	211	219	217	226	223	228	233	240
Mean		162	172	179	191	201	208	215	222	228	236	238	244	247	253	257	263
S.D.		11	11	12	13	13	15	16	19	20	22	23	25	25	26	27	29
S.E.		3	3	4	4	4	5	5	6	6	7	7	8	8	8	9	9
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 16 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : DMS Dose : 5 mg/kg Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
3101		268	273	271	275	283	286	293	292	292	298	288
3102		276	278	284	283	284	286	277	285	291	280	287
3103		242	247	246	255	246	250	252	259	260	264	258
3104		291	296	290	298	308	308	313	314	306	313	314
3105		240	245	246	251	247	251	258	264	263	264	257
3106		281	291	293	303	297	304	301	303	308	312	313
3107		233	235	228	234	244	241	243	251	248	248	243
3108		306	308	310	315	313	316	326	331	335	338	339
3109		319	323	328	332	328	332	340	345	349	347	348
3110		246	252	255	257	253	253	263	266	266	263	266
Mean		270	275	275	280	280	283	287	291	292	293	291
S.D.		30	30	32	31	31	32	33	32	33	34	36
S.E.		9	9	10	10	10	10	10	10	11	11	11
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 17 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : DMS Dose : 15 mg/kg Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
4101		161	168	182	195	206	203	216	225	230	232	240	251	255	262	261	267
4102		162	175	182	194	205	212	215	219	229	239	236	244	245	254	264	268
4103		177	171	183	193	200	208	206	216	205	215	230	240	248	251	255	259
4104		156	164	163	179	191	201	208	209	212	217	222	231	231	234	237	244
4105		165	177	178	194	208	220	226	237	238	250	250	256	268	277	277	282
4106		165	171	185	200	214	225	229	238	241	245	255	261	264	273	268	281
4107		151	149	157	170	177	187	187	196	197	205	211	216	223	233	231	242
4108		181	189	194	211	227	238	245	253	254	264	262	269	274	284	286	293
4109		159	168	177	195	201	207	214	223	224	234	242	246	249	258	259	266
4110		159	174	185	203	213	226	234	246	254	262	263	267	272	278	277	285
Mean		164	171	179	193	204	213	218	226	228	236	241	248	253	260	262	269
S.D.		9	10	11	12	14	15	16	17	19	20	17	16	17	18	17	17
S.E.		3	3	3	4	4	5	5	6	6	6	5	5	5	6	5	5
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 18 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : DMS Dose : 15 mg/kg Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
4101		273	279	282	294	287	290	291	295	297	299	298
4102		275	273	278	288	280	283	292	297	294	302	293
4103		251	258	273	274	284	280	271	275	286	284	285
4104		239	248	255	257	264	265	265	266	270	272	279
4105		291	292	292	296	306	312	316	316	310	309	309
4106		274	278	286	298	300	306	299	303	298	300	301
4107		235	237	240	249	250	256	254	256	249	253	262
4108		294	301	298	303	308	312	320	323	322	323	316
4109		262	270	281	281	282	283	286	280	283	293	291
4110		296	291	296	296	303	301	310	312	314	312	307
Mean		269	273	278	284	286	289	290	292	292	295	294
S.D.		22	20	18	18	19	19	22	22	22	20	16
S.E.		7	6	6	6	6	6	7	7	7	6	5
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 19 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : DMS Dose : 50 mg/kg Unit : g

Animal No.	Day	1	4	7	11	14	18	21	25	28	32	35	39	42	46	49	53
5101		175	179	188	199	203	219	225	236	241	255	256	266	277	287	291	299
5102		157	169	173	189	192	200	200	207	216	221	227	233	235	243	238	247
5103		153	157	163	172	172	180	184	186	193	203	207	211	206	210	223	226
5104		175	182	192	203	203	214	221	228	233	241	244	254	253	256	267	277
5105		162	163	177	187	197	205	208	216	217	227	235	243	248	251	251	253
5106		170	182	192	201	220	230	227	248	258	267	277	293	299	300	314	318
5107		159	166	178	193	203	212	218	223	226	236	247	254	260	268	267	275
5108		155	166	164	172	187	195	204	215	214	219	213	222	233	240	243	250
5109		170	180	185	202	205	216	229	240	245	250	247	254	264	266	277	277
5110		156	166	172	188	193	207	215	228	238	247	256	264	263	270	282	286
Mean		163	171	178	191	198	208	213	223	228	237	241	249	254	259	265	271
S.D.		9	9	11	11	13	14	14	18	19	19	21	24	26	25	27	27
S.E.		3	3	3	4	4	4	4	6	6	6	7	7	8	8	9	9
n		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Appendix 2 - 20 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual body weight
 Sex : Female Test Article : DMS Dose : 50 mg/kg Unit : g

Animal No.	Day	56	60	63	67	70	74	77	81	84	88	91
5101		299	311	308	313	315	318	322	324	327	325	326
5102		253	260	261	264	261	262	263	264	272	269	267
5103		231	236	236	242	233	240	249	251	258	260	249
5104		281	289	291	294	289	296	301	305	310	311	307
5105		252	261	267	267	272	281	279	286	280	285	287
5106		320	333	341	349	347	345	350	358	354	343	355
5107		270	275	289	287	289	293	293	294	287	287	288
5108		250	250	243	253	253	259	265	264	268	268	257
5109		278	284	278	286	293	298	303	303	295	303	311
5110		293	294	298	308	300	304	311	313	315	318	316
Mean		273	279	281	286	285	290	294	296	297	297	296
S.D.		27	29	31	32	33	31	31	32	30	28	33
S.E.		9	9	10	10	10	10	10	10	9	9	10
n		10	10	10	10	10	10	10	10	10	10	10

Appendix 3 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Male Test Article : DMS Dose : 0 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
1001		24	23	23	23	23	22	22	22	21	21	20	20	21	20
1002															
1003		23	23	25	24	22	22	22	22	21	21	21	21	20	19
1004															
1005		25	23	23	22	21	21	21	21	20	20	21	21	21	20
1006															
1007		23	24	24	23	23	23	23	23	23	23	23	22	23	22
1008															
1009		25	24	24	24	23	23	23	22	21	22	22	22	22	22
1010															
Mean		24	23	24	23	22	22	22	22	21	21	21	21	21	21
S.D.		1	1	1	1	1	1	1	1	1	1	1	1	1	1
S.E.		0	0	0	0	0	0	0	0	0	1	1	0	1	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Male Test Article : Corn oil Dose : 0 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
2001		23	25	27	26	25	24	25	24	23	23	22	22	22	23
2002															
2003		26	23	23	23	24	23	23	23	23	23	23	21	21	21
2004															
2005		26	24	25	25	24	23	23	22	22	22	21	20	21	22
2006															
2007		22	24	25	24	23	23	24	23	23	23	23	23	22	21
2008															
2009		27	27	27	27	26	26	27	27	26	26	27	27	27	26
2010															
Mean		25	25	25	25	24	24	24	24	23	23	23	23	23	23
S.D.		2	2	2	2	1	1	2	2	2	2	2	3	3	2
S.E.		1	1	1	1	1	1	1	1	1	1	1	1	1	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Male Test Article : DMS Dose : 5 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
3001		24	25	27	26	25	24	24	23	23	21	22	21	21	21
3002															
3003		22	24	25	24	22	21	21	19	18	19	19	19	19	19
3004															
3005		26	27	26	25	24	23	24	23	23	22	22	22	21	22
3006															
3007		23	24	26	24	24	23	24	24	23	23	24	23	22	23
3008															
3009		22	24	24	24	23	23	23	22	23	24	23	22	22	22
3010															
Mean		23	25	26	25	24	23	23	22	22	22	22	21	21	21
S.D.		2	1	1	1	1	1	1	2	2	2	2	2	1	2
S.E.		1	1	1	0	1	0	1	1	1	1	1	1	1	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Male Test Article : DMS Dose : 15 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
4001		23	25	26	25	24	22	23	22	21	21	20	21	20	20
4002															
4003		23	25	26	24	24	24	24	24	22	22	23	22	23	22
4004															
4005		23	25	26	25	24	23	24	23	22	23	23	23	23	23
4006															
4007		22	22	24	24	25	25	24	23	22	22	20	21	20	21
4008															
4009		23	23	23	23	22	21	22	20	20	20	20	20	21	20
4010															
Mean		23	24	25	24	24	23	23	22	21	22	21	21	21	21
S.D.		0	1	1	1	1	2	1	2	1	1	2	1	2	1
S.E.		0	1	1	0	0	1	0	1	0	1	1	1	1	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Male Test Article : DMS Dose : 50 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
5001		23	25	26	25	25	25	25	23	24	23	23	23	22	21
5002															
5003		22	20	20	19	20	20	20	20	19	20	19	20	19	19
5004															
5005		24	25	25	23	23	23	23	22	12	21	21	21	21	21
5006															
5007		25	26	28	27	25	23	24	23	23	22	23	22	22	22
5008															
5009		24	24	22	21	22	22	22	22	22	22	23	22	22	22
5010															
Mean		24	24	24	23	23	23	23	22	20	22	22	22	21	21
S.D.		1	2	3	3	2	2	2	1	5	1	2	1	1	1
S.E.		1	1	1	1	1	1	1	1	2	1	1	1	1	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Female Test Article : DMS Dose : 0 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
1101		18	15	16	15	15	15	17	16	15	16	16	15	14	14
1102															
1103		15	13	14	14	14	14	15	14	13	13	15	15	14	13
1104															
1105		16	15	16	16	18	18	17	16	16	15	14	14	14	14
1106															
1107		18	15	17	16	16	17	18	18	17	17	17	17	17	17
1108															
1109		19	16	17	16	17	17	17	15	15	15	16	15	14	15
1110															
Mean		17	15	16	15	16	16	17	16	15	15	16	15	15	15
S.D.		2	1	1	1	2	2	1	1	1	1	1	1	1	2
S.E.		1	0	1	0	1	1	0	1	1	1	1	0	1	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Female Test Article : Corn oil Dose : 0 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
2101		17	14	14	16	15	15	16	15	15	15	15	15	15	15
2102															
2103		14	16	16	16	17	16	16	16	16	15	14	14	13	12
2104															
2105		18	14	15	14	14	13	14	13	13	14	14	13	12	13
2106															
2107		16	15	15	16	16	16	16	15	16	15	15	15	15	14
2108															
2109		16	15	16	16	16	15	16	15	15	16	16	16	15	14
2110															
Mean		16	15	15	16	16	15	16	15	15	15	15	15	14	14
S.D.		1	1	1	1	1	1	1	1	1	1	1	1	1	1
S.E.		1	0	0	0	1	1	0	0	1	0	0	1	1	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Female Test Article : DMS Dose : 5 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
3101		13	14	13	14	15	14	15	14	14	13	13	13	12	12
3102															
3103		19	15	16	18	16	16	17	15	16	15	15	16	14	15
3104															
3105		14	14	14	15	15	16	17	16	17	17	17	17	16	16
3106															
3107		16	14	14	14	14	14	15	15	15	15	15	15	14	15
3108															
3109		17	16	16	16	16	16	17	17	16	16	16	16	15	15
3110															
Mean		16	15	15	15	15	15	16	15	16	15	15	15	14	15
S.D.		2	1	1	2	1	1	1	1	1	1	1	2	1	2
S.E.		1	0	1	1	0	0	0	1	1	1	1	1	1	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 9 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Female Test Article : DMS Dose : 15 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
4101		16	15	15	15	14	14	14	14	14	13	13	13	13	13
4102															
4103		17	14	15	15	15	16	16	16	15	16	15	15	15	14
4104															
4105		19	15	16	16	17	17	18	17	17	17	17	16	15	15
4106															
4107		18	14	15	16	17	17	17	16	16	16	15	15	15	15
4108															
4109		14	15	16	16	16	16	16	15	16	15	14	14	14	14
4110															
Mean		17	15	15	16	16	16	16	16	16	15	15	15	14	14
S.D.		2	1	1	1	1	1	1	1	1	2	1	1	1	1
S.E.		1	0	0	0	1	1	1	1	1	1	1	1	0	0
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 3 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual food consumption
 Sex : Female Test Article : DMS Dose : 50 mg/kg Unit : g/animal/day

Animal No.	Day	1	7	14	21	28	35	42	49	56	63	70	77	84	91
5101		16	15	14	15	15	15	16	15	15	15	15	14	14	15
5102															
5103		18	14	14	15	14	15	16	16	16	17	16	18	16	16
5104															
5105		18	16	16	17	18	19	19	18	18	18	17	16	16	17
5106															
5107		16	14	15	15	16	16	16	16	16	15	14	14	14	14
5108															
5109		17	14	15	16	16	16	17	17	16	16	17	16	16	17
5110															
Mean		17	15	15	16	16	16	17	16	16	16	16	16	15	16
S.D.		1	1	1	1	1	2	1	1	1	1	1	2	1	1
S.E.		0	0	0	0	1	1	1	1	0	1	1	1	0	1
n		5	5	5	5	5	5	5	5	5	5	5	5	5	5

Appendix 4 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
Test article : DMS
Dose (mg/kg) : 0

Sex	Animal No.	Ophthalmoscopy											
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi	
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Male	1001	-	-	-	-	-	-	-	-	-	-	-	-
	1002	-	-	-	-	-	-	-	-	-	-	-	-
	1003	-	-	-	-	-	-	-	-	-	-	-	-
	1004	-	-	-	-	-	-	-	-	-	-	-	-
	1005	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 4 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
 Test article : Corn oil
 Dose (mg/kg) : 0

Sex	Animal No.	Ophthalmoscopy												
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi		
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	
Male	2001	-	-	-	-	-	-	-	-	-	-	-	-	-
	2002	-	-	-	-	-	-	-	-	-	-	-	-	-
	2003	-	-	-	-	-	-	-	-	-	-	-	-	-
	2004	-	-	-	-	-	-	-	-	-	-	-	-	-
	2005	-	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 4 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
Test article : DMS
Dose (mg/kg) : 5

Sex	Animal No.	Ophthalmoscopy											
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi	
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Male	3001	-	-	-	-	-	-	-	-	-	-	-	-
	3002	-	-	-	-	-	-	-	-	-	-	-	-
	3003	-	-	-	-	-	-	-	-	-	-	-	-
	3004	-	-	-	-	-	-	-	-	-	-	-	-
	3005	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 4 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
 Test article : DMS
 Dose (mg/kg) : 15

Sex	Animal No.	Ophthalmoscopy												
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi		
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	
Male	4001	-	-	-	-	-	-	-	-	-	-	-	A	-
	4002	-	-	-	-	-	-	-	-	-	-	-	-	-
	4003	-	-	-	-	-	-	-	-	-	-	-	-	-
	4004	-	-	-	-	-	-	-	-	-	-	-	-	-
	4005	-	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality
 A: Hyperreflectivity in fundus, focal

Appendix 4 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
Test article : DMS
Dose (mg/kg) : 50

Sex	Animal No.	Ophthalmoscopy											
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi	
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Male	5001	-	-	-	-	-	-	-	-	-	-	-	-
	5002	-	-	-	-	-	-	-	-	-	-	-	-
	5003	-	-	-	-	-	-	-	-	-	-	-	-
	5004	-	-	-	-	-	-	-	-	-	-	-	-
	5005	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 4 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
 Test article : DMS
 Dose (mg/kg) : 0

Sex	Animal No.	Ophthalmoscopy											
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi	
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Female	1101	-	-	-	-	-	-	-	-	-	-	-	-
	1102	-	-	-	-	-	-	-	-	-	-	-	-
	1103	-	-	-	-	-	-	-	-	-	-	-	-
	1104	-	-	-	-	-	-	-	-	-	-	-	-
	1105	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 4 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
Test article : Corn oil
Dose (mg/kg) : 0

Sex	Animal No.	Ophthalmoscopy											
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi	
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Female	2101	-	-	-	-	-	-	-	-	-	-	-	-
	2102	-	-	-	-	-	-	-	-	-	-	-	-
	2103	-	-	-	-	-	-	-	-	-	-	-	-
	2104	-	-	-	-	-	-	-	-	-	-	-	-
	2105	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 4 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
 Test article : DMS
 Dose (mg/kg) : 5

Sex	Animal No.	Ophthalmoscopy											
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi	
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Female	3101	-	-	-	-	-	-	-	-	-	-	-	-
	3102	-	-	-	-	-	-	-	-	-	-	-	-
	3103	-	-	-	-	-	-	-	-	-	-	-	-
	3104	-	-	-	-	-	-	-	-	-	-	-	-
	3105	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 4 - 9 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
Test article : DMS
Dose (mg/kg) : 15

Sex	Animal No.	Ophthalmoscopy											
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi	
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Female	4101	-	-	-	-	-	-	-	-	-	-	-	-
	4102	-	-	-	-	-	-	-	-	-	-	-	-
	4103	-	-	-	-	-	-	-	-	-	-	-	-
	4104	-	-	-	-	-	-	-	-	-	-	-	-
	4105	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 4 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual ophthalmology (Week 13)
Test article : DMS
Dose (mg/kg) : 50

Sex	Animal No.	Ophthalmoscopy											
		Cornea		Iris		Anterior chamber		Lens		Vitreous body		Fundus oculi	
		Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
Female	5101	-	-	-	-	-	-	-	-	-	-	-	-
	5102	-	-	-	-	-	-	-	-	-	-	-	-
	5103	-	-	-	-	-	-	-	-	-	-	-	-
	5104	-	-	-	-	-	-	-	-	-	-	-	-
	5105	-	-	-	-	-	-	-	-	-	-	-	-

-: No abnormality

Appendix 5 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
1001	8.5	2 +	2 +	1 +	-	+/-	-	1.020
1002	8.5	1 +	1 +	-	-	+/-	-	1.015
1003	8.5	1 +	2 +	-	2 +	+/-	-	1.025
1004	6.5	2 +	2 +	-	+/-	+/-	-	1.030 ≤
1005	9.0 ≤	2 +	2 +	1 +	+/-	+/-	1 +	1.020
1006	8.5	+/-	+/-	-	+/-	+/-	-	1.010
1007	8.5	1 +	2 +	-	+/-	+/-	-	1.015
1008	8.5	+/-	1 +	-	+/-	+/-	-	1.010
1009	9.0 ≤	1 +	1 +	-	+/-	+/-	-	1.010
1010	9.0 ≤	2 +	1 +	-	-	+/-	-	1.005 ≥
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity

Appendix 5 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
Sex : Male

Test Article : DMS

Stage : Week 13
Dose : 0 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
1001	Y	-	-	+/-	-	-	+/-	-
1002	Y	-	-	+/-	-	-	+/-	-
1003	Y	+/-	-	+/-	-	-	-	-
1004	Y	-	-	+/-	-	-	-	-
1005	Y	-	-	+/-	-	-	+/-	-
1006	Y	-	-	+/-	-	-	-	-
1007	Y	-	-	+/-	-	-	-	-
1008	Y	-	-	+/-	-	-	-	-
1009	Y	-	-	+/-	-	-	-	-
1010	Y	-	-	+/-	-	-	-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color

RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts

Cr.CO : Crystal calcium oxalate

Appendix 5 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
1001	6.7	1.0	2.2	1.7
1002	6.5	1.0	1.6	1.2
1003	7.6	1.5	3.0	2.3
1004	4.3	0.6	2.0	1.3
1005	8.1	1.4	2.4	1.9
1006	9.0	1.0	3.2	2.2
1007	7.0	1.3	3.3	2.3
1008	6.6	1.1	2.9	2.3
1009	8.8	1.8	3.4	2.7
1010	9.2	2.1	4.1	3.1
Mean	7.4	1.3	2.8	2.1
S.D.	1.5	0.4	0.8	0.6
S.E.	0.5	0.1	0.2	0.2
n	10	10	10	10

Uri.Vol. : Urine volume

Appendix 5 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
2001	7.5	2 +	1 +	-	+/-	+/-	-	1.025
2002	8.5	2 +	2 +	-	-	+/-	1 +	1.010
2003	9.0 \leq	1 +	1 +	-	-	+/-	-	1.010
2004	8.5	2 +	1 +	-	+/-	+/-	-	1.020
2005	8.5	-	+/-	-	+/-	+/-	-	1.010
2006	9.0 \leq	2 +	2 +	-	-	+/-	1 +	1.010
2007	7.0	1 +	1 +	-	+/-	+/-	-	1.025
2008	8.5	2 +	2 +	-	1 +	+/-	-	1.020
2009	8.5	1 +	1 +	-	+/-	+/-	-	1.010
2010	8.0	1 +	1 +	-	+/-	+/-	-	1.015
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+: \geq 300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+: \geq 1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+: \geq 8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity

Appendix 5 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
2001	Y	-	-	+/-	-	-	-	-
2002	Y	-	-	+/-	-	-	+/-	-
2003	Y	-	-	+/-	-	-	+/-	-
2004	Y	-	-	+/-	-	-	-	-
2005	Y	-	-	+/-	-	-	-	-
2006	Y	-	-	+/-	-	-	+/-	-
2007	Y	-	-	+/-	-	-	-	-
2008	Y	-	-	+/-	-	-	-	-
2009	Y	-	-	+/-	-	-	-	-
2010	Y	-	-	+/-	-	-	-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
 RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts
 Cr.CO : Crystal calcium oxalate

Appendix 5 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
2001	6.3	1.4	2.3	1.9
2002	7.0	1.2	2.6	2.1
2003	6.0	1.5	2.5	2.6
2004	7.9	1.6	3.2	2.4
2005	12.6	1.2	3.4	2.5
2006	6.8	0.9	2.6	1.8
2007	5.3	0.8	2.2	1.8
2008	4.7	0.9	2.1	1.5
2009	11.3	2.1	3.5	2.7
2010	13.9	1.8	4.4	3.3
Mean	8.2	1.3	2.9	2.3
S.D.	3.2	0.4	0.7	0.5
S.E.	1.0	0.1	0.2	0.2
n	10	10	10	10

Uri.Vol. : Urine volume

Appendix 5 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis Stage : Week 13
 Sex : Male Test Article : DMS Dose : 5 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
3001	9.0 ≤	1 +	+/-	-	-	+/-	1 +	1.010
3002	9.0 ≤	1 +	+/-	-	+/-	+/-	-	1.010
3003	8.5	+/-	+/-	-	-	+/-	-	1.015
3004	9.0 ≤	+/-	1 +	-	-	+/-	-	1.010
3005	8.5	2 +	2 +	-	+/-	+/-	-	1.020
3006	9.0 ≤	2 +	2 +	-	-	+/-	-	1.010
3007	7.0	1 +	+/-	-	+/-	+/-	-	1.020
3008	8.5	2 +	1 +	-	-	+/-	-	1.020
3009	8.5	3 +	2 +	-	-	+/-	1 +	1.020
3010	9.0 ≤	1 +	1 +	-	-	+/-	-	1.015
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity

Appendix 5 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
3001	Y	-	-	+/-	-	-	+/-	-
3002	Y	-	-	+/-	-	-	-	-
3003	Y	-	-	+/-	-	-	+/-	-
3004	Y	-	-	+/-	-	-	-	-
3005	Y	-	-	+/-	-	-	+/-	-
3006	Y	-	-	+/-	-	-	+/-	-
3007	Y	-	-	+/-	-	-	-	-
3008	Y	-	-	+/-	-	-	+/-	-
3009	Y	-	-	+/-	-	-	-	-
3010	Y	-	-	+/-	-	-	+/-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
 RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts
 Cr.CO : Crystal calcium oxalate

Appendix 5 - 9 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
3001	10.4	2.1	3.3	2.6
3002	9.3	1.9	3.9	3.1
3003	8.3	1.4	2.9	2.3
3004	13.1	2.0	3.5	2.8
3005	19.9	1.0	2.7	2.0
3006	7.6	1.3	3.4	2.3
3007	20.3	1.5	2.4	2.0
3008	9.8	1.9	3.4	2.5
3009	8.4	1.7	3.4	2.4
3010	6.0	1.4	2.7	2.1
Mean	11.3	1.6	3.2	2.4
S.D.	5.0	0.4	0.5	0.4
S.E.	1.6	0.1	0.1	0.1
n	10	10	10	10

Uri.Vol. : Urine volume

Appendix 5 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
4001	8.5	2 +	1 +	-	+/-	+/-	-	1.025
4002	8.0	3 +	2 +	1 +	-	+/-	-	1.025
4003	8.5	2 +	2 +	1 +	-	+/-	-	1.015
4004	7.0	2 +	2 +	-	1 +	+/-	-	1.025
4005	7.5	2 +	2 +	-	-	+/-	-	1.025
4006	8.0	1 +	1 +	-	+/-	+/-	-	1.020
4007	8.5	1 +	1 +	-	-	+/-	-	1.015
4008	6.5	+/-	+/-	-	-	+/-	-	1.015
4009	7.5	+/-	1 +	-	+/-	+/-	-	1.010
4010	8.5	2 +	2 +	-	+/-	+/-	-	1.010
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity

Appendix 5 - 11 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
Sex : Male

Test Article : DMS

Stage : Week 13
Dose : 15 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
4001	Y	-	-	+/-	-	-	-	-
4002	Y	-	-	+/-	-	-	+/-	-
4003	Y	-	-	+/-	-	-	+/-	-
4004	Y	+/-	-	+/-	-	-	-	-
4005	Y	-	-	+/-	-	-	-	-
4006	Y	-	-	+/-	-	-	-	-
4007	Y	-	-	+/-	-	-	+/-	-
4008	Y	-	-	+/-	-	-	-	-
4009	Y	-	-	+/-	-	-	-	-
4010	Y	-	-	+/-	-	-	+/-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color

RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts

Cr.CO : Crystal calcium oxalate

Appendix 5 - 12 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male

Test Article : DMS

Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
4001	8.5	1.3	3.2	2.3
4002	6.7	2.2	3.0	2.7
4003	7.5	1.5	2.5	2.0
4004	10.2	2.2	4.4	3.5
4005	10.9	2.3	3.8	3.1
4006	12.2	2.5	4.2	3.7
4007	8.3	1.0	3.2	2.0
4008	9.9	1.7	3.3	2.3
4009	8.1	1.5	2.3	1.9
4010	5.1	0.9	2.1	1.4
Mean	8.7	1.7	3.2	2.5
S.D.	2.1	0.6	0.8	0.7
S.E.	0.7	0.2	0.2	0.2
n	10	10	10	10

Uri.Vol. : Urine volume

Appendix 5 - 13 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
5001	8.5	+/-	+/-	-	+/-	+/-	-	1.010
5002	9.0 \leq	2 +	1 +	-	-	+/-	1 +	1.010
5003	8.5	2 +	2 +	-	+/-	+/-	-	1.020
5004	9.0 \leq	3 +	2 +	1 +	-	+/-	1 +	1.005 \geq
5005	9.0 \leq	2 +	2 +	-	-	+/-	1 +	1.010
5006	8.5	1 +	1 +	-	+/-	+/-	-	1.020
5007	7.0	3 +	2 +	1 +	+/-	+/-	1 +	1.030 \leq
5008	8.5	2 +	1 +	-	-	+/-	-	1.020
5009	6.5	2 +	1 +	-	-	+/-	-	1.030 \leq
5010	8.5	+/-	+/-	-	+/-	+/-	-	1.010
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+: \geq 300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+: \geq 1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+: \geq 8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity

Appendix 5 - 14 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
Sex : Male

Test Article : DMS

Stage : Week 13
Dose : 50 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
5001	Y	-	-	+/-	-	-	-	-
5002	Y	-	-	+/-	-	-	+/-	-
5003	Y	-	-	+/-	-	-	+/-	-
5004	Y	-	-	+/-	-	-	-	-
5005	Y	-	-	+/-	-	-	+/-	-
5006	Y	-	-	+/-	-	-	+/-	-
5007	Y	-	-	+/-	-	-	-	-
5008	Y	-	-	+/-	-	-	+/-	-
5009	Y	-	-	+/-	-	-	-	+/-
5010	Y	-	-	+/-	-	-	-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color

RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe

Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts

Cr.CO : Crystal calcium oxalate

Appendix 5 - 15 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
5001	9.4	1.6	2.6	2.2
5002	8.0	1.7	3.2	2.9
5003	7.5	1.6	2.9	2.2
5004	4.5	1.3	2.2	2.1
5005	7.0	1.2	2.6	2.0
5006	12.1	2.3	3.9	3.2
5007	4.5	0.9	1.6	1.3
5008	13.2	2.0	3.6	2.9
5009	9.7	2.2	4.0	3.1
5010	13.9	1.8	3.4	2.7
Mean	9.0	1.7	3.0	2.5
S.D.	3.3	0.4	0.8	0.6
S.E.	1.1	0.1	0.2	0.2
n	10	10	10	10

Uri.Vol. : Urine volume

Appendix 5 - 16 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
1101	6.0	+/-	+/-	-	-	+/-	-	1.030 ≤
1102	8.0	1 +	1 +	-	-	+/-	-	1.025
1103	7.0	-	-	-	-	+/-	-	1.010
1104	6.0	1 +	+/-	-	-	+/-	-	1.030 ≤
1105	7.0	+/-	+/-	-	-	+/-	-	1.025
1106	7.0	-	-	-	-	+/-	-	1.005 >
1107	6.0	1 +	1 +	-	-	+/-	-	1.030 ≤
1108	6.5	1 +	1 +	-	-	+/-	-	1.030 ≤
1109	8.5	+/-	+/-	-	-	+/-	-	1.020
1110	6.5	1 +	1 +	-	-	+/-	-	1.025
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity

Appendix 5 - 17 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female
 Test Article : DMS
 Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
1101	Y	-	-	+/-	-	-	-	-
1102	Y	-	-	+/-	-	-	-	-
1103	Y	-	-	+/-	-	-	-	-
1104	Y	-	-	+/-	-	-	-	-
1105	Y	-	-	+/-	-	-	-	-
1106	Y	-	-	+/-	-	-	-	-
1107	Y	-	-	+/-	-	-	-	-
1108	Y	-	-	+/-	-	-	-	-
1109	Y	-	-	+/-	-	-	-	-
1110	Y	-	-	+/-	-	-	-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
 RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts
 Cr.CO : Crystal calcium oxalate

Appendix 5 - 18 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female

Test Article : DMS

Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
1101	10.0	1.1	1.7	1.3
1102	3.5	0.6	1.4	1.0
1103	3.2	0.8	1.8	1.4
1104	3.7	0.7	1.4	1.2
1105	5.8	1.1	1.9	1.6
1106	5.1	1.1	2.1	1.7
1107	6.5	0.8	2.2	1.5
1108	8.0	1.1	2.0	1.7
1109	6.1	0.7	1.8	1.4
1110	4.6	1.0	1.9	1.6
Mean	5.7	0.9	1.8	1.4
S.D.	2.1	0.2	0.3	0.2
S.E.	0.7	0.1	0.1	0.1
n	10	10	10	10

Uri.Vol. : Urine volume



Item : Individual urinalysis Stage : Week 13
 Sex : Female Test Article : Corn oil Dose : 0 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
2101	7.5	+/-	+/-	-	-	+/-	-	1.010
2102	6.5	+/-	+/-	-	-	+/-	-	1.025
2103	6.0	+/-	+/-	-	-	+/-	-	1.025
2104	6.5	+/-	+/-	-	-	+/-	-	1.015
2105	7.0	-	-	-	-	+/-	-	1.010
2106	6.5	2 +	1 +	-	-	+/-	-	1.030 <
2107	7.0	-	-	-	-	+/-	-	1.010
2108	6.5	-	-	-	-	+/-	-	1.005 >
2109	7.5	-	-	-	-	+/-	-	1.010
2110	8.5	-	-	-	-	+/-	-	1.015
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity



Item : Individual urinalysis
 Sex : Female Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
2101	Y	-	-	+/-	-	-	-	-
2102	Y	-	-	+/-	-	-	-	-
2103	Y	-	-	+/-	-	-	-	-
2104	Y	-	-	+/-	-	-	-	-
2105	Y	-	-	+/-	-	-	-	-
2106	Y	-	-	+/-	-	-	-	-
2107	Y	-	-	+/-	-	-	+/-	-
2108	Y	-	-	+/-	-	-	-	-
2109	Y	-	-	+/-	-	-	-	-
2110	Y	-	-	+/-	-	-	+/-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
 RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts
 Cr.CO : Crystal calcium oxalate

Appendix 5 - 21 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
Sex : Female
Test Article : Corn oil
Stage : Week 13
Dose : 0 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
2101	2.9	0.4	1.2	0.8
2102	1.5	0.4	1.2	0.8
2103	3.6	0.6	0.8	0.8
2104	4.3	0.9	1.5	1.2
2105	1.5	0.3	0.5	0.3
2106	2.2	0.5	0.9	0.7
2107	3.7	0.6	1.1	0.9
2108	12.3	1.5	2.4	1.9
2109	12.4	1.0	2.1	1.5
2110	4.9	0.7	2.1	1.4
Mean	4.9	0.7	1.4	1.0
S.D.	4.1	0.4	0.6	0.5
S.E.	1.3	0.1	0.2	0.1
n	10	10	10	10

Uri.Vol. : Urine volume

Appendix 5 - 22 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
3101	7.0	-	-	-	-	+/-	-	1.005 ≥
3102	7.0	2 +	1 +	-	-	+/-	-	1.030 ≤
3103	8.5	-	-	-	-	+/-	-	1.010
3104	8.5	+/-	+/-	-	-	+/-	-	1.015
3105	7.5	-	-	-	-	+/-	-	1.015
3106	6.5	-	-	-	-	+/-	-	1.005 ≥
3107	9.0 ≤	-	-	-	-	+/-	-	1.010
3108	6.5	+/-	+/-	-	-	+/-	-	1.020
3109	7.0	-	-	-	-	+/-	-	1.010
3110	7.0	1 +	1 +	-	-	+/-	-	1.025
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity

Appendix 5 - 23 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female
 Test Article : DMS
 Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
3101	Y	-	-	+/-	-	-	-	-
3102	Y	-	-	+/-	-	-	-	-
3103	Y	-	-	+/-	-	-	+/-	-
3104	Y	-	-	+/-	-	-	+/-	-
3105	Y	-	-	+/-	-	-	-	-
3106	Y	-	-	+/-	-	-	-	-
3107	Y	-	-	+/-	-	-	-	-
3108	Y	-	-	+/-	-	-	-	-
3109	Y	-	-	+/-	-	-	-	-
3110	Y	-	-	+/-	-	-	+/-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
 RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts
 Cr.CO : Crystal calcium oxalate

Appendix 5 - 24 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female

Test Article : DMS

Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
3101	12.0	1.0	2.1	1.4
3102	2.8	0.5	1.1	0.8
3103	7.2	0.6	1.5	1.0
3104	4.6	0.8	1.3	0.9
3105	4.4	0.8	1.3	1.0
3106	21.0	1.3	2.1	1.8
3107	5.1	1.0	1.9	1.5
3108	2.9	0.6	1.1	0.8
3109	1.5	0.2	0.7	0.4
3110	4.8	1.0	1.8	1.4
Mean	6.6	0.8	1.5	1.1
S.D.	5.8	0.3	0.5	0.4
S.E.	1.8	0.1	0.1	0.1
n	10	10	10	10

Uri.Vol. : Urine volume

Appendix 5 - 25 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
4101	6.5	+/-	+/-	-	-	+/-	-	1.015
4102	7.0	1 +	+/-	-	-	+/-	-	1.025
4103	6.0	2 +	-	-	-	+/-	-	1.030 \leq
4104	6.5	-	-	-	-	+/-	-	1.005 \geq
4105	7.0	+/-	+/-	-	-	+/-	-	1.025
4106	7.5	-	-	-	-	+/-	-	1.010
4107	6.5	+/-	+/-	-	-	+/-	-	1.025
4108	7.0	+/-	+/-	-	-	+/-	-	1.020
4109	7.0	-	-	-	-	+/-	-	1.005 \geq
4110	7.0	+/-	+/-	-	-	+/-	-	1.020
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+: \geq 300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+: \geq 1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+: \geq 8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity



Item : Individual urinalysis
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
4101	Y	-	-	+/-	-	-	-	-
4102	Y	-	-	+/-	-	-	-	-
4103	Y	-	-	+/-	-	-	+/-	-
4104	Y	-	-	+/-	-	-	-	-
4105	Y	-	-	+/-	-	-	-	-
4106	Y	-	-	+/-	-	-	-	-
4107	Y	-	-	+/-	-	-	-	-
4108	Y	-	-	+/-	-	-	-	-
4109	Y	-	-	+/-	-	-	-	-
4110	Y	-	-	+/-	-	-	-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
 RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts
 Cr.CO : Crystal calcium oxalate

Appendix 5 - 27 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female

Test Article : DMS

Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
4101	11.8	1.6	2.5	2.1
4102	10.2	1.4	2.0	1.9
4103	1.0	0.3	0.6	0.4
4104	24.8	0.8	1.7	1.5
4105	8.1	1.4	2.0	1.9
4106	20.2	1.9	3.0	2.5
4107	6.0	0.9	1.9	1.5
4108	5.3	1.0	1.7	1.5
4109	7.6	0.8	1.9	1.2
4110	8.3	0.7	1.6	1.0
Mean	10.3	1.1	1.9	1.6
S.D.	7.1	0.5	0.6	0.6
S.E.	2.3	0.2	0.2	0.2
n	10	10	10	10

Uri.Vol. : Urine volume



Item : Individual urinalysis
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	pH	Protein	Ketones	Glucose	Oc.Blood	Urobili.	Bilirubin	S.G.
5101	7.5	-	-	-	-	+/-	-	1.005 ≥
5102	7.0	+/-	+/-	-	-	+/-	-	1.025
5103	7.5	-	-	-	-	+/-	-	1.010
5104	6.5	+/-	+/-	-	-	+/-	-	1.020
5105	6.0	+/-	+/-	-	-	+/-	-	1.020
5106	8.0	-	-	-	-	+/-	-	1.010
5107	8.5	-	-	-	-	+/-	-	1.010
5108	7.0	-	-	-	-	+/-	-	1.015
5109	8.5	-	-	-	-	+/-	-	1.015
5110	6.0	+/-	+/-	-	+/-	+/-	-	1.025
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

Protein) -:Negative, +/-:15, 1+:30, 2+:100, 3+:≥300 mg/dL
 Ketones) -:Negative, +/-:5, 1+:15, 2+:40, 3+:80 mg/dL
 Glucose) -:Negative, 1+:100, 2+:250, 3+:500, 4+:≥1000 mg/dL
 Oc.Blood) -:Negative, +/-:0.015, 1+:0.062, 2+:0.135, 3+:0.405 mg/dL
 Urobili.) +/-:0.1-1.0, 1+:2.0, 2+:4.0, 3+:≥8.0 Ehrlich U/dL
 Bilirubin) -:Negative, 1+:0.8, 2+:1.6, 3+:3.2 mg/dL
 Oc.Blood : Occult blood Urobili. : Urobilinogen S.G. : Specific gravity

Appendix 5 - 29 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female

Test Article : DMS

Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Color	RBC	WBC	Ep.SEC	Ep.SREC	Cast	Cr.PS	Cr.CO
5101	Y	-	-	+/-	-	-	-	-
5102	Y	-	-	+/-	-	-	-	-
5103	Y	-	-	+/-	-	-	-	-
5104	Y	-	-	+/-	-	-	-	-
5105	Y	-	-	+/-	-	-	-	-
5106	Y	-	-	+/-	-	-	-	-
5107	Y	-	-	+/-	-	-	-	-
5108	Y	-	-	+/-	-	-	-	-
5109	Y	-	+/-	+/-	-	-	+/-	-
5110	Y	-	-	+/-	-	-	-	-
Mean								
S.D.								
S.E.								
n	10	10	10	10	10	10	10	10

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Color) LY:Light yellow, Y:Yellow, DY:Dark yellow, Other:Other color
 RBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 WBC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SREC) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cast) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.PS) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Cr.CO) -:Negative, +/-:Slight, 1+:Mild, 2+:Moderate, 3+:Severe
 Ep.SEC : Squamous epithelial cells Ep.SREC : Small round epithelial cells Cr.PS : Crystal phosphate salts
 Cr.CO : Crystal calcium oxalate

Appendix 5 - 30 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual urinalysis
 Sex : Female

Test Article : DMS

Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Uri.Vol. mL/24h	U-Na mmol/24h	U-K mmol/24h	U-Cl mmol/24h
5101	12.9	1.7	2.7	2.3
5102	6.9	0.6	1.4	0.9
5103	6.3	0.8	1.9	1.1
5104	5.6	0.6	1.4	0.8
5105	13.0	1.6	3.1	2.4
5106	11.2	1.3	3.2	2.3
5107	10.4	1.4	2.8	2.4
5108	14.3	1.3	2.2	1.7
5109	10.6	1.8	3.2	2.9
5110	6.8	1.2	2.3	1.6
Mean	9.8	1.2	2.4	1.8
S.D.	3.2	0.4	0.7	0.7
S.E.	1.0	0.1	0.2	0.2
n	10	10	10	10

Uri.Vol. : Urine volume

Appendix 6 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
1001	852	15.9	45.4	53.3	18.7	35.0	168.8	106.1	109.2	89.5
1002	837	15.4	43.9	52.4	18.5	35.2	130.4	110.4	63.2	41.7
1003	855	15.4	45.0	52.7	18.0	34.1	165.5	107.9	73.7	51.0
1004	843	14.9	43.6	51.7	17.6	34.2	176.5	106.0	69.5	53.8
1005	884	15.6	44.9	50.8	17.6	34.6	172.7	133.4	83.2	63.9
1006	891	15.5	45.4	50.9	17.4	34.1	181.4	102.5	126.0	101.7
1007	894	15.9	45.9	51.4	17.8	34.6	181.5	99.2	85.1	64.8
1008	844	15.0	44.0	52.2	17.8	34.1	166.0	93.4	80.8	61.1
1009	794	14.6	41.5	52.2	18.4	35.2	124.1	95.5	54.7	44.6
1010	859	15.6	44.8	52.1	18.2	34.9	181.4	91.8	71.3	57.5
Mean	855	15.4	44.4	52.0	18.0	34.6	164.8	104.6	81.7	63.0
S.D.	30	0.4	1.3	0.8	0.4	0.5	20.8	11.9	21.4	19.0
S.E.	9	0.1	0.4	0.2	0.1	0.1	6.6	3.8	6.8	6.0
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Male

Test Article : DMS

Stage : Week 13
 Dose : 0 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
1001	14.5	1.1	0.3	3.2	0.6	11.4	15.6	353
1002	17.6	1.1	0.1	2.5	0.2	12.4	13.9	271
1003	16.6	1.6	0.1	3.9	0.5	12.3	16.0	317
1004	12.8	0.7	0.1	1.6	0.5	11.1	16.4	289
1005	14.9	1.3	0.3	2.2	0.7	12.3	16.5	284
1006	18.2	0.8	0.5	3.0	1.8	12.6	19.7	317
1007	15.2	2.0	0.3	2.2	0.6	11.8	20.6	273
1008	14.4	0.7	0.3	3.8	0.6	12.0	16.8	287
1009	7.8	0.6	0.1	1.2	0.3	12.7	17.6	242
1010	9.1	0.8	0.2	2.8	0.9	11.9	17.7	322
Mean	14.1	1.1	0.2	2.6	0.7	12.1	17.1	296
S.D.	3.4	0.5	0.1	0.9	0.4	0.5	2.0	32
S.E.	1.1	0.1	0.0	0.3	0.1	0.2	0.6	10
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology

Stage : Week 13

Sex : Male

Test Article : Corn oil

Dose : 0 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
2001	839	15.0	44.3	52.8	17.9	34.0	162.6	90.1	65.2	47.8
2002	862	15.9	46.3	53.7	18.4	34.3	176.5	79.2	87.5	65.7
2003	797	14.8	43.5	54.6	18.6	34.1	144.7	92.9	50.7	36.6
2004	888	15.7	46.0	51.9	17.7	34.2	178.2	108.1	70.5	44.9
2005	858	15.5	44.7	52.1	18.0	34.6	144.6	112.8	63.0	46.7
2006	835	15.4	44.4	53.2	18.5	34.7	142.9	85.4	73.1	48.6
2007	823	15.6	43.8	53.2	19.0	35.7	124.9	102.2	71.6	59.4
2008	853	15.5	44.4	52.1	18.2	34.9	177.3	91.5	100.4	77.4
2009	855	15.6	44.5	52.0	18.3	35.2	200.4	111.0	107.8	85.1
2010	832	15.3	44.2	53.2	18.4	34.6	197.7	87.8	111.6	76.5
Mean	844	15.4	44.6	52.9	18.3	34.6	165.0	96.1	80.1	58.9
S.D.	25	0.3	0.9	0.9	0.4	0.5	25.2	11.6	20.6	16.5
S.E.	8	0.1	0.3	0.3	0.1	0.2	8.0	3.7	6.5	5.2
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Male
 Test Article : Corn oil
 Stage : Week 13
 Dose : 0 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
2001	14.3	1.1	0.1	1.3	0.5	11.3	13.3	316
2002	15.5	1.4	0.2	3.6	1.0	12.8	19.0	274
2003	9.8	0.4	0.1	3.4	0.4	11.9	16.4	259
2004	21.8	0.4	0.1	2.6	0.7	10.9	17.1	286
2005	12.9	1.4	0.2	1.4	0.4	12.3	18.0	313
2006	21.4	0.9	0.1	1.8	0.3	11.4	16.5	280
2007	8.1	0.9	0.2	2.2	0.8	11.6	16.6	272
2008	18.1	1.1	0.2	2.3	1.2	12.3	17.6	297
2009	16.9	1.4	0.4	3.0	1.0	12.0	15.8	300
2010	27.5	1.1	0.3	5.6	0.5	11.3	12.9	357
Mean	16.6	1.0	0.2	2.7	0.7	11.8	16.3	295
S.D.	5.9	0.4	0.1	1.3	0.3	0.6	1.9	28
S.E.	1.9	0.1	0.0	0.4	0.1	0.2	0.6	9
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
Sex : Male

Test Article : DMS

Stage : Week 13
Dose : 5 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
3001	841	15.0	42.8	50.9	17.8	35.0	82.2	96.2	66.4	54.7
3002	811	14.5	43.0	53.0	17.9	33.8	193.9	92.9	73.0	57.1
3003	828	14.6	42.7	51.6	17.6	34.2	160.0	98.5	70.8	51.9
3004	824	15.6	45.5	55.2	18.9	34.3	155.1	111.3	50.0	32.6
3005	892	16.1	46.5	52.1	18.0	34.6	167.4	96.4	116.3	88.3
3006	816	14.5	42.0	51.5	17.7	34.4	207.8	94.1	109.5	81.7
3007	896	15.1	44.5	49.7	16.9	34.0	172.7	87.3	73.5	54.0
3008	826	14.7	42.6	51.6	17.8	34.6	169.2	96.3	132.3	68.5
3009	774	14.4	41.4	53.5	18.6	34.7	171.1	98.9	102.5	64.6
3010	865	14.7	42.9	49.6	17.0	34.2	194.2	109.9	96.5	68.7
Mean	837	14.9	43.4	51.9	17.8	34.4	167.4	98.2	89.1	62.2
S.D.	38	0.5	1.6	1.7	0.6	0.4	34.3	7.3	26.1	15.9
S.E.	12	0.2	0.5	0.5	0.2	0.1	10.8	2.3	8.3	5.0
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
3001	7.3	0.5	0.2	3.1	0.5	11.9	14.1	266
3002	12.7	0.7	0.2	2.1	0.2	12.1	16.4	282
3003	14.5	0.8	0.1	2.8	0.7	12.3	16.3	310
3004	14.5	0.7	0.1	1.9	0.2	15.1	18.7	311
3005	22.0	1.7	0.4	2.9	0.9	12.5	21.2	272
3006	21.8	0.7	0.4	3.8	1.1	11.2	13.4	299
3007	15.4	0.8	0.1	2.8	0.4	12.2	17.0	318
3008	54.4	1.2	0.3	5.8	2.2	11.3	14.5	377
3009	32.9	1.0	0.2	3.1	0.7	11.6	15.8	287
3010	21.6	0.6	0.2	4.1	1.3	12.8	18.3	309
Mean	21.7	0.9	0.2	3.2	0.8	12.3	16.6	303
S.D.	13.4	0.4	0.1	1.1	0.6	1.1	2.4	31
S.E.	4.3	0.1	0.0	0.4	0.2	0.4	0.7	10
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Male

Test Article : DMS

Stage : Week 13
 Dose : 15 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
4001	843	15.3	44.2	52.5	18.2	34.6	179.9	93.4	86.1	72.5
4002	839	15.2	44.5	53.1	18.1	34.1	196.2	95.3	64.7	44.5
4003	845	15.8	46.0	54.5	18.6	34.2	169.9	88.0	63.8	45.9
4004	867	15.3	44.9	51.8	17.7	34.2	196.2	96.3	71.0	50.7
4005	800	14.7	41.8	52.2	18.4	35.2	142.0	104.0	116.4	82.9
4006	845	15.2	43.6	51.6	18.0	34.9	174.2	102.1	82.5	63.1
4007	884	15.9	45.3	51.2	17.9	35.0	159.0	86.8	118.6	80.1
4008	919	15.6	45.0	48.9	16.9	34.6	199.8	97.6	92.4	68.9
4009	831	15.5	44.6	53.7	18.6	34.7	172.1	101.8	99.3	74.6
4010	846	15.0	43.2	51.1	17.7	34.7	153.3	88.8	72.7	55.6
Mean	852	15.4	44.3	52.1	18.0	34.6	174.3	95.4	86.8	63.9
S.D.	32	0.4	1.2	1.6	0.5	0.4	19.4	6.2	19.9	14.1
S.E.	10	0.1	0.4	0.5	0.2	0.1	6.1	1.9	6.3	4.4
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Male

Test Article : DMS

Stage : Week 13
 Dose : 15 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
4001	10.3	0.9	0.3	1.5	0.6	11.9	16.9	316
4002	15.9	0.8	0.0	2.9	0.6	12.4	15.8	328
4003	13.8	0.6	0.0	3.0	0.6	11.2	15.1	288
4004	16.5	1.1	0.2	2.0	0.5	12.3	17.0	324
4005	26.4	1.3	0.3	4.6	0.9	11.6	15.4	242
4006	15.2	0.6	0.3	2.6	0.7	11.8	11.8	313
4007	30.0	2.8	0.3	4.7	0.7	12.3	14.5	325
4008	17.0	2.1	0.3	3.3	0.8	11.2	16.1	255
4009	18.0	0.9	0.3	4.5	1.0	12.1	19.1	278
4010	13.4	0.6	0.2	2.6	0.4	12.0	17.1	309
Mean	17.7	1.2	0.2	3.2	0.7	11.9	15.9	298
S.D.	6.0	0.7	0.1	1.1	0.2	0.4	1.9	31
S.E.	1.9	0.2	0.0	0.4	0.1	0.1	0.6	10
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 9 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
5001	861	15.0	43.1	50.1	17.5	34.9	165.9	98.3	85.5	68.1
5002	793	14.6	41.4	52.1	18.4	35.3	196.8	98.8	61.9	48.1
5003	850	15.5	45.1	53.1	18.3	34.4	156.4	82.4	83.8	69.2
5004	841	15.7	44.9	53.4	18.7	35.0	169.9	97.7	119.0	92.4
5005	833	15.2	43.3	52.0	18.2	35.0	138.5	107.4	66.9	54.0
5006	826	15.1	43.7	52.9	18.3	34.6	157.9	98.3	64.4	49.9
5007	901	16.8	48.8	54.2	18.6	34.3	186.1	96.9	88.5	61.6
5008	867	14.6	42.8	49.3	16.8	34.1	169.0	138.5	92.6	60.2
5009	871	15.8	44.9	51.5	18.1	35.2	204.0	93.6	144.4	95.2
5010	873	15.7	44.9	51.4	17.9	34.9	139.6	98.5	72.0	50.0
Mean	852	15.4	44.3	52.0	18.1	34.8	168.4	101.0	87.9	64.9
S.D.	30	0.7	2.0	1.5	0.6	0.4	22.0	14.5	26.1	16.9
S.E.	10	0.2	0.6	0.5	0.2	0.1	7.0	4.6	8.3	5.4
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Male

Test Article : DMS

Stage : Week 13
 Dose : 50 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
5001	12.5	1.2	0.1	3.0	0.5	11.2	16.7	281
5002	10.8	0.8	0.2	1.6	0.4	12.0	17.0	274
5003	11.3	0.5	0.1	2.0	0.7	14.8	19.6	272
5004	20.8	2.0	0.5	2.5	0.9	12.3	16.9	288
5005	9.0	0.9	0.1	2.2	0.7	11.6	17.3	260
5006	11.7	0.8	0.1	1.3	0.5	11.5	13.7	276
5007	19.7	1.9	0.3	3.7	1.3	11.4	14.7	299
5008	25.9	2.2	0.2	3.4	0.8	11.3	14.3	288
5009	40.7	0.9	0.6	5.9	1.1	12.2	16.4	280
5010	18.2	1.1	0.2	2.1	0.4	13.1	17.8	291
Mean	18.1	1.2	0.2	2.8	0.7	12.1	16.4	281
S.D.	9.6	0.6	0.2	1.3	0.3	1.1	1.8	11
S.E.	3.0	0.2	0.1	0.4	0.1	0.3	0.6	4
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 11 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology

Stage : Week 13

Sex : Female

Test Article : DMS

Dose : 0 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
1101	792	14.7	41.8	52.7	18.6	35.2	133.9	108.4	60.2	42.8
1102	748	14.5	41.5	55.6	19.4	34.9	184.0	112.4	34.7	27.6
1103	781	14.5	41.5	53.2	18.6	35.1	127.2	95.9	33.6	26.4
1104	788	15.4	44.6	56.6	19.6	34.7	195.8	87.3	65.3	48.7
1105	792	14.4	41.3	52.1	18.1	34.8	206.4	107.0	43.6	31.4
1106	784	14.5	41.4	52.9	18.5	35.0	154.9	93.6	35.2	24.7
1107	745	14.5	41.9	56.3	19.5	34.6	159.7	101.3	67.5	54.8
1108	744	15.1	42.5	57.2	20.3	35.5	162.9	86.7	89.2	70.9
1109	832	14.5	40.8	49.1	17.5	35.6	112.7	126.0	64.7	53.9
1110	751	14.5	41.1	54.8	19.4	35.4	168.8	92.7	39.9	29.1
Mean	776	14.7	41.8	54.1	19.0	35.1	160.6	101.1	53.4	41.0
S.D.	28	0.3	1.1	2.5	0.8	0.3	30.0	12.4	18.7	15.7
S.E.	9	0.1	0.3	0.8	0.3	0.1	9.5	3.9	5.9	5.0
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 12 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Female

Test Article : DMS

Stage : Week 13
 Dose : 0 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
1101	13.9	0.8	0.2	2.2	0.4	11.8	13.8	223
1102	5.6	0.4	0.0	0.9	0.1	11.4	16.5	208
1103	5.5	0.5	0.0	0.8	0.4	11.8	14.7	212
1104	13.6	1.0	0.2	1.2	0.6	11.9	16.8	205
1105	9.5	0.7	0.0	1.5	0.5	11.7	13.8	212
1106	7.8	0.6	0.0	1.6	0.5	11.6	15.5	177
1107	9.2	0.7	0.1	1.7	0.9	10.7	12.7	210
1108	14.3	0.9	0.2	1.9	1.0	11.2	13.0	205
1109	7.3	1.2	0.1	1.5	0.5	11.1	12.6	247
1110	8.3	0.5	0.1	1.4	0.5	10.4	13.0	234
Mean	9.5	0.7	0.1	1.5	0.5	11.4	14.2	213
S.D.	3.3	0.2	0.1	0.4	0.3	0.5	1.6	19
S.E.	1.1	0.1	0.0	0.1	0.1	0.2	0.5	6
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 13 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology

Stage : Week 13

Sex : Female

Test Article : Corn oil

Dose : 0 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
2101	740	13.9	39.9	53.9	18.8	34.9	141.8	89.6	43.0	34.5
2102	752	14.8	42.5	56.6	19.7	34.8	138.7	99.3	43.2	32.4
2103	750	14.1	40.8	54.5	18.8	34.5	185.9	111.6	45.3	35.2
2104	768	14.5	41.1	53.5	18.8	35.2	131.3	108.4	46.8	33.6
2105	796	15.2	42.8	53.7	19.1	35.6	102.1	101.3	52.6	44.2
2106	770	14.2	41.3	53.6	18.5	34.5	141.3	105.0	60.7	52.8
2107	842	15.5	44.1	52.4	18.4	35.2	121.2	103.4	55.1	43.4
2108	771	14.7	41.2	53.4	19.1	35.7	120.5	91.4	41.1	29.2
2109	743	14.4	40.8	54.9	19.4	35.3	135.6	99.3	53.4	45.4
2110	798	14.8	41.9	52.5	18.5	35.3	94.3	106.8	59.6	49.6
Mean	773	14.6	41.6	53.9	18.9	35.1	131.3	101.6	50.1	40.0
S.D.	31	0.5	1.2	1.2	0.4	0.4	25.2	7.0	7.1	8.0
S.E.	10	0.2	0.4	0.4	0.1	0.1	8.0	2.2	2.3	2.5
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 14 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Female
 Test Article : Corn oil
 Stage : Week 13
 Dose : 0 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
2101	6.4	1.0	0.1	0.8	0.2	11.5	17.2	224
2102	8.2	1.0	0.1	1.3	0.3	12.1	14.4	219
2103	8.2	0.5	0.1	1.0	0.3	12.9	16.9	158
2104	10.5	0.7	0.1	1.5	0.5	11.3	15.2	255
2105	4.9	0.8	0.1	2.1	0.5	11.6	17.0	195
2106	5.8	0.6	0.1	1.1	0.3	11.4	13.5	225
2107	6.6	1.7	0.1	2.6	0.6	10.7	13.1	233
2108	9.2	0.4	0.1	1.7	0.5	11.1	13.3	204
2109	4.9	0.6	0.1	1.9	0.6	11.3	15.7	241
2110	6.6	0.9	0.1	1.9	0.5	11.5	15.1	215
Mean	7.1	0.8	0.1	1.6	0.4	11.5	15.1	217
S.D.	1.8	0.4	0.0	0.6	0.1	0.6	1.6	27
S.E.	0.6	0.1	0.0	0.2	0.0	0.2	0.5	9
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 15 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
Sex : Female

Test Article : DMS

Stage : Week 13
Dose : 5 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
3101	800	14.7	42.6	53.2	18.4	34.5	130.3	115.1	49.7	43.4
3102	762	14.0	40.6	53.2	18.4	34.6	138.0	96.9	33.9	27.6
3103	793	15.0	42.9	54.1	19.0	35.1	121.0	96.4	41.2	33.8
3104	805	14.3	41.7	51.8	17.8	34.3	184.4	93.1	45.1	30.1
3105	816	14.9	42.3	51.8	18.3	35.3	115.3	112.0	44.0	34.1
3106	745	14.2	40.0	53.7	19.0	35.4	179.6	97.3	69.5	55.9
3107	759	14.2	39.9	52.6	18.7	35.6	92.6	119.9	51.2	43.8
3108	742	14.1	39.9	53.7	19.0	35.3	124.1	106.5	61.5	49.8
3109	767	14.6	42.6	55.6	19.1	34.3	156.8	111.9	61.6	45.0
3110	773	15.5	43.8	56.7	20.0	35.3	149.6	105.8	85.5	71.6
Mean	776	14.6	41.6	53.6	18.8	35.0	139.2	105.5	54.3	43.5
S.D.	26	0.5	1.4	1.6	0.6	0.5	28.8	9.2	15.3	13.3
S.E.	8	0.2	0.5	0.5	0.2	0.2	9.1	2.9	4.9	4.2
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 16 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
Sex : Female

Test Article : DMS

Stage : Week 13
Dose : 5 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
3101	3.7	0.7	0.1	1.1	0.6	11.1	15.5	222
3102	4.6	0.9	0.0	0.6	0.2	12.5	16.6	198
3103	5.3	0.7	0.1	0.9	0.4	11.2	14.6	192
3104	12.9	0.6	0.1	1.3	0.2	10.8	12.9	225
3105	7.6	0.7	0.1	1.2	0.3	12.4	15.1	236
3106	11.2	0.7	0.1	1.2	0.5	10.9	14.0	211
3107	5.2	0.4	0.1	1.5	0.2	11.5	13.8	228
3108	8.2	1.1	0.1	1.7	0.6	11.1	12.3	227
3109	11.4	1.1	0.1	3.5	0.5	10.5	12.3	183
3110	7.0	1.9	0.2	3.3	1.6	10.8	14.1	191
Mean	7.7	0.9	0.1	1.6	0.5	11.3	14.1	211
S.D.	3.2	0.4	0.0	1.0	0.4	0.7	1.4	19
S.E.	1.0	0.1	0.0	0.3	0.1	0.2	0.4	6
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 17 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology

Stage : Week 13

Sex : Female

Test Article : DMS

Dose : 15 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
4101	766	14.7	42.5	55.5	19.1	34.5	156.0	110.6	55.6	44.2
4102	819	15.4	44.0	53.7	18.8	35.0	144.9	103.9	54.7	41.2
4103	749	14.1	40.5	54.0	18.9	34.9	167.0	105.5	71.2	56.5
4104	755	14.3	40.7	53.9	18.9	35.0	145.8	113.2	45.9	32.4
4105	722	14.4	41.2	57.1	20.0	35.0	206.1	101.9	61.6	45.2
4106	718	14.4	41.5	57.9	20.1	34.8	182.3	87.7	68.1	52.1
4107	770	14.3	41.4	53.8	18.6	34.6	176.3	104.7	46.0	25.8
4108	794	15.1	42.3	53.2	19.0	35.7	131.3	99.0	73.9	63.7
4109	744	14.0	40.4	54.3	18.8	34.7	144.2	90.1	45.8	33.5
4110	806	15.0	42.2	52.4	18.6	35.5	123.8	99.8	50.3	39.6
Mean	764	14.6	41.7	54.6	19.1	35.0	157.8	101.6	57.3	43.4
S.D.	34	0.5	1.1	1.7	0.5	0.4	25.2	8.0	10.8	11.6
S.E.	11	0.1	0.4	0.5	0.2	0.1	8.0	2.5	3.4	3.7
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 18 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Female

Test Article : DMS

Stage : Week 13
 Dose : 15 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
4101	8.4	1.0	0.1	1.7	0.3	10.7	13.6	174
4102	9.2	1.3	0.1	2.4	0.4	11.5	15.3	207
4103	11.4	0.9	0.1	1.6	0.7	12.4	13.1	245
4104	11.5	0.5	0.0	1.0	0.4	11.6	14.7	171
4105	12.9	1.0	0.1	1.9	0.5	11.3	13.5	222
4106	13.8	0.4	0.1	0.9	0.7	11.3	15.3	207
4107	18.0	0.5	0.1	1.3	0.3	11.3	14.3	217
4108	7.2	0.6	0.2	1.3	0.9	11.4	13.9	217
4109	9.7	0.4	0.1	1.7	0.4	10.4	11.1	191
4110	6.6	1.3	0.1	2.2	0.5	11.7	13.1	219
Mean	10.9	0.8	0.1	1.6	0.5	11.4	13.8	207
S.D.	3.4	0.4	0.0	0.5	0.2	0.5	1.2	23
S.E.	1.1	0.1	0.0	0.2	0.1	0.2	0.4	7
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 6 - 19 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology

Stage : Week 13

Sex : Female

Test Article : DMS

Dose : 50 mg/kg

Animal No.	RBC 10E4/ μ L	HGB g/dL	HCT %	MCV fL	MCH pg	MCHC g/dL	Retic 10E9/L	PLT 10E4/ μ L	WBC 10E2/ μ L	LYMP 10E2/ μ L
5101	767	15.0	42.6	55.6	19.6	35.2	149.8	88.9	53.5	46.9
5102	774	14.1	39.9	51.5	18.2	35.3	139.7	124.8	68.2	57.8
5103	790	14.6	43.0	54.4	18.5	34.1	99.5	87.2	52.2	35.6
5104	751	14.5	41.8	55.7	19.3	34.7	156.5	106.5	55.9	41.0
5105	728	14.1	39.8	54.7	19.3	35.4	166.2	97.2	36.6	30.0
5106	779	15.0	42.5	54.6	19.3	35.4	157.2	98.3	30.4	24.5
5107	739	14.1	40.1	54.3	19.1	35.3	154.9	97.9	45.2	35.4
5108	774	14.3	41.9	54.2	18.5	34.2	141.2	103.7	58.5	45.6
5109	752	13.9	39.9	53.0	18.5	35.0	193.2	103.2	29.0	24.5
5110	755	14.3	41.7	55.2	18.9	34.3	156.5	103.1	46.9	34.1
Mean	761	14.4	41.3	54.3	18.9	34.9	151.5	101.1	47.6	37.5
S.D.	19	0.4	1.3	1.3	0.5	0.5	23.6	10.4	12.6	10.5
S.E.	6	0.1	0.4	0.4	0.1	0.2	7.5	3.3	4.0	3.3
n	10	10	10	10	10	10	10	10	10	10

Retic : Reticulocyte

Appendix 6 - 20 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual hematology
 Sex : Female

Test Article : DMS

Stage : Week 13
 Dose : 50 mg/kg

Animal No.	NEUT 10E2/ μ L	EOS 10E2/ μ L	BASO 10E2/ μ L	MONO 10E2/ μ L	LUC 10E2/ μ L	PT s	APTT s	FIB mg/dL
5101	4.7	0.6	0.1	0.9	0.3	11.2	15.0	213
5102	8.0	0.5	0.2	0.9	1.0	11.4	15.4	211
5103	13.0	0.8	0.1	2.3	0.5	11.3	16.5	185
5104	10.7	0.7	0.1	2.7	0.6	11.9	14.5	221
5105	5.2	0.4	0.0	0.8	0.2	10.3	12.3	203
5106	4.2	0.8	0.1	0.7	0.1	11.0	11.4	221
5107	6.8	0.7	0.0	1.8	0.5	10.5	12.6	228
5108	8.6	1.4	0.1	2.1	0.6	11.5	15.3	183
5109	2.6	0.4	0.0	1.2	0.3	10.3	10.9	211
5110	10.0	0.6	0.0	1.8	0.3	11.2	13.2	203
Mean	7.4	0.7	0.1	1.5	0.4	11.1	13.7	208
S.D.	3.3	0.3	0.1	0.7	0.3	0.5	1.9	15
S.E.	1.0	0.1	0.0	0.2	0.1	0.2	0.6	5
n	10	10	10	10	10	10	10	10

LUC : Large unstained cells

Appendix 7 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
1001	55	38	48	379	92	94	199	1	59	102
1002	66	34	45	512	57	50	407	1	78	37
1003	58	46	49	617	70	77	469	1	59	99
1004	53	26	35	287	120	80	86	1	63	55
1005	45	37	37	364	114	77	178	1	84	49
1006	62	34	106	302	101	87	120	1	65	74
1007	49	40	43	321	82	88	150	0	68	93
1008	51	35	36	352	132	108	110	1	81	56
1009	68	39	63	319	82	79	159	1	54	31
1010	49	33	59	323	103	122	101	1	80	87
Mean	56	36	52	378	95	86	198	1	69	68
S.D.	8	5	21	105	23	19	132	0	11	26
S.E.	2	2	7	33	7	6	42	0	3	8
n	10	10	10	10	10	10	10	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	PL mg/dL	T-BIL mg/dL	GLU mg/dL	BUN mg/dL	CRNN mg/dL	Na mmol/L	K mmol/L	Cl mmol/L	Ca mg/dL	P mg/dL
1001	106	0.1	161	15	0.30	144	3.3	107	10.7	5.4
1002	124	0.1	135	14	0.34	144	3.4	107	10.6	4.6
1003	107	0.1	130	11	0.22	146	3.6	107	10.9	5.3
1004	96	0.1	162	10	0.29	145	4.1	109	10.1	4.9
1005	135	0.1	157	14	0.22	144	3.6	107	10.4	5.9
1006	110	0.1	134	12	0.23	145	3.5	108	10.8	6.4
1007	112	0.1	111	11	0.21	145	3.7	107	10.9	4.7
1008	116	0.1	164	11	0.25	146	3.7	107	10.9	5.4
1009	89	0.1	170	10	0.23	144	3.8	107	10.1	5.0
1010	131	0.1	152	11	0.18	145	3.8	108	11.3	5.9
Mean	113	0.1	148	12	0.25	145	3.7	107	10.7	5.4
S.D.	15	0.0	19	2	0.05	1	0.2	1	0.4	0.6
S.E.	5	0.0	6	1	0.02	0	0.1	0	0.1	0.2
n	10	10	10	10	10	10	10	10	10	10

Appendix 7 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
2001	63	36	59	420	---	---	---	1	51	40
2002	51	39	30	257	---	---	---	0	60	50
2003	74	40	104	340	---	---	---	1	59	108
2004	84	61	136	473	---	---	---	0	61	65
2005	73	44	39	596	---	---	---	1	52	32
2006	60	38	53	269	---	---	---	1	45	14
2007	53	28	36	371	---	---	---	1	71	55
2008	41	23	34	277	---	---	---	1	63	74
2009	51	42	28	265	---	---	---	1	76	38
2010	57	29	51	437	---	---	---	1	64	56
Mean	61	38	57	371				1	60	53
S.D.	13	11	36	112				0	9	26
S.E.	4	3	11	35				0	3	8
n	10	10	10	10	0	0	0	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry Stage : Week 13
 Sex : Male Test Article : Corn oil Dose : 0 mg/kg

Animal No.	PL mg/dL	T-BIL mg/dL	GLU mg/dL	BUN mg/dL	CRNN mg/dL	Na mmol/L	K mmol/L	Cl mmol/L	Ca mg/dL	P mg/dL
2001	84	0.1	152	13	0.31	143	3.8	109	10.3	5.0
2002	97	0.1	118	17	0.25	145	3.5	109	10.4	5.6
2003	102	0.1	164	14	0.24	145	4.0	109	10.5	5.0
2004	106	0.1	156	13	0.23	145	4.1	107	10.8	5.6
2005	81	0.1	127	18	0.32	145	3.5	108	10.3	6.1
2006	74	0.1	116	12	0.24	145	3.4	109	10.6	4.9
2007	108	0.1	111	14	0.24	145	3.6	106	10.4	5.3
2008	105	0.1	183	13	0.23	143	3.9	106	10.6	4.5
2009	117	0.1	152	13	0.21	144	3.7	106	10.6	5.2
2010	102	0.1	167	11	0.23	145	4.3	108	10.6	5.9
Mean	98	0.1	145	14	0.25	145	3.8	108	10.5	5.3
S.D.	14	0.0	25	2	0.04	1	0.3	1	0.2	0.5
S.E.	4	0.0	8	1	0.01	0	0.1	0	0.1	0.2
n	10	10	10	10	10	10	10	10	10	10

Appendix 7 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry Stage : Week 13
 Sex : Male Test Article : Corn oil Dose : 0 mg/kg

Animal No.	TP g/dL	ALB g/dL	A/G
2001	6.0	3.1	1.1
2002	6.2	3.1	1.0
2003	6.1	3.1	1.0
2004	6.5	3.4	1.1
2005	6.3	3.1	1.0
2006	6.2	3.3	1.1
2007	6.3	3.2	1.0
2008	6.5	3.4	1.1
2009	6.4	3.2	1.0
2010	6.3	3.2	1.0
Mean	6.3	3.2	1.0
S.D.	0.2	0.1	0.1
S.E.	0.1	0.0	0.0
n	10	10	10

Appendix 7 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
3001	50	32	36	475	---	---	---	2	58	133
3002	62	34	47	471	---	---	---	1	57	42
3003	52	26	37	340	---	---	---	1	69	44
3004	72	45	45	363	---	---	---	1	52	54
3005	44	37	34	323	---	---	---	1	81	54
3006	51	29	41	371	---	---	---	1	64	60
3007	58	34	36	376	---	---	---	1	53	26
3008	70	54	66	275	---	---	---	1	53	33
3009	56	37	56	416	---	---	---	0	64	133
3010	53	33	35	337	---	---	---	0	72	56
Mean	57	36	43	375				1	62	64
S.D.	9	8	11	64				1	10	38
S.E.	3	3	3	20				0	3	12
n	10	10	10	10	0	0	0	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	PL mg/dL	T-BIL mg/dL	GLU mg/dL	BUN mg/dL	CRNN mg/dL	Na mmol/L	K mmol/L	Cl mmol/L	Ca mg/dL	P mg/dL
3001	102	0.1	167	9	0.28	143	4.0	106	10.1	4.4
3002	90	0.1	157	11	0.23	145	3.9	107	10.4	5.0
3003	97	0.1	117	10	0.22	145	3.6	108	10.7	5.7
3004	87	0.1	158	11	0.27	144	4.4	110	10.0	6.5
3005	128	0.1	113	14	0.22	146	3.0	106	10.8	5.4
3006	104	0.1	136	11	0.20	146	3.6	108	10.7	4.8
3007	87	0.1	120	16	0.31	145	3.6	108	10.5	5.2
3008	84	0.1	121	13	0.25	145	3.7	105	11.0	5.8
3009	114	0.1	129	12	0.16	144	3.9	106	11.0	5.3
3010	112	0.1	152	12	0.20	147	3.8	108	10.4	5.9
Mean	101	0.1	137	12	0.23	145	3.8	107	10.6	5.4
S.D.	14	0.0	20	2	0.04	1	0.4	1	0.3	0.6
S.E.	5	0.0	6	1	0.01	0	0.1	0	0.1	0.2
n	10	10	10	10	10	10	10	10	10	10

Appendix 7 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
4001	55	39	35	459	---	---	---	2	54	42
4002	67	49	67	368	---	---	---	1	68	27
4003	48	29	37	352	---	---	---	1	71	54
4004	67	35	59	358	---	---	---	1	50	78
4005	65	33	48	383	---	---	---	1	75	39
4006	56	33	41	405	---	---	---	1	52	49
4007	53	29	55	314	---	---	---	1	69	93
4008	53	36	38	378	---	---	---	1	76	69
4009	53	44	46	382	---	---	---	1	58	45
4010	56	36	35	267	---	---	---	0	56	33
Mean	57	36	46	367				1	63	53
S.D.	7	6	11	51				0	10	21
S.E.	2	2	4	16				0	3	7
n	10	10	10	10	0	0	0	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 11 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	PL mg/dL	T-BIL mg/dL	GLU mg/dL	BUN mg/dL	CRNN mg/dL	Na mmol/L	K mmol/L	Cl mmol/L	Ca mg/dL	P mg/dL
4001	97	0.1	172	14	0.26	143	3.7	107	10.6	5.0
4002	107	0.1	171	17	0.26	143	3.7	107	10.6	4.7
4003	113	0.1	131	11	0.25	146	3.5	108	10.6	4.9
4004	90	0.1	152	11	0.28	144	3.7	106	10.4	4.5
4005	114	0.1	145	10	0.23	143	3.8	104	10.3	5.3
4006	88	0.1	109	11	0.19	144	3.3	106	10.7	5.3
4007	116	0.1	144	13	0.22	143	3.5	107	10.6	5.3
4008	119	0.1	143	13	0.22	144	3.8	108	11.0	5.3
4009	94	0.1	161	13	0.22	145	3.6	108	10.6	5.4
4010	89	0.1	126	11	0.19	145	3.4	107	10.4	5.0
Mean	103	0.1	145	12	0.23	144	3.6	107	10.6	5.1
S.D.	12	0.0	20	2	0.03	1	0.2	1	0.2	0.3
S.E.	4	0.0	6	1	0.01	0	0.1	0	0.1	0.1
n	10	10	10	10	10	10	10	10	10	10

Appendix 7 - 12 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
Sex : Male Test Article : DMS Stage : Week 13
Dose : 15 mg/kg

Animal No.	TP g/dL	ALB g/dL	A/G
4001	6.5	3.4	1.1
4002	6.4	3.3	1.1
4003	6.1	3.3	1.2
4004	6.3	3.2	1.0
4005	5.8	3.0	1.1
4006	6.2	3.2	1.1
4007	6.5	3.2	1.0
4008	6.2	3.2	1.1
4009	6.2	3.4	1.2
4010	6.0	3.1	1.1
Mean	6.2	3.2	1.1
S.D.	0.2	0.1	0.1
S.E.	0.1	0.0	0.0
n	10	10	10

Appendix 7 - 13 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
5001	72	47	52	362	81	68	210	1	57	58
5002	87	37	227	380	101	100	182	1	69	56
5003	47	29	30	363	91	84	184	1	59	52
5004	57	40	38	368	102	68	196	1	73	61
5005	57	30	42	606	109	53	446	1	58	65
5006	57	28	51	417	144	100	175	1	64	37
5007	52	30	53	378	112	79	188	0	76	82
5008	66	31	57	555	96	56	406	2	70	43
5009	59	35	43	338	79	83	172	0	57	77
5010	60	33	30	337	132	79	120	0	38	29
Mean	61	34	62	410	105	77	228	1	62	56
S.D.	11	6	59	93	21	16	107	1	11	17
S.E.	4	2	19	29	7	5	34	0	3	5
n	10	10	10	10	10	10	10	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 14 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	PL mg/dL	T-BIL mg/dL	GLU mg/dL	BUN mg/dL	CRNN mg/dL	Na mmol/L	K mmol/L	Cl mmol/L	Ca mg/dL	P mg/dL
5001	94	0.1	152	17	0.31	144	3.7	107	10.3	5.0
5002	112	0.1	169	16	0.28	144	3.9	108	10.2	4.8
5003	98	0.1	163	14	0.23	144	4.2	109	10.4	5.4
5004	107	0.1	120	14	0.21	144	3.7	107	10.7	5.7
5005	99	0.1	144	11	0.25	145	3.8	109	10.4	5.6
5006	98	0.1	120	10	0.23	145	3.5	109	10.5	5.6
5007	112	0.1	125	10	0.30	146	4.0	108	10.8	5.7
5008	109	0.1	126	10	0.26	146	3.3	109	10.6	5.5
5009	100	0.1	162	11	0.17	144	3.8	107	10.6	5.7
5010	68	0.1	150	10	0.19	145	3.4	108	10.0	5.3
Mean	100	0.1	143	12	0.24	145	3.7	108	10.5	5.4
S.D.	13	0.0	19	3	0.05	1	0.3	1	0.2	0.3
S.E.	4	0.0	6	1	0.01	0	0.1	0	0.1	0.1
n	10	10	10	10	10	10	10	10	10	10

Appendix 7 - 16 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
1101	52	37	49	286	90	15	185	1	61	30
1102	54	32	29	133	46	9	78	1	60	15
1103	54	32	28	155	56	9	89	1	70	13
1104	57	33	32	198	99	15	85	1	54	12
1105	55	30	19	187	78	18	93	1	60	42
1106	49	23	26	182	63	20	97	1	76	95
1107	50	24	40	208	58	11	138	2	81	47
1108	55	40	26	189	72	12	101	1	72	30
1109	53	29	27	133	65	19	48	1	68	18
1110	61	24	27	239	127	15	96	2	57	35
Mean	54	30	30	191	75	14	101	1	66	34
S.D.	3	6	8	47	24	4	37	0	9	25
S.E.	1	2	3	15	8	1	12	0	3	8
n	10	10	10	10	10	10	10	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 17 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	PL mg/dL	T-BIL mg/dL	GLU mg/dL	BUN mg/dL	CRNN mg/dL	Na mmol/L	K mmol/L	Cl mmol/L	Ca mg/dL	P mg/dL
1101	128	0.1	122	15	0.30	143	3.2	108	10.4	2.4
1102	134	0.1	135	19	0.36	143	3.2	110	10.5	3.0
1103	126	0.1	117	13	0.31	143	3.4	110	10.2	2.9
1104	106	0.1	102	15	0.25	141	3.6	107	10.6	4.9
1105	126	0.1	105	13	0.24	146	3.2	108	10.5	4.5
1106	169	0.1	135	11	0.20	144	3.4	110	10.7	5.4
1107	147	0.1	132	11	0.28	144	3.2	108	10.9	4.4
1108	144	0.1	119	20	0.33	144	3.1	110	10.7	4.4
1109	120	0.1	124	16	0.31	143	3.4	109	11.0	4.7
1110	110	0.1	130	11	0.33	144	3.7	111	10.6	4.5
Mean	131	0.1	122	14	0.29	144	3.3	109	10.6	4.1
S.D.	19	0.0	12	3	0.05	1	0.2	1	0.2	1.0
S.E.	6	0.0	4	1	0.02	0	0.1	0	0.1	0.3
n	10	10	10	10	10	10	10	10	10	10

Appendix 7 - 19 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Female Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
2101	67	30	42	207	---	---	---	1	63	13
2102	62	32	32	307	---	---	---	1	64	24
2103	52	29	37	177	---	---	---	2	47	15
2104	48	37	24	168	---	---	---	1	92	36
2105	49	30	24	235	---	---	---	2	53	18
2106	61	42	31	343	---	---	---	1	54	13
2107	56	45	28	198	---	---	---	1	67	32
2108	53	38	35	181	---	---	---	1	76	69
2109	56	35	26	308	---	---	---	1	84	20
2110	59	45	31	263	---	---	---	1	74	18
Mean	56	36	31	239				1	67	26
S.D.	6	6	6	63				0	14	17
S.E.	2	2	2	20				0	5	5
n	10	10	10	10	0	0	0	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 21 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry Stage : Week 13
Sex : Female Test Article : Corn oil Dose : 0 mg/kg

Animal No.	TP g/dL	ALB g/dL	A/G
2101	7.3	4.1	1.3
2102	7.0	3.9	1.3
2103	6.2	3.7	1.5
2104	7.2	4.1	1.3
2105	6.6	3.7	1.3
2106	6.2	3.5	1.3
2107	6.8	3.8	1.3
2108	6.8	3.7	1.2
2109	6.4	3.5	1.2
2110	6.8	3.8	1.3
Mean	6.7	3.8	1.3
S.D.	0.4	0.2	0.1
S.E.	0.1	0.1	0.0
n	10	10	10

Appendix 7 - 22 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
3101	54	37	37	325	---	---	---	1	77	27
3102	60	39	26	175	---	---	---	1	62	10
3103	58	64	31	341	---	---	---	2	52	15
3104	54	30	27	338	---	---	---	1	68	16
3105	60	30	63	247	---	---	---	1	45	16
3106	61	27	29	186	---	---	---	1	59	26
3107	48	40	30	192	---	---	---	1	81	45
3108	65	33	38	153	---	---	---	1	60	22
3109	52	38	27	180	---	---	---	1	70	50
3110	57	41	28	168	---	---	---	2	60	47
Mean	57	38	34	231				1	63	27
S.D.	5	10	11	76				0	11	15
S.E.	2	3	4	24				0	3	5
n	10	10	10	10	0	0	0	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 23 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	PL mg/dL	T-BIL mg/dL	GLU mg/dL	BUN mg/dL	CRNN mg/dL	Na mmol/L	K mmol/L	Cl mmol/L	Ca mg/dL	P mg/dL
3101	142	0.1	116	11	0.33	143	3.5	109	10.2	3.1
3102	113	0.1	137	14	0.35	145	3.4	110	10.1	2.3
3103	104	0.1	117	11	0.30	145	3.1	110	10.0	3.9
3104	137	0.1	130	10	0.28	143	3.2	109	10.5	3.1
3105	102	0.1	109	11	0.25	143	3.3	109	10.1	4.0
3106	116	0.1	138	11	0.30	143	3.4	109	10.2	4.2
3107	151	0.1	109	21	0.34	143	3.4	109	10.5	4.2
3108	118	0.1	116	16	0.34	141	3.3	107	10.3	3.6
3109	164	0.1	114	11	0.22	142	3.4	108	10.8	4.1
3110	128	0.1	103	23	0.30	142	3.5	107	10.6	4.9
Mean	128	0.1	119	14	0.30	143	3.4	109	10.3	3.7
S.D.	21	0.0	12	5	0.04	1	0.1	1	0.3	0.7
S.E.	7	0.0	4	1	0.01	0	0.0	0	0.1	0.2
n	10	10	10	10	10	10	10	10	10	10

Appendix 7 - 25 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
4101	42	36	55	168	---	---	---	0	78	137
4102	63	43	47	226	---	---	---	1	59	51
4103	53	31	24	344	---	---	---	1	72	41
4104	56	33	28	209	---	---	---	1	69	20
4105	65	31	34	206	---	---	---	1	58	19
4106	57	28	27	184	---	---	---	1	100	26
4107	61	35	28	235	---	---	---	1	63	29
4108	63	47	36	223	---	---	---	1	77	22
4109	44	16	21	238	---	---	---	1	67	25
4110	46	26	33	151	---	---	---	2	66	37
Mean	55	33	33	218				1	71	41
S.D.	8	9	11	53				0	12	35
S.E.	3	3	3	17				0	4	11
n	10	10	10	10	0	0	0	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 7 - 26 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	PL mg/dL	T-BIL mg/dL	GLU mg/dL	BUN mg/dL	CRNN mg/dL	Na mmol/L	K mmol/L	Cl mmol/L	Ca mg/dL	P mg/dL
4101	174	0.1	115	12	0.28	143	3.3	110	10.4	2.9
4102	117	0.1	127	11	0.25	143	3.7	110	10.4	3.3
4103	138	0.1	145	8	0.23	143	3.4	112	10.1	3.2
4104	141	0.1	115	9	0.24	143	3.2	107	10.4	4.2
4105	117	0.1	129	10	0.26	144	3.3	110	10.7	4.5
4106	186	0.1	123	9	0.23	144	3.1	107	10.7	4.8
4107	137	0.1	137	14	0.27	143	3.2	110	10.0	2.8
4108	144	0.1	120	24	0.38	142	3.2	107	10.4	4.5
4109	136	0.1	127	12	0.26	142	3.1	108	10.6	4.5
4110	130	0.1	118	13	0.26	144	3.2	110	10.6	3.6
Mean	142	0.1	126	12	0.27	143	3.3	109	10.4	3.8
S.D.	22	0.0	10	5	0.04	1	0.2	2	0.2	0.8
S.E.	7	0.0	3	1	0.01	0	0.1	1	0.1	0.2
n	10	10	10	10	10	10	10	10	10	10

Appendix 7 - 27 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
Sex : Female Test Article : DMS Stage : Week 13
Dose : 15 mg/kg

Animal No.	TP g/dL	ALB g/dL	A/G
4101	6.9	4.1	1.5
4102	6.4	3.4	1.1
4103	6.3	3.6	1.3
4104	6.5	3.7	1.3
4105	6.7	3.7	1.2
4106	7.1	3.9	1.2
4107	6.6	3.9	1.4
4108	6.4	3.5	1.2
4109	6.7	4.0	1.5
4110	6.5	3.7	1.3
Mean	6.6	3.8	1.3
S.D.	0.2	0.2	0.1
S.E.	0.1	0.1	0.0
n	10	10	10

Appendix 7 - 28 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual blood chemistry
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	AST IU/L	ALT IU/L	LDH IU/L	ALP IU/L	BALP IU/L	LALP IU/L	IALP IU/L	γ-GTP IU/L	T-CHO mg/dL	TG mg/dL
5101	64	40	30	274	118	18	140	1	48	14
5102	52	35	29	143	55	20	67	1	53	15
5103	77	52	30	159	73	10	75	2	76	45
5104	59	36	31	157	44	15	100	1	70	23
5105	55	19	32	195	118	16	65	1	67	15
5106	50	23	21	190	77	16	97	1	58	43
5107	59	32	30	340	87	13	243	2	60	40
5108	49	29	31	157	84	15	58	0	69	42
5109	71	28	28	339	124	25	188	1	53	17
5110	56	32	32	138	56	8	75	1	44	53
Mean	59	33	29	209	84	16	111	1	60	31
S.D.	9	9	3	79	29	5	61	1	10	15
S.E.	3	3	1	25	9	2	19	0	3	5
n	10	10	10	10	10	10	10	10	10	10

BALP : Bone-ALP, LALP : Liver-ALP, IALP : Intestine-ALP

Appendix 8 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
1001	597	2.13	12.5	13.3	15.1	28.4	371	371	742	312
1002	531	2.18	10.3	10.4	7.8	18.2	321	317	638	316
1003	587	2.22	14.0	9.8	11.8	21.6	347	341	688	183
1004	595	2.36	14.7	15.0	11.6	26.6	423	420	843	264
1005	542	2.29	12.0	8.9	10.0	18.9	315	330	645	218
1006	520	2.13	12.5	9.0	12.0	21.0	371	362	733	225
1007	509	2.16	11.9	13.1	12.0	25.1	325	315	640	281
1008	597	2.21	13.2	13.3	12.4	25.7	391	405	796	217
1009	544	2.22	13.4	8.0	8.3	16.3	302	307	609	231
1010	595	2.34	15.1	16.3	13.1	29.4	364	350	714	306
Mean	562	2.22	13.0	11.7	11.4	23.1	353	352	705	255
S.D.	36	0.08	1.4	2.9	2.2	4.5	38	38	76	47
S.E.	11	0.03	0.5	0.9	0.7	1.4	12	12	24	15
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
1001	1.53	1.62	13.80	0.78	1.56	1.63	3.19	27	25	52
1002	1.35	1.54	10.99	0.69	1.23	1.29	2.52	29	32	61
1003	1.55	1.46	15.00	0.71	1.67	1.68	3.35	28	28	56
1004	1.59	1.70	14.00	0.72	1.60	1.66	3.26	27	28	55
1005	1.35	1.63	13.16	0.54	1.57	1.62	3.19	28	28	56
1006	1.62	1.53	14.81	0.75	1.51	1.55	3.06	29	32	61
1007	1.56	1.52	13.47	0.64	1.53	1.60	3.13	29	32	61
1008	1.81	1.56	15.86	0.84	1.62	1.63	3.25	32	34	66
1009	1.51	1.45	12.79	0.64	1.57	1.69	3.26	29	29	58
1010	1.82	1.45	17.27	0.62	1.74	1.85	3.59	36	45	81
Mean	1.57	1.55	14.12	0.69	1.56	1.62	3.18	29	31	61
S.D.	0.16	0.08	1.74	0.09	0.13	0.14	0.27	3	6	8
S.E.	0.05	0.03	0.55	0.03	0.04	0.04	0.09	1	2	3
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 3 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Testis-R g	Testis-L g	Testis-RL g	Prostate g	Sem.Ves. g
1001	1.65	1.66	3.31	1.57	1.27
1002	1.63	1.62	3.25	0.92	0.87
1003	1.83	1.85	3.68	1.20	1.60
1004	1.92	1.99	3.91	1.56	2.20
1005	1.68	1.67	3.35	1.10	1.40
1006	1.66	1.77	3.43	1.12	1.37
1007	1.74	1.79	3.53	1.24	1.25
1008	1.74	1.74	3.48	1.23	1.48
1009	1.77	1.73	3.50	1.24	1.33
1010	1.74	1.74	3.48	1.25	1.28
Mean	1.74	1.76	3.49	1.24	1.41
S.D.	0.09	0.11	0.19	0.20	0.34
S.E.	0.03	0.03	0.06	0.06	0.11
n	10	10	10	10	10

Sem.Ves. : Seminal vesicle

Appendix 8 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
2001	634	2.18	15.2	9.7	12.6	22.3	479	486	965	128
2002	508	2.09	12.4	12.2	5.7	17.9	325	322	647	333
2003	626	2.24	11.2	11.3	10.8	22.1	350	360	710	133
2004	545	2.19	12.6	13.4	12.0	25.4	388	380	768	315
2005	566	2.34	13.9	11.9	10.0	21.9	355	369	724	211
2006	556	2.10	13.1	10.8	9.8	20.6	394	397	791	256
2007	523	2.14	10.2	9.7	7.3	17.0	397	402	799	369
2008	633	2.20	13.7	9.9	10.8	20.7	438	441	879	364
2009	622	2.21	14.0	11.4	7.8	19.2	365	351	716	279
2010	714	2.23	15.6	13.3	8.3	21.6	487	495	982	256
Mean	593	2.19	13.2	11.4	9.5	20.9	398	400	798	264
S.D.	64	0.07	1.7	1.4	2.2	2.4	55	57	112	86
S.E.	20	0.02	0.5	0.4	0.7	0.8	17	18	35	27
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
2001	1.78	1.87	16.14	0.76	1.71	1.79	3.50	28	35	63
2002	1.46	1.58	12.40	0.77	1.53	1.62	3.15	27	30	57
2003	1.52	1.49	16.93	0.65	1.76	1.80	3.56	28	27	55
2004	1.46	1.51	14.10	0.50	1.63	1.69	3.32	29	31	60
2005	1.51	1.55	14.83	0.73	1.73	1.74	3.47	30	32	62
2006	1.48	1.53	14.11	0.63	1.50	1.59	3.09	28	30	58
2007	1.48	1.46	12.56	0.68	1.37	1.48	2.85	36	36	72
2008	1.72	1.74	18.07	0.85	1.91	2.19	4.10	30	33	63
2009	1.63	1.75	15.79	0.99	1.75	1.91	3.66	30	31	61
2010	1.95	1.99	18.31	1.01	1.90	1.91	3.81	34	35	69
Mean	1.60	1.65	15.32	0.76	1.68	1.77	3.45	30	32	62
S.D.	0.17	0.18	2.09	0.16	0.17	0.20	0.37	3	3	5
S.E.	0.05	0.06	0.66	0.05	0.05	0.06	0.12	1	1	2
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
3001	565	2.31	11.3	13.1	9.0	22.1	342	341	683	176
3002	615	1.92	15.6	13.3	12.8	26.1	363	348	711	232
3003	596	2.36	14.7	17.7	16.9	34.6	430	429	859	253
3004	454	2.07	14.0	12.0	15.3	27.3	299	294	593	232
3005	514	2.14	14.2	12.0	10.9	22.9	301	290	591	233
3006	678	2.19	15.4	15.3	13.7	29.0	371	380	751	426
3007	555	2.30	15.2	14.8	11.2	26.0	365	348	713	222
3008	577	2.11	11.4	11.0	13.2	24.2	415	405	820	235
3009	583	2.28	12.4	11.5	14.9	26.4	351	337	688	317
3010	556	2.39	10.8	12.2	11.9	24.1	382	368	750	327
Mean	569	2.21	13.5	13.3	13.0	26.3	362	354	716	265
S.D.	59	0.15	1.9	2.1	2.3	3.6	42	44	86	72
S.E.	19	0.05	0.6	0.7	0.7	1.1	13	14	27	23
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
3001	1.55	1.60	13.90	0.75	1.38	1.43	2.81	27	26	53
3002	1.62	1.64	15.10	0.73	1.64	1.71	3.35	25	30	55
3003	1.62	1.74	15.48	0.91	1.76	1.75	3.51	30	39	69
3004	1.34	1.42	10.85	0.64	1.36	1.34	2.70	31	32	63
3005	1.59	1.31	14.00	0.65	1.82	1.68	3.50	27	29	56
3006	1.69	1.77	16.69	1.09	1.77	1.97	3.74	32	33	65
3007	1.43	1.65	14.22	0.73	1.59	1.65	3.24	23	24	47
3008	1.65	1.74	14.17	1.00	1.64	1.71	3.35	24	28	52
3009	1.56	1.59	15.88	0.77	1.83	1.96	3.79	23	25	48
3010	1.87	1.58	13.08	0.68	1.65	1.74	3.39	24	24	48
Mean	1.59	1.60	14.34	0.80	1.64	1.69	3.34	27	29	56
S.D.	0.14	0.14	1.63	0.15	0.17	0.20	0.35	3	5	8
S.E.	0.05	0.05	0.52	0.05	0.05	0.06	0.11	1	1	2
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 9 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Testis-R g	Testis-L g	Testis-RL g	Prostate g	Sem.Ves. g
3001	1.80	1.74	3.54	0.90	1.10
3002	1.70	1.77	3.47	1.46	1.42
3003	1.77	1.84	3.61	1.37	1.52
3004	1.70	1.60	3.30	1.11	1.29
3005	1.63	1.62	3.25	1.16	1.43
3006	1.75	1.77	3.52	1.26	1.73
3007	1.60	1.56	3.16	1.21	1.52
3008	1.81	1.81	3.62	1.36	1.44
3009	1.69	1.77	3.46	1.27	1.23
3010	1.84	1.72	3.56	1.41	1.69
Mean	1.73	1.72	3.45	1.25	1.44
S.D.	0.08	0.09	0.16	0.17	0.19
S.E.	0.02	0.03	0.05	0.05	0.06
n	10	10	10	10	10

Sem.Ves. : Seminal vesicle

Appendix 8 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
4001	576	2.23	12.6	10.3	10.4	20.7	308	275	583	171
4002	580	2.15	16.0	10.6	8.9	19.5	341	315	656	248
4003	524	2.22	12.8	13.1	11.3	24.4	346	336	682	250
4004	720	2.31	14.3	9.9	14.5	24.4	393	370	763	202
4005	607	2.31	16.9	14.6	12.5	27.1	451	401	852	317
4006	580	2.27	13.4	11.5	9.9	21.4	425	419	844	331
4007	572	1.98	11.3	12.8	10.8	23.6	261	264	525	335
4008	542	2.20	11.9	12.1	7.8	19.9	337	340	677	346
4009	509	2.45	11.5	8.4	9.8	18.2	384	375	759	380
4010	522	2.17	12.8	10.0	11.6	21.6	340	342	682	292
Mean	573	2.23	13.4	11.3	10.8	22.1	359	344	702	287
S.D.	60	0.12	1.9	1.8	1.9	2.7	56	50	105	67
S.E.	19	0.04	0.6	0.6	0.6	0.9	18	16	33	21
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 11 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
4001	1.43	1.70	13.24	0.63	1.74	1.77	3.51	24	27	51
4002	1.67	1.62	15.80	0.72	1.74	1.87	3.61	26	32	58
4003	1.52	1.59	11.85	0.72	1.44	1.47	2.91	26	25	51
4004	1.83	1.67	19.25	1.10	1.87	1.76	3.63	26	28	54
4005	1.61	1.60	14.18	0.83	1.81	1.92	3.73	28	40	68
4006	1.51	1.61	14.18	0.77	1.55	1.51	3.06	28	29	57
4007	1.60	1.68	16.66	0.77	1.67	1.75	3.42	21	22	43
4008	1.30	1.43	13.76	0.67	1.56	1.76	3.32	28	29	57
4009	1.59	1.62	13.08	0.79	1.61	1.56	3.17	27	33	60
4010	1.43	1.36	12.95	0.59	1.65	1.72	3.37	19	24	43
Mean	1.55	1.59	14.50	0.76	1.66	1.71	3.37	25	29	54
S.D.	0.15	0.11	2.18	0.14	0.13	0.15	0.26	3	5	8
S.E.	0.05	0.03	0.69	0.04	0.04	0.05	0.08	1	2	2
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 12 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Testis-R g	Testis-L g	Testis-RL g	Prostate g	Sem.Ves. g
4001	1.74	1.71	3.45	1.33	1.28
4002	2.04	2.02	4.06	1.20	1.71
4003	1.86	1.86	3.72	0.97	1.58
4004	1.85	1.86	3.71	1.15	1.62
4005	1.58	1.65	3.23	1.38	1.82
4006	1.73	1.81	3.54	1.34	1.43
4007	1.91	1.94	3.85	1.03	1.17
4008	1.75	1.76	3.51	1.14	1.43
4009	1.78	1.87	3.65	1.01	1.46
4010	1.61	1.55	3.16	1.45	1.07
Mean	1.79	1.80	3.59	1.20	1.46
S.D.	0.14	0.14	0.27	0.17	0.24
S.E.	0.04	0.04	0.09	0.05	0.07
n	10	10	10	10	10

Sem.Ves. : Seminal vesicle

Appendix 8 - 13 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
5001	556	2.30	13.5	8.4	10.3	18.7	419	416	835	264
5002	586	2.20	15.2	12.4	11.2	23.6	377	389	766	511
5003	504	2.23	11.6	10.9	9.4	20.3	389	383	772	248
5004	484	2.08	9.7	14.2	6.1	20.3	328	342	670	404
5005	570	2.27	15.5	14.8	10.1	24.9	342	330	672	299
5006	540	2.18	13.8	9.0	11.8	20.8	349	370	719	241
5007	609	2.43	15.3	10.2	10.1	20.3	369	370	739	320
5008	652	2.44	16.7	12.2	10.6	22.8	422	409	831	303
5009	589	2.19	11.1	8.1	12.3	20.4	386	392	778	297
5010	442	2.14	12.0	10.8	8.6	19.4	290	277	567	207
Mean	553	2.25	13.4	11.1	10.1	21.2	367	368	735	309
S.D.	63	0.12	2.3	2.3	1.8	2.0	41	42	82	89
S.E.	20	0.04	0.7	0.7	0.6	0.6	13	13	26	28
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 14 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
5001	1.62	1.70	13.71	0.78	1.51	1.60	3.11	31	32	63
5002	1.66	1.62	17.35	0.84	1.69	1.71	3.40	25	25	50
5003	1.43	1.54	12.65	0.72	1.73	1.79	3.52	25	28	53
5004	1.34	1.41	11.93	0.78	1.51	1.52	3.03	24	27	51
5005	1.38	1.66	14.35	0.62	1.53	1.53	3.06	28	27	55
5006	1.48	1.58	13.17	0.71	1.55	1.56	3.11	27	28	55
5007	1.63	1.62	15.39	0.97	1.54	1.76	3.30	25	24	49
5008	1.70	1.84	16.08	0.73	1.56	1.76	3.32	33	38	71
5009	1.49	1.63	14.55	0.75	1.82	1.94	3.76	32	32	64
5010	1.29	1.20	10.00	0.61	1.40	1.53	2.93	24	26	50
Mean	1.50	1.58	13.92	0.75	1.58	1.67	3.25	27	29	56
S.D.	0.14	0.17	2.13	0.10	0.12	0.14	0.26	3	4	7
S.E.	0.05	0.05	0.67	0.03	0.04	0.05	0.08	1	1	2
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 15 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Testis-R g	Testis-L g	Testis-RL g	Prostate g	Sem.Ves. g
5001	1.78	1.76	3.54	1.06	1.41
5002	1.82	1.74	3.56	1.02	1.27
5003	1.61	1.59	3.20	1.28	1.49
5004	1.69	1.72	3.41	1.13	1.38
5005	1.58	1.62	3.20	1.42	1.31
5006	1.29	1.31	2.60	1.26	1.47
5007	1.80	1.83	3.63	1.22	1.46
5008	1.92	1.91	3.83	1.21	1.39
5009	1.78	1.86	3.64	1.41	1.35
5010	1.62	1.54	3.16	1.04	1.60
Mean	1.69	1.69	3.38	1.21	1.41
S.D.	0.18	0.18	0.35	0.14	0.10
S.E.	0.06	0.06	0.11	0.05	0.03
n	10	10	10	10	10

Sem.Ves. : Seminal vesicle

Appendix 8 - 16 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
1101	269	2.00	16.2	14.6	12.4	27.0	243	230	473	267
1102	266	1.84	17.7	7.2	8.6	15.8	211	207	418	281
1103	266	2.03	14.0	8.1	9.0	17.1	276	268	544	247
1104	255	1.91	12.7	7.6	8.3	15.9	240	242	482	208
1105	282	2.04	18.4	7.0	9.7	16.7	227	233	460	225
1106	321	1.95	13.9	8.0	8.8	16.8	200	193	393	172
1107	346	2.23	13.8	13.1	10.5	23.6	248	251	499	410
1108	286	1.89	19.6	11.6	8.7	20.3	246	247	493	389
1109	317	2.03	16.0	15.2	12.9	28.1	224	218	442	279
1110	319	2.17	13.0	17.9	13.5	31.4	277	278	555	278
Mean	293	2.01	15.5	11.0	10.2	21.3	239	237	476	276
S.D.	31	0.12	2.4	4.0	2.0	5.8	25	26	51	74
S.E.	10	0.04	0.8	1.3	0.6	1.8	8	8	16	24
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 17 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
1101	0.94	1.13	7.15	0.48	0.87	0.94	1.81	28	29	57
1102	0.98	1.07	6.72	0.42	0.79	0.85	1.64	33	33	66
1103	0.96	1.19	6.90	0.54	0.90	0.94	1.84	38	40	78
1104	0.98	1.17	6.18	0.56	0.91	0.88	1.79	37	40	77
1105	0.84	1.03	6.77	0.46	1.06	1.04	2.10	30	34	64
1106	0.94	1.02	7.20	0.39	0.91	0.90	1.81	30	30	60
1107	1.08	1.29	8.88	0.61	1.03	0.95	1.98	34	37	71
1108	1.01	1.16	8.08	0.63	1.07	1.08	2.15	26	29	55
1109	0.92	1.26	7.89	0.56	1.05	1.01	2.06	30	33	63
1110	0.94	1.14	7.46	0.53	0.93	0.94	1.87	37	35	72
Mean	0.96	1.15	7.32	0.52	0.95	0.95	1.91	32	34	66
S.D.	0.06	0.09	0.78	0.08	0.09	0.07	0.16	4	4	8
S.E.	0.02	0.03	0.25	0.02	0.03	0.02	0.05	1	1	3
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 18 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight Stage : Week 13
 Sex : Female Test Article : DMS Dose : 0 mg/kg

Animal No.	Ovary-R mg	Ovary-L mg	Ovary-RL mg	Uterus mg
1101	41.5	39.8	81.3	727
1102	41.4	34.9	76.3	590
1103	51.5	38.1	89.6	485
1104	42.0	39.9	81.9	427
1105	36.8	43.4	80.2	665
1106	32.0	42.6	74.6	521
1107	53.6	50.0	103.6	546
1108	46.8	50.0	96.8	688
1109	52.3	52.2	104.5	463
1110	43.0	35.8	78.8	678
Mean	44.1	42.7	86.8	579
S.D.	7.0	6.2	11.2	106
S.E.	2.2	2.0	3.5	33
n	10	10	10	10

Appendix 8 - 19 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight Stage : Week 13
 Sex : Female Test Article : Corn oil Dose : 0 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
2101	269	2.01	19.3	12.1	8.9	21.0	201	191	392	247
2102	292	1.97	15.7	8.9	8.4	17.3	202	200	402	192
2103	288	2.03	16.2	8.2	8.8	17.0	232	222	454	239
2104	326	1.92	15.4	11.1	11.7	22.8	225	231	456	244
2105	259	1.94	14.0	10.0	9.9	19.9	212	224	436	169
2106	241	1.91	10.8	6.1	7.7	13.8	224	221	445	204
2107	319	2.13	15.9	9.4	11.3	20.7	252	247	499	366
2108	290	1.93	13.8	6.8	8.7	15.5	228	238	466	174
2109	298	2.02	16.5	7.4	8.2	15.6	269	282	551	302
2110	277	1.95	17.7	9.1	8.1	17.2	210	216	426	174
Mean	286	1.98	15.5	8.9	9.2	18.1	226	227	453	231
S.D.	26	0.07	2.3	1.9	1.4	2.9	22	25	46	64
S.E.	8	0.02	0.7	0.6	0.4	0.9	7	8	15	20
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 20 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
2101	0.90	1.10	6.86	0.46	0.83	0.85	1.68	29	33	62
2102	1.03	1.21	7.13	0.48	1.07	1.08	2.15	40	41	81
2103	0.86	1.02	6.41	0.54	0.95	0.91	1.86	28	34	62
2104	0.93	1.25	8.23	0.48	0.97	0.97	1.94	36	37	73
2105	0.85	1.00	6.13	0.39	0.88	0.95	1.83	29	34	63
2106	0.77	1.04	5.93	0.43	0.77	0.77	1.54	27	26	53
2107	0.94	1.23	7.96	0.52	0.98	0.99	1.97	33	29	62
2108	0.94	1.24	7.58	0.44	0.91	0.92	1.83	29	25	54
2109	0.86	1.18	7.52	0.64	0.84	0.89	1.73	30	32	62
2110	0.96	1.17	6.98	0.42	1.04	1.02	2.06	30	33	63
Mean	0.90	1.14	7.07	0.48	0.92	0.94	1.86	31	32	64
S.D.	0.07	0.10	0.77	0.07	0.10	0.09	0.18	4	5	8
S.E.	0.02	0.03	0.24	0.02	0.03	0.03	0.06	1	2	3
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 22 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
3101	282	2.03	15.9	8.0	6.1	14.1	249	237	486	277
3102	277	2.03	15.3	8.9	8.7	17.6	228	233	461	194
3103	251	1.95	14.3	9.5	8.9	18.4	209	211	420	225
3104	301	1.98	17.7	9.2	8.6	17.8	250	246	496	255
3105	254	2.08	12.7	7.1	8.2	15.3	202	221	423	168
3106	305	2.10	14.6	8.3	7.2	15.5	241	243	484	235
3107	239	1.91	12.5	6.7	7.0	13.7	201	191	392	301
3108	332	2.17	16.4	12.0	8.0	20.0	222	222	444	193
3109	339	2.06	14.6	10.6	10.7	21.3	211	210	421	245
3110	255	1.90	12.7	8.0	8.1	16.1	216	215	431	241
Mean	284	2.02	14.7	8.8	8.2	17.0	223	223	446	233
S.D.	35	0.09	1.7	1.6	1.2	2.5	18	17	35	40
S.E.	11	0.03	0.5	0.5	0.4	0.8	6	5	11	13
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 23 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
3101	0.89	1.08	5.97	0.45	0.80	0.83	1.63	23	24	47
3102	0.81	1.05	6.26	0.48	0.81	0.82	1.63	29	28	57
3103	0.79	1.02	5.92	0.38	0.80	0.79	1.59	26	29	55
3104	1.03	1.13	8.12	0.51	0.91	0.92	1.83	30	27	57
3105	0.82	1.03	6.08	0.42	0.86	0.90	1.76	27	31	58
3106	0.87	1.10	7.63	0.52	0.83	0.77	1.60	35	40	75
3107	0.85	1.07	6.77	0.41	0.85	0.86	1.71	26	30	56
3108	1.02	1.26	7.68	0.52	1.01	1.05	2.06	26	31	57
3109	1.04	1.06	7.58	0.51	1.00	0.99	1.99	29	33	62
3110	0.92	1.04	6.83	0.50	0.96	0.98	1.94	26	27	53
Mean	0.90	1.08	6.88	0.47	0.88	0.89	1.77	28	30	58
S.D.	0.10	0.07	0.82	0.05	0.08	0.09	0.17	3	4	7
S.E.	0.03	0.02	0.26	0.02	0.03	0.03	0.05	1	1	2
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 25 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
4101	294	1.93	17.4	12.1	14.1	26.2	199	196	395	229
4102	287	1.90	12.9	10.0	7.7	17.7	235	232	467	175
4103	279	2.05	14.2	10.4	11.1	21.5	223	221	444	338
4104	263	1.98	15.9	8.4	11.2	19.6	238	235	473	220
4105	299	2.06	15.9	10.3	12.6	22.9	263	269	532	284
4106	289	1.90	19.0	11.1	10.7	21.8	242	236	478	270
4107	253	1.91	14.0	9.2	7.8	17.0	198	204	402	212
4108	314	1.96	12.3	7.0	7.1	14.1	226	229	455	183
4109	284	1.90	13.7	10.6	7.2	17.8	224	225	449	361
4110	300	1.89	15.0	7.1	5.2	12.3	232	255	487	255
Mean	286	1.95	15.0	9.6	9.5	19.1	228	230	458	253
S.D.	18	0.06	2.1	1.7	2.9	4.2	19	21	40	62
S.E.	6	0.02	0.7	0.5	0.9	1.3	6	7	13	20
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 26 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
4101	0.96	1.13	7.58	0.47	0.91	0.86	1.77	25	27	52
4102	0.91	1.08	6.82	0.51	1.02	0.98	2.00	31	30	61
4103	0.86	1.00	7.05	0.55	0.92	0.90	1.82	23	23	46
4104	0.92	1.06	6.76	0.44	0.92	0.94	1.86	38	39	77
4105	1.00	1.07	8.09	0.57	0.94	0.96	1.90	38	47	85
4106	0.96	1.13	8.36	0.57	0.95	0.90	1.85	25	31	56
4107	0.89	0.98	7.20	0.41	0.80	0.87	1.67	34	37	71
4108	0.89	1.18	8.15	0.61	1.01	1.00	2.01	23	23	46
4109	0.85	1.03	7.36	0.48	0.88	0.94	1.82	27	27	54
4110	0.93	1.06	7.06	0.56	0.88	0.87	1.75	24	24	48
Mean	0.92	1.07	7.44	0.52	0.92	0.92	1.85	29	31	60
S.D.	0.05	0.06	0.58	0.07	0.06	0.05	0.11	6	8	14
S.E.	0.01	0.02	0.18	0.02	0.02	0.02	0.03	2	3	4
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 27 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Ovary-R mg	Ovary-L mg	Ovary-RL mg	Uterus mg
4101	34.4	34.3	68.7	706
4102	43.3	37.8	81.1	579
4103	31.4	34.1	65.5	847
4104	36.5	39.7	76.2	999
4105	48.7	42.2	90.9	632
4106	37.7	43.4	81.1	618
4107	39.2	40.0	79.2	848
4108	43.9	43.6	87.5	529
4109	36.2	46.2	82.4	872
4110	33.3	27.4	60.7	517
Mean	38.5	38.9	77.3	715
S.D.	5.4	5.6	9.6	166
S.E.	1.7	1.8	3.1	53
n	10	10	10	10

Appendix 8 - 28 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	F.B.W. g	Brain g	Pituitary mg	Thyroid-R mg	Thyroid-L mg	Thyroid-RL mg	Sa.G. -R mg	Sa.G. -L mg	Sa.G. -RL mg	Thymus mg
5101	314	2.16	15.7	9.4	6.3	15.7	268	271	539	170
5102	262	1.87	14.7	11.8	10.2	22.0	198	191	389	313
5103	249	1.93	15.3	7.3	6.6	13.9	221	223	444	136
5104	298	2.01	19.5	7.3	7.2	14.5	241	240	481	212
5105	277	2.12	13.1	10.3	11.0	21.3	234	237	471	290
5106	341	1.90	12.2	11.8	9.1	20.9	246	256	502	530
5107	283	2.15	15.1	6.7	8.7	15.4	219	215	434	292
5108	260	2.05	18.1	10.8	9.2	20.0	231	228	459	259
5109	301	2.18	15.4	7.1	6.3	13.4	226	221	447	225
5110	306	1.97	15.6	7.7	7.4	15.1	235	233	468	241
Mean	289	2.03	15.5	9.0	8.2	17.2	232	232	463	267
S.D.	28	0.11	2.1	2.0	1.7	3.4	18	22	40	108
S.E.	9	0.04	0.7	0.6	0.5	1.1	6	7	13	34
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 8 - 29 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Heart g	Lung g	Liver g	Spleen g	Kidney-R g	Kidney-L g	Kidney-RL g	Adrenal-R mg	Adrenal-L mg	Adrenal-RL mg
5101	0.96	1.27	7.54	0.56	0.99	1.04	2.03	35	37	72
5102	0.87	1.04	7.07	0.48	0.94	0.88	1.82	29	29	58
5103	0.90	0.98	6.20	0.44	0.80	0.82	1.62	33	33	66
5104	1.05	1.18	8.23	0.59	0.97	0.96	1.93	35	35	70
5105	0.95	1.23	8.38	0.53	1.00	1.03	2.03	39	41	80
5106	1.13	1.12	7.20	0.55	0.84	0.91	1.75	27	31	58
5107	0.91	1.14	7.40	0.46	0.81	0.83	1.64	28	32	60
5108	0.91	1.09	7.07	0.42	0.95	0.88	1.83	26	27	53
5109	0.97	1.06	7.90	0.42	0.97	1.03	2.00	35	38	73
5110	1.02	1.11	7.63	0.55	0.94	0.99	1.93	29	35	64
Mean	0.97	1.12	7.46	0.50	0.92	0.94	1.86	32	34	65
S.D.	0.08	0.09	0.64	0.06	0.08	0.08	0.15	4	4	8
S.E.	0.03	0.03	0.20	0.02	0.02	0.03	0.05	1	1	3
n	10	10	10	10	10	10	10	10	10	10

Appendix 8 - 30 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual absolute organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Ovary-R mg	Ovary-L mg	Ovary-RL mg	Uterus mg
5101	46.4	55.8	102.2	600
5102	33.7	47.6	81.3	749
5103	43.8	35.4	79.2	466
5104	46.4	45.9	92.3	430
5105	55.7	53.7	109.4	703
5106	36.9	31.8	68.7	627
5107	41.5	36.5	78.0	682
5108	34.2	40.7	74.9	463
5109	59.7	57.1	116.8	671
5110	37.9	40.8	78.7	489
Mean	43.6	44.5	88.2	588
S.D.	8.8	8.9	16.2	116
S.E.	2.8	2.8	5.1	37
n	10	10	10	10

Appendix 9 - 1 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
1001	597	0.36	2.1	2.2	2.5	4.8	62	62	124	52
1002	531	0.41	1.9	2.0	1.5	3.4	60	60	120	60
1003	587	0.38	2.4	1.7	2.0	3.7	59	58	117	31
1004	595	0.40	2.5	2.5	1.9	4.5	71	71	142	44
1005	542	0.42	2.2	1.6	1.8	3.5	58	61	119	40
1006	520	0.41	2.4	1.7	2.3	4.0	71	70	141	43
1007	509	0.42	2.3	2.6	2.4	4.9	64	62	126	55
1008	597	0.37	2.2	2.2	2.1	4.3	65	68	133	36
1009	544	0.41	2.5	1.5	1.5	3.0	56	56	112	42
1010	595	0.39	2.5	2.7	2.2	4.9	61	59	120	51
Mean	562	0.40	2.3	2.1	2.0	4.1	63	63	125	45
S.D.	36	0.02	0.2	0.4	0.3	0.7	5	5	10	9
S.E.	11	0.01	0.1	0.1	0.1	0.2	2	2	3	3
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 2 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
1001	0.26	0.27	2.31	0.13	0.26	0.27	0.53	5	4	9
1002	0.25	0.29	2.07	0.13	0.23	0.24	0.47	5	6	11
1003	0.26	0.25	2.56	0.12	0.28	0.29	0.57	5	5	10
1004	0.27	0.29	2.35	0.12	0.27	0.28	0.55	5	5	9
1005	0.25	0.30	2.43	0.10	0.29	0.30	0.59	5	5	10
1006	0.31	0.29	2.85	0.14	0.29	0.30	0.59	6	6	12
1007	0.31	0.30	2.65	0.13	0.30	0.31	0.61	6	6	12
1008	0.30	0.26	2.66	0.14	0.27	0.27	0.54	5	6	11
1009	0.28	0.27	2.35	0.12	0.29	0.31	0.60	5	5	11
1010	0.31	0.24	2.90	0.10	0.29	0.31	0.60	6	8	14
Mean	0.28	0.28	2.51	0.12	0.28	0.29	0.57	5	6	11
S.D.	0.03	0.02	0.26	0.01	0.02	0.02	0.04	0	1	2
S.E.	0.01	0.01	0.08	0.00	0.01	0.01	0.01	0	0	0
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 4 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
2001	634	0.34	2.4	1.5	2.0	3.5	76	77	152	20
2002	508	0.41	2.4	2.4	1.1	3.5	64	63	127	66
2003	626	0.36	1.8	1.8	1.7	3.5	56	58	113	21
2004	545	0.40	2.3	2.5	2.2	4.7	71	70	141	58
2005	566	0.41	2.5	2.1	1.8	3.9	63	65	128	37
2006	556	0.38	2.4	1.9	1.8	3.7	71	71	142	46
2007	523	0.41	2.0	1.9	1.4	3.3	76	77	153	71
2008	633	0.35	2.2	1.6	1.7	3.3	69	70	139	58
2009	622	0.36	2.3	1.8	1.3	3.1	59	56	115	45
2010	714	0.31	2.2	1.9	1.2	3.0	68	69	138	36
Mean	593	0.37	2.3	1.9	1.6	3.6	67	68	135	46
S.D.	64	0.03	0.2	0.3	0.4	0.5	7	7	14	18
S.E.	20	0.01	0.1	0.1	0.1	0.2	2	2	4	6
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 5 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
2001	0.28	0.29	2.55	0.12	0.27	0.28	0.55	4	6	10
2002	0.29	0.31	2.44	0.15	0.30	0.32	0.62	5	6	11
2003	0.24	0.24	2.70	0.10	0.28	0.29	0.57	4	4	9
2004	0.27	0.28	2.59	0.09	0.30	0.31	0.61	5	6	11
2005	0.27	0.27	2.62	0.13	0.31	0.31	0.61	5	6	11
2006	0.27	0.28	2.54	0.11	0.27	0.29	0.56	5	5	10
2007	0.28	0.28	2.40	0.13	0.26	0.28	0.54	7	7	14
2008	0.27	0.27	2.85	0.13	0.30	0.35	0.65	5	5	10
2009	0.26	0.28	2.54	0.16	0.28	0.31	0.59	5	5	10
2010	0.27	0.28	2.56	0.14	0.27	0.27	0.53	5	5	10
Mean	0.27	0.28	2.58	0.13	0.28	0.30	0.58	5	6	11
S.D.	0.01	0.02	0.13	0.02	0.02	0.02	0.04	1	1	1
S.E.	0.00	0.01	0.04	0.01	0.01	0.01	0.01	0	0	0
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 6 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight Stage : Week 13
 Sex : Male Test Article : Corn oil Dose : 0 mg/kg

Animal No.	Testis-R g/100g	Testis-L g/100g	Testis-RL g/100g	Prostate g/100g	Sem.Ves. g/100g
2001	0.26	0.27	0.53	0.25	0.20
2002	0.38	0.37	0.76	0.28	0.31
2003	0.33	0.32	0.65	0.21	0.20
2004	0.35	0.37	0.72	0.25	0.25
2005	0.34	0.35	0.70	0.20	0.25
2006	0.33	0.33	0.66	0.23	0.35
2007	0.31	0.33	0.63	0.23	0.24
2008	0.27	0.26	0.53	0.16	0.18
2009	0.28	0.28	0.55	0.22	0.22
2010	0.31	0.30	0.61	0.18	0.27
Mean	0.32	0.32	0.63	0.22	0.25
S.D.	0.04	0.04	0.08	0.04	0.05
S.E.	0.01	0.01	0.03	0.01	0.02
n	10	10	10	10	10

Sem.Ves. : Seminal vesicle

Appendix 9 - 7 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
3001	565	0.41	2.0	2.3	1.6	3.9	61	60	121	31
3002	615	0.31	2.5	2.2	2.1	4.2	59	57	116	38
3003	596	0.40	2.5	3.0	2.8	5.8	72	72	144	42
3004	454	0.46	3.1	2.6	3.4	6.0	66	65	131	51
3005	514	0.42	2.8	2.3	2.1	4.5	59	56	115	45
3006	678	0.32	2.3	2.3	2.0	4.3	55	56	111	63
3007	555	0.41	2.7	2.7	2.0	4.7	66	63	128	40
3008	577	0.37	2.0	1.9	2.3	4.2	72	70	142	41
3009	583	0.39	2.1	2.0	2.6	4.5	60	58	118	54
3010	556	0.43	1.9	2.2	2.1	4.3	69	66	135	59
Mean	569	0.39	2.4	2.4	2.3	4.6	64	62	126	46
S.D.	59	0.05	0.4	0.3	0.5	0.7	6	6	12	10
S.E.	19	0.01	0.1	0.1	0.2	0.2	2	2	4	3
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 8 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
3001	0.27	0.28	2.46	0.13	0.24	0.25	0.50	5	5	9
3002	0.26	0.27	2.46	0.12	0.27	0.28	0.54	4	5	9
3003	0.27	0.29	2.60	0.15	0.30	0.29	0.59	5	7	12
3004	0.30	0.31	2.39	0.14	0.30	0.30	0.59	7	7	14
3005	0.31	0.25	2.72	0.13	0.35	0.33	0.68	5	6	11
3006	0.25	0.26	2.46	0.16	0.26	0.29	0.55	5	5	10
3007	0.26	0.30	2.56	0.13	0.29	0.30	0.58	4	4	8
3008	0.29	0.30	2.46	0.17	0.28	0.30	0.58	4	5	9
3009	0.27	0.27	2.72	0.13	0.31	0.34	0.65	4	4	8
3010	0.34	0.28	2.35	0.12	0.30	0.31	0.61	4	4	9
Mean	0.28	0.28	2.52	0.14	0.29	0.30	0.59	5	5	10
S.D.	0.03	0.02	0.13	0.02	0.03	0.03	0.05	1	1	2
S.E.	0.01	0.01	0.04	0.01	0.01	0.01	0.02	0	0	1
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 9 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight Stage : Week 13
 Sex : Male Test Article : DMS Dose : 5 mg/kg

Animal No.	Testis-R g/100g	Testis-L g/100g	Testis-RL g/100g	Prostate g/100g	Sem.Ves. g/100g
3001	0.32	0.31	0.63	0.16	0.19
3002	0.28	0.29	0.56	0.24	0.23
3003	0.30	0.31	0.61	0.23	0.26
3004	0.37	0.35	0.73	0.24	0.28
3005	0.32	0.32	0.63	0.23	0.28
3006	0.26	0.26	0.52	0.19	0.26
3007	0.29	0.28	0.57	0.22	0.27
3008	0.31	0.31	0.63	0.24	0.25
3009	0.29	0.30	0.59	0.22	0.21
3010	0.33	0.31	0.64	0.25	0.30
Mean	0.31	0.30	0.61	0.22	0.25
S.D.	0.03	0.02	0.06	0.03	0.03
S.E.	0.01	0.01	0.02	0.01	0.01
n	10	10	10	10	10

Sem.Ves. : Seminal vesicle

Appendix 9 - 10 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
4001	576	0.39	2.2	1.8	1.8	3.6	53	48	101	30
4002	580	0.37	2.8	1.8	1.5	3.4	59	54	113	43
4003	524	0.42	2.4	2.5	2.2	4.7	66	64	130	48
4004	720	0.32	2.0	1.4	2.0	3.4	55	51	106	28
4005	607	0.38	2.8	2.4	2.1	4.5	74	66	140	52
4006	580	0.39	2.3	2.0	1.7	3.7	73	72	146	57
4007	572	0.35	2.0	2.2	1.9	4.1	46	46	92	59
4008	542	0.41	2.2	2.2	1.4	3.7	62	63	125	64
4009	509	0.48	2.3	1.7	1.9	3.6	75	74	149	75
4010	522	0.42	2.5	1.9	2.2	4.1	65	66	131	56
Mean	573	0.39	2.4	2.0	1.9	3.9	63	60	123	51
S.D.	60	0.04	0.3	0.3	0.3	0.5	10	10	20	15
S.E.	19	0.01	0.1	0.1	0.1	0.1	3	3	6	5
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 11 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
4001	0.25	0.30	2.30	0.11	0.30	0.31	0.61	4	5	9
4002	0.29	0.28	2.72	0.12	0.30	0.32	0.62	4	6	10
4003	0.29	0.30	2.26	0.14	0.27	0.28	0.56	5	5	10
4004	0.25	0.23	2.67	0.15	0.26	0.24	0.50	4	4	8
4005	0.27	0.26	2.34	0.14	0.30	0.32	0.61	5	7	11
4006	0.26	0.28	2.44	0.13	0.27	0.26	0.53	5	5	10
4007	0.28	0.29	2.91	0.13	0.29	0.31	0.60	4	4	8
4008	0.24	0.26	2.54	0.12	0.29	0.32	0.61	5	5	11
4009	0.31	0.32	2.57	0.16	0.32	0.31	0.62	5	6	12
4010	0.27	0.26	2.48	0.11	0.32	0.33	0.65	4	5	8
Mean	0.27	0.28	2.52	0.13	0.29	0.30	0.59	5	5	10
S.D.	0.02	0.03	0.20	0.02	0.02	0.03	0.05	1	1	1
S.E.	0.01	0.01	0.06	0.01	0.01	0.01	0.01	0	0	0
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 12 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Testis-R g/100g	Testis-L g/100g	Testis-RL g/100g	Prostate g/100g	Sem.Ves. g/100g
4001	0.30	0.30	0.60	0.23	0.22
4002	0.35	0.35	0.70	0.21	0.29
4003	0.35	0.35	0.71	0.19	0.30
4004	0.26	0.26	0.52	0.16	0.23
4005	0.26	0.27	0.53	0.23	0.30
4006	0.30	0.31	0.61	0.23	0.25
4007	0.33	0.34	0.67	0.18	0.20
4008	0.32	0.32	0.65	0.21	0.26
4009	0.35	0.37	0.72	0.20	0.29
4010	0.31	0.30	0.61	0.28	0.20
Mean	0.31	0.32	0.63	0.21	0.25
S.D.	0.03	0.04	0.07	0.03	0.04
S.E.	0.01	0.01	0.02	0.01	0.01
n	10	10	10	10	10

Sem.Ves. : Seminal vesicle

Appendix 9 - 13 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
5001	556	0.41	2.4	1.5	1.9	3.4	75	75	150	47
5002	586	0.38	2.6	2.1	1.9	4.0	64	66	131	87
5003	504	0.44	2.3	2.2	1.9	4.0	77	76	153	49
5004	484	0.43	2.0	2.9	1.3	4.2	68	71	138	83
5005	570	0.40	2.7	2.6	1.8	4.4	60	58	118	52
5006	540	0.40	2.6	1.7	2.2	3.9	65	69	133	45
5007	609	0.40	2.5	1.7	1.7	3.3	61	61	121	53
5008	652	0.37	2.6	1.9	1.6	3.5	65	63	127	46
5009	589	0.37	1.9	1.4	2.1	3.5	66	67	132	50
5010	442	0.48	2.7	2.4	1.9	4.4	66	63	128	47
Mean	553	0.41	2.4	2.0	1.8	3.9	67	67	133	56
S.D.	63	0.03	0.3	0.5	0.3	0.4	5	6	11	16
S.E.	20	0.01	0.1	0.2	0.1	0.1	2	2	4	5
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 14 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
5001	0.29	0.31	2.47	0.14	0.27	0.29	0.56	6	6	11
5002	0.28	0.28	2.96	0.14	0.29	0.29	0.58	4	4	9
5003	0.28	0.31	2.51	0.14	0.34	0.36	0.70	5	6	11
5004	0.28	0.29	2.46	0.16	0.31	0.31	0.63	5	6	11
5005	0.24	0.29	2.52	0.11	0.27	0.27	0.54	5	5	10
5006	0.27	0.29	2.44	0.13	0.29	0.29	0.58	5	5	10
5007	0.27	0.27	2.53	0.16	0.25	0.29	0.54	4	4	8
5008	0.26	0.28	2.47	0.11	0.24	0.27	0.51	5	6	11
5009	0.25	0.28	2.47	0.13	0.31	0.33	0.64	5	5	11
5010	0.29	0.27	2.26	0.14	0.32	0.35	0.66	5	6	11
Mean	0.27	0.29	2.51	0.14	0.29	0.31	0.59	5	5	10
S.D.	0.02	0.01	0.18	0.02	0.03	0.03	0.06	1	1	1
S.E.	0.01	0.00	0.06	0.01	0.01	0.01	0.02	0	0	0
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 15 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Male Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Testis-R g/100g	Testis-L g/100g	Testis-RL g/100g	Prostate g/100g	Sem.Ves. g/100g
5001	0.32	0.32	0.64	0.19	0.25
5002	0.31	0.30	0.61	0.17	0.22
5003	0.32	0.32	0.63	0.25	0.30
5004	0.35	0.36	0.70	0.23	0.29
5005	0.28	0.28	0.56	0.25	0.23
5006	0.24	0.24	0.48	0.23	0.27
5007	0.30	0.30	0.60	0.20	0.24
5008	0.29	0.29	0.59	0.19	0.21
5009	0.30	0.32	0.62	0.24	0.23
5010	0.37	0.35	0.71	0.24	0.36
Mean	0.31	0.31	0.61	0.22	0.26
S.D.	0.04	0.03	0.07	0.03	0.05
S.E.	0.01	0.01	0.02	0.01	0.01
n	10	10	10	10	10

Sem.Ves. : Seminal vesicle

Appendix 9 - 16 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
1101	269	0.74	6.0	5.4	4.6	10.0	90	86	176	99
1102	266	0.69	6.7	2.7	3.2	5.9	79	78	157	106
1103	266	0.76	5.3	3.0	3.4	6.4	104	101	205	93
1104	255	0.75	5.0	3.0	3.3	6.2	94	95	189	82
1105	282	0.72	6.5	2.5	3.4	5.9	80	83	163	80
1106	321	0.61	4.3	2.5	2.7	5.2	62	60	122	54
1107	346	0.64	4.0	3.8	3.0	6.8	72	73	144	118
1108	286	0.66	6.9	4.1	3.0	7.1	86	86	172	136
1109	317	0.64	5.0	4.8	4.1	8.9	71	69	139	88
1110	319	0.68	4.1	5.6	4.2	9.8	87	87	174	87
Mean	293	0.69	5.4	3.7	3.5	7.2	83	82	164	94
S.D.	31	0.05	1.1	1.2	0.6	1.7	12	12	25	22
S.E.	10	0.02	0.3	0.4	0.2	0.5	4	4	8	7
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 17 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
1101	0.35	0.42	2.66	0.18	0.32	0.35	0.67	10	11	21
1102	0.37	0.40	2.53	0.16	0.30	0.32	0.62	12	12	25
1103	0.36	0.45	2.59	0.20	0.34	0.35	0.69	14	15	29
1104	0.38	0.46	2.42	0.22	0.36	0.35	0.70	15	16	30
1105	0.30	0.37	2.40	0.16	0.38	0.37	0.74	11	12	23
1106	0.29	0.32	2.24	0.12	0.28	0.28	0.56	9	9	19
1107	0.31	0.37	2.57	0.18	0.30	0.27	0.57	10	11	21
1108	0.35	0.41	2.83	0.22	0.37	0.38	0.75	9	10	19
1109	0.29	0.40	2.49	0.18	0.33	0.32	0.65	9	10	20
1110	0.29	0.36	2.34	0.17	0.29	0.29	0.59	12	11	23
Mean	0.33	0.40	2.51	0.18	0.33	0.33	0.65	11	12	23
S.D.	0.04	0.04	0.17	0.03	0.03	0.04	0.07	2	2	4
S.E.	0.01	0.01	0.05	0.01	0.01	0.01	0.02	1	1	1
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 18 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight Stage : Week 13
 Sex : Female Test Article : DMS Dose : 0 mg/kg

Animal No.	Ovary-R mg/100g	Ovary-L mg/100g	Ovary-RL mg/100g	Uterus mg/100g
1101	15.4	14.8	30.2	270
1102	15.6	13.1	28.7	222
1103	19.4	14.3	33.7	182
1104	16.5	15.6	32.1	167
1105	13.0	15.4	28.4	236
1106	10.0	13.3	23.2	162
1107	15.5	14.5	29.9	158
1108	16.4	17.5	33.8	241
1109	16.5	16.5	33.0	146
1110	13.5	11.2	24.7	213
Mean	15.2	14.6	29.8	200
S.D.	2.5	1.8	3.6	42
S.E.	0.8	0.6	1.2	13
n	10	10	10	10

Appendix 9 - 19 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight Stage : Week 13
 Sex : Female Test Article : Corn oil Dose : 0 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
2101	269	0.75	7.2	4.5	3.3	7.8	75	71	146	92
2102	292	0.67	5.4	3.0	2.9	5.9	69	68	138	66
2103	288	0.70	5.6	2.8	3.1	5.9	81	77	158	83
2104	326	0.59	4.7	3.4	3.6	7.0	69	71	140	75
2105	259	0.75	5.4	3.9	3.8	7.7	82	86	168	65
2106	241	0.79	4.5	2.5	3.2	5.7	93	92	185	85
2107	319	0.67	5.0	2.9	3.5	6.5	79	77	156	115
2108	290	0.67	4.8	2.3	3.0	5.3	79	82	161	60
2109	298	0.68	5.5	2.5	2.8	5.2	90	95	185	101
2110	277	0.70	6.4	3.3	2.9	6.2	76	78	154	63
Mean	286	0.70	5.5	3.1	3.2	6.3	79	80	159	81
S.D.	26	0.06	0.8	0.7	0.3	0.9	8	9	16	18
S.E.	8	0.02	0.3	0.2	0.1	0.3	2	3	5	6
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 20 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Female Test Article : Corn oil Stage : Week 13
 Dose : 0 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
2101	0.33	0.41	2.55	0.17	0.31	0.32	0.62	11	12	23
2102	0.35	0.41	2.44	0.16	0.37	0.37	0.74	14	14	28
2103	0.30	0.35	2.23	0.19	0.33	0.32	0.65	10	12	22
2104	0.29	0.38	2.52	0.15	0.30	0.30	0.60	11	11	22
2105	0.33	0.39	2.37	0.15	0.34	0.37	0.71	11	13	24
2106	0.32	0.43	2.46	0.18	0.32	0.32	0.64	11	11	22
2107	0.29	0.39	2.50	0.16	0.31	0.31	0.62	10	9	19
2108	0.32	0.43	2.61	0.15	0.31	0.32	0.63	10	9	19
2109	0.29	0.40	2.52	0.21	0.28	0.30	0.58	10	11	21
2110	0.35	0.42	2.52	0.15	0.38	0.37	0.74	11	12	23
Mean	0.32	0.40	2.47	0.17	0.33	0.33	0.65	11	11	22
S.D.	0.02	0.02	0.11	0.02	0.03	0.03	0.06	1	2	3
S.E.	0.01	0.01	0.03	0.01	0.01	0.01	0.02	0	0	1
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 21 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight Stage : Week 13
 Sex : Female Test Article : Corn oil Dose : 0 mg/kg

Animal No.	Ovary-R mg/100g	Ovary-L mg/100g	Ovary-RL mg/100g	Uterus mg/100g
2101	13.9	14.7	28.6	220
2102	12.9	15.0	27.9	180
2103	14.7	16.6	31.3	235
2104	9.8	13.3	23.0	171
2105	12.5	9.1	21.7	278
2106	16.1	12.7	28.9	199
2107	17.1	12.2	29.2	152
2108	13.4	11.6	25.0	347
2109	12.9	13.9	26.8	204
2110	11.8	12.7	24.5	162
Mean	13.5	13.2	26.7	215
S.D.	2.1	2.1	3.1	60
S.E.	0.7	0.7	1.0	19
n	10	10	10	10

Appendix 9 - 22 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight Stage : Week 13
 Sex : Female Test Article : DMS Dose : 5 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
3101	282	0.72	5.6	2.8	2.2	5.0	88	84	172	98
3102	277	0.73	5.5	3.2	3.1	6.4	82	84	166	70
3103	251	0.78	5.7	3.8	3.5	7.3	83	84	167	90
3104	301	0.66	5.9	3.1	2.9	5.9	83	82	165	85
3105	254	0.82	5.0	2.8	3.2	6.0	80	87	167	66
3106	305	0.69	4.8	2.7	2.4	5.1	79	80	159	77
3107	239	0.80	5.2	2.8	2.9	5.7	84	80	164	126
3108	332	0.65	4.9	3.6	2.4	6.0	67	67	134	58
3109	339	0.61	4.3	3.1	3.2	6.3	62	62	124	72
3110	255	0.75	5.0	3.1	3.2	6.3	85	84	169	95
Mean	284	0.72	5.2	3.1	2.9	6.0	79	79	159	84
S.D.	35	0.07	0.5	0.4	0.4	0.7	8	8	16	20
S.E.	11	0.02	0.2	0.1	0.1	0.2	3	3	5	6
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 23 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 5 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
3101	0.32	0.38	2.12	0.16	0.28	0.29	0.58	8	9	17
3102	0.29	0.38	2.26	0.17	0.29	0.30	0.59	10	10	21
3103	0.31	0.41	2.36	0.15	0.32	0.31	0.63	10	12	22
3104	0.34	0.38	2.70	0.17	0.30	0.31	0.61	10	9	19
3105	0.32	0.41	2.39	0.17	0.34	0.35	0.69	11	12	23
3106	0.29	0.36	2.50	0.17	0.27	0.25	0.52	11	13	25
3107	0.36	0.45	2.83	0.17	0.36	0.36	0.72	11	13	23
3108	0.31	0.38	2.31	0.16	0.30	0.32	0.62	8	9	17
3109	0.31	0.31	2.24	0.15	0.29	0.29	0.59	9	10	18
3110	0.36	0.41	2.68	0.20	0.38	0.38	0.76	10	11	21
Mean	0.32	0.39	2.44	0.17	0.31	0.32	0.63	10	11	21
S.D.	0.03	0.04	0.23	0.01	0.04	0.04	0.07	1	2	3
S.E.	0.01	0.01	0.07	0.00	0.01	0.01	0.02	0	1	1
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 24 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight Stage : Week 13
 Sex : Female Test Article : DMS Dose : 5 mg/kg

Animal No.	Ovary-R mg/100g	Ovary-L mg/100g	Ovary-RL mg/100g	Uterus mg/100g
3101	11.2	11.6	22.8	199
3102	16.1	13.2	29.4	285
3103	18.3	14.4	32.7	212
3104	17.3	18.6	35.9	202
3105	13.8	17.8	31.6	169
3106	14.9	17.5	32.4	230
3107	15.9	15.5	31.3	182
3108	14.3	14.4	28.7	124
3109	10.9	8.8	19.7	163
3110	19.4	16.2	35.6	198
Mean	15.2	14.8	30.0	196
S.D.	2.8	3.0	5.2	43
S.E.	0.9	1.0	1.6	14
n	10	10	10	10

Appendix 9 - 25 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	F.B.W. g	Brain g/100g	Pituitary mg/100g	Thyroid-R mg/100g	Thyroid-L mg/100g	Thyroid-RL mg/100g	Sa.G. -R mg/100g	Sa.G. -L mg/100g	Sa.G. -RL mg/100g	Thymus mg/100g
4101	294	0.66	5.9	4.1	4.8	8.9	68	67	134	78
4102	287	0.66	4.5	3.5	2.7	6.2	82	81	163	61
4103	279	0.73	5.1	3.7	4.0	7.7	80	79	159	121
4104	263	0.75	6.0	3.2	4.3	7.5	90	89	180	84
4105	299	0.69	5.3	3.4	4.2	7.7	88	90	178	95
4106	289	0.66	6.6	3.8	3.7	7.5	84	82	165	93
4107	253	0.75	5.5	3.6	3.1	6.7	78	81	159	84
4108	314	0.62	3.9	2.2	2.3	4.5	72	73	145	58
4109	284	0.67	4.8	3.7	2.5	6.3	79	79	158	127
4110	300	0.63	5.0	2.4	1.7	4.1	77	85	162	85
Mean	286	0.68	5.3	3.4	3.3	6.7	80	81	160	89
S.D.	18	0.05	0.8	0.6	1.0	1.5	7	7	14	22
S.E.	6	0.01	0.2	0.2	0.3	0.5	2	2	4	7
n	10	10	10	10	10	10	10	10	10	10

Sa.G. : Salivary gland

Appendix 9 - 26 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 15 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
4101	0.33	0.38	2.58	0.16	0.31	0.29	0.60	9	9	18
4102	0.32	0.38	2.38	0.18	0.36	0.34	0.70	11	10	21
4103	0.31	0.36	2.53	0.20	0.33	0.32	0.65	8	8	16
4104	0.35	0.40	2.57	0.17	0.35	0.36	0.71	14	15	29
4105	0.33	0.36	2.71	0.19	0.31	0.32	0.64	13	16	28
4106	0.33	0.39	2.89	0.20	0.33	0.31	0.64	9	11	19
4107	0.35	0.39	2.85	0.16	0.32	0.34	0.66	13	15	28
4108	0.28	0.38	2.60	0.19	0.32	0.32	0.64	7	7	15
4109	0.30	0.36	2.59	0.17	0.31	0.33	0.64	10	10	19
4110	0.31	0.35	2.35	0.19	0.29	0.29	0.58	8	8	16
Mean	0.32	0.38	2.61	0.18	0.32	0.32	0.65	10	11	21
S.D.	0.02	0.02	0.18	0.02	0.02	0.02	0.04	2	3	5
S.E.	0.01	0.01	0.06	0.00	0.01	0.01	0.01	1	1	2
n	10	10	10	10	10	10	10	10	10	10

Appendix 9 - 27 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight Stage : Week 13
 Sex : Female Test Article : DMS Dose : 15 mg/kg

Animal No.	Ovary-R mg/100g	Ovary-L mg/100g	Ovary-RL mg/100g	Uterus mg/100g
4101	11.7	11.7	23.4	240
4102	15.1	13.2	28.3	202
4103	11.3	12.2	23.5	304
4104	13.9	15.1	29.0	380
4105	16.3	14.1	30.4	211
4106	13.0	15.0	28.1	214
4107	15.5	15.8	31.3	335
4108	14.0	13.9	27.9	168
4109	12.7	16.3	29.0	307
4110	11.1	9.1	20.2	172
Mean	13.5	13.6	27.1	253
S.D.	1.8	2.2	3.5	73
S.E.	0.6	0.7	1.1	23
n	10	10	10	10

Appendix 9 - 29 A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats



Item : Individual relative organ weight
 Sex : Female Test Article : DMS Stage : Week 13
 Dose : 50 mg/kg

Animal No.	Heart g/100g	Lung g/100g	Liver g/100g	Spleen g/100g	Kidney-R g/100g	Kidney-L g/100g	Kidney-RL g/100g	Adrenal-R mg/100g	Adrenal-L mg/100g	Adrenal-RL mg/100g
5101	0.31	0.40	2.40	0.18	0.32	0.33	0.65	11	12	23
5102	0.33	0.40	2.70	0.18	0.36	0.34	0.69	11	11	22
5103	0.36	0.39	2.49	0.18	0.32	0.33	0.65	13	13	27
5104	0.35	0.40	2.76	0.20	0.33	0.32	0.65	12	12	23
5105	0.34	0.44	3.03	0.19	0.36	0.37	0.73	14	15	29
5106	0.33	0.33	2.11	0.16	0.25	0.27	0.51	8	9	17
5107	0.32	0.40	2.61	0.16	0.29	0.29	0.58	10	11	21
5108	0.35	0.42	2.72	0.16	0.37	0.34	0.70	10	10	20
5109	0.32	0.35	2.62	0.14	0.32	0.34	0.66	12	13	24
5110	0.33	0.36	2.49	0.18	0.31	0.32	0.63	9	11	21
Mean	0.33	0.39	2.59	0.17	0.32	0.33	0.65	11	12	23
S.D.	0.02	0.03	0.24	0.02	0.04	0.03	0.06	2	2	3
S.E.	0.00	0.01	0.08	0.01	0.01	0.01	0.02	1	1	1
n	10	10	10	10	10	10	10	10	10	10

Appendix 10-1(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1001 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Prostate Cell infiltration,interstitial: minimal, mononuclear dorsolateral

Testis Cell infiltration,interstitial: minimal, mononuclear

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejenum, Intestine,ileum(Peyer's patch)
Intestine,cecum, Intestine,colon, Intestine,rectum, Kidney
Lymph node,mesenteric, Lymph node,submandibular, Lung(bronchus)
Mammary gland,inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland,submandibular, Salivary gland,sublingual
Skin,inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle,femoral
Seminal vesicle, Spinal cord,thoracic, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-2(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1002 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Prostate, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-3(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1003 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Prostate Cell infiltration,interstitial: minimal, mononuclear ventral

Spleen Hematopoiesis,extramedullary: minimal

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejunum, Intestine,ileum(Peyer's patch)
Intestine,cecum, Intestine,colon, Intestine,rectum, Kidney
Lymph node,mesenteric, Lymph node,submandibular, Liver, Lung(bronchus)
Mammary gland,inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland,submandibular, Salivary gland,sublingual
Skin,inguinal, Sciatic nerve, Stomach, Skeletal muscle,femoral, Seminal vesicle
Spinal cord,thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-4(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1004 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Prostate Cell infiltration, interstitial: minimal, mononuclear ventral and dorsolateral

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-5(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1005 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Kidney Urinary cast,hyaline: minimal

Liver Microgranuloma: minimal

Lung(bronchus) Aggregation,alveolar macrophage: minimal
with brown pigment

Prostate Cell infiltration,interstitial: minimal, mononuclear
ventral

Spleen Hematopoiesis,extramedullary: minimal

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejenum, Intestine,ileum(Peyer's patch)
Intestine,cecum, Intestine,colon, Intestine,rectum, Lymph node,mesenteric
Lymph node,submandibular, Mammary gland,inguinal, Nasal cavity, Optic nerve
Parathyroid, Pancreas, Pituitary, Salivary gland,submandibular
Salivary gland,sublingual, Skin,inguinal, Sciatic nerve, Stomach
Skeletal muscle,femoral, Seminal vesicle, Spinal cord,thoracic, Testis, Thymus
Tongue, Trachea, Thyroid, Urinary bladder, Zymbal gland

Appendix 10-6(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1006 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Kidney	Basophilia,tubular: minimal with cell infiltration
Liver	Microgranuloma: minimal
Pancreas	Atrophy,acinar,focal: minimal Cell infiltration,interstitial: minimal, mononuclear
Prostate	Cell infiltration,interstitial: minimal, mononuclear ventral

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejunum, Intestine,ileum(Peyer's patch)
Intestine,cecum, Intestine,colon, Intestine,rectum, Lymph node,mesenteric
Lymph node,submandibular, Lung(bronchus), Mammary gland,inguinal, Nasal cavity
Optic nerve, Parathyroid, Pituitary, Salivary gland,submandibular
Salivary gland,sublingual, Skin,inguinal, Sciatic nerve, Spleen, Stomach
Skeletal muscle,femoral, Seminal vesicle, Spinal cord,thoracic, Testis, Thymus
Tongue, Trachea, Thyroid, Urinary bladder, Zymbal gland

Appendix 10-7(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1007 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Lung (bronchus) Aggregation, alveolar macrophage: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Mammary gland, inguinal
Nasal cavity, Optic nerve, Parathyroid, Pancreas, Pituitary, Prostate
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-8(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1008 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 3 present
4x1mm, 4x1mm, 2x1mm

Other tissues Not remarkable

Histopathology:

Heart Cell infiltration: minimal, focal, mononuclear

Prostate Cell infiltration, interstitial: mild, mononuclear
ventral

Stomach Erosion/Ulcer, glandular stomach: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-9(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1009 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Prostate, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-10(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1010 Male DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Spleen Hematopoiesis,extramedullary: minimal

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejunum, Intestine,ileum(Peyer's patch)
Intestine,cecum, Intestine,colon, Intestine,rectum, Kidney
Lymph node,mesenteric, Lymph node,submandibular, Liver, Lung(bronchus)
Mammary gland,inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Prostate, Salivary gland,submandibular, Salivary gland,sublingual
Skin,inguinal, Sciatic nerve, Stomach, Skeletal muscle,femoral, Seminal vesicle
Spinal cord,thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-11(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2001 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Prostate Cell infiltration,interstitial: minimal, inflammatory dorsolateral

Spleen Hematopoiesis,extramedullary: minimal

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejunum, Intestine,ileum(Peyer's patch)
Intestine,cecum, Intestine,colon, Intestine,rectum, Kidney
Lymph node,mesenteric, Lymph node,submandibular, Liver, Lung(bronchus)
Mammary gland,inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland,submandibular, Salivary gland,sublingual
Skin,inguinal, Sciatic nerve, Stomach, Skeletal muscle,femoral, Seminal vesicle
Spinal cord,thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-12(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2002 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Pancreas Atrophy, acinar, focal: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pituitary
Prostate, Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-13(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2003 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

Spleen Hematopoiesis, extramedullary: minimal

Stomach Erosion/Ulcer, glandular stomach: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Prostate, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-14(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2004 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Prostate Cell infiltration,interstitial: minimal, mononuclear ventral

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-15(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2005 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Kidney Urinary cast,hyaline: minimal

Liver Microgranuloma: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Lymph node, mesenteric
Lymph node, submandibular, Lung (bronchus), Mammary gland, inguinal, Nasal cavity
Optic nerve, Parathyroid, Pancreas, Pituitary, Prostate
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-16(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2006 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Heart Cell infiltration: minimal, focal, mononuclear

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Prostate, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-17(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2007 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

Heart Cell infiltration: minimal, focal, mononuclear

Prostate Cell infiltration, interstitial: mild, mononuclear
ventral

Stomach Erosion/Ulcer, glandular stomach: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-18(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2008 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Prostate, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-19(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2009 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Prostate Cell infiltration,interstitial: minimal, mononuclear ventral

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejunum, Intestine,ileum(Peyer's patch)
Intestine,cecum, Intestine,colon, Intestine,rectum, Kidney
Lymph node,mesenteric, Lymph node,submandibular, Lung(bronchus)
Mammary gland,inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland,submandibular, Salivary gland,sublingual
Skin,inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle,femoral
Seminal vesicle, Spinal cord,thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-20(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2010 Male Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

Spleen Cyst: 1 present
3x4x3mm

Other tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Pancreas Atrophy, acinar, focal: mild
with hemorrhage

Spleen Cyst, capsular: mild

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pituitary
Prostate, Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Stomach, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-21(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3001 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-22(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3002 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-23(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3003 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-24(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3004 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-25(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3005 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-26(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3006 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-27(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3007 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-28(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3008 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-29(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3009 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-30(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3010 Male DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-31(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4001 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-32(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4002 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-33(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4003 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-34(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4004 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
2x1mm

Other tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-35(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4005 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-36(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4006 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-37(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4007 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-38(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4008 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-39(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4009 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-40(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4010 Male DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
2x1mm

Other tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-41(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5001 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Kidney Basophilia,tubular: minimal

Prostate Cell infiltration,interstitial: minimal, mononuclear ventral

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejunum, Intestine,ileum(Peyer's patch)
Intestine,cecum, Intestine,colon, Intestine,rectum, Lymph node,mesenteric
Lymph node,submandibular, Liver, Lung(bronchus), Mammary gland,inguinal
Nasal cavity, Optic nerve, Parathyroid, Pancreas, Pituitary
Salivary gland,submandibular, Salivary gland,sublingual, Skin,inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle,femoral, Seminal vesicle
Spinal cord,thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-42(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5002 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Intestine,cecum Cell infiltration,mucosal: minimal, mononuclear

Kidney Urinary cast,hyaline: minimal

Lung(bronchus) Aggregation,alveolar macrophage: minimal

Prostate Cell infiltration,interstitial: minimal, mononuclear
ventral and dorsolateral

Spleen Hematopoiesis,extramedullary: minimal

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine,duodenum, Intestine,jejunum, Intestine,ileum(Peyer's patch)
Intestine,colon, Intestine,rectum, Lymph node,mesenteric
Lymph node,submandibular, Liver, Mammary gland,inguinal, Nasal cavity
Optic nerve, Parathyroid, Pancreas, Pituitary, Salivary gland,submandibular
Salivary gland,sublingual, Skin,inguinal, Sciatic nerve, Stomach
Skeletal muscle,femoral, Seminal vesicle, Spinal cord,thoracic, Testis, Thymus
Tongue, Trachea, Thyroid, Urinary bladder, Zymbal gland

Appendix 10-43(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5003 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Prostate Cell infiltration, interstitial: minimal, mononuclear ventral

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-44(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5004 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Prostate, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-45(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5005 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Kidney Cyst: minimal, papillary

Prostate Cell infiltration, interstitial: minimal, inflammatory ventral and dorsolateral

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Optic nerve, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-46(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5006 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Kidney Basophilia,tubular: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Optic nerve, Parathyroid, Pancreas, Pituitary, Prostate
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-47(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5007 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Prostate, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral
Seminal vesicle, Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Zymbal gland

Appendix 10-48(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5008 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Lung (bronchus) Aggregation, alveolar macrophage: minimal

Prostate Cell infiltration, interstitial: minimal, inflammatory ventral and dorsolateral

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland, Heart
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Mammary gland, inguinal
Nasal cavity, Optic nerve, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-49(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5009 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

Heart Cell infiltration: minimal, focal, mononuclear

Prostate Cell infiltration, interstitial: minimal, inflammatory
ventral

Stomach Erosion/Ulcer, glandular stomach: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Harderian gland
Intestine, duodenum, Intestine, jejunum, Intestine, ileum (Peyer's patch)
Intestine, cecum, Intestine, colon, Intestine, rectum, Kidney
Lymph node, mesenteric, Lymph node, submandibular, Liver, Lung (bronchus)
Mammary gland, inguinal, Nasal cavity, Optic nerve, Parathyroid, Pancreas
Pituitary, Salivary gland, submandibular, Salivary gland, sublingual
Skin, inguinal, Sciatic nerve, Spleen, Skeletal muscle, femoral, Seminal vesicle
Spinal cord, thoracic, Testis, Thymus, Tongue, Trachea, Thyroid, Urinary bladder
Zymbal gland

Appendix 10-50(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5010 Male DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Harderian gland Cell infiltration,interstitial: minimal, mononuclear

Kidney Basophilia,tubular: minimal

Liver Microgranuloma: minimal

Prostate Cell infiltration,interstitial: minimal, mononuclear ventral

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Epididymis, Esophagus, Eye, Heart, Intestine,duodenum
Intestine,jejunum, Intestine,ileum(Peyer's patch), Intestine,cecum
Intestine,colon, Intestine,rectum, Lymph node,mesenteric
Lymph node,submandibular, Lung(bronchus), Mammary gland,inguinal, Nasal cavity
Optic nerve, Parathyroid, Pancreas, Pituitary, Salivary gland,submandibular
Salivary gland,sublingual, Skin,inguinal, Sciatic nerve, Spleen, Stomach
Skeletal muscle,femoral, Seminal vesicle, Spinal cord,thoracic, Testis, Thymus
Tongue, Trachea, Thyroid, Urinary bladder, Zymbal gland

Appendix 10-51(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1101 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

Harderian gland Cell infiltration, interstitial: minimal, mononuclear

Liver Microgranuloma: minimal

Stomach Erosion/Ulcer, glandular stomach: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum(Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Lung(bronchus), Mammary gland, inguinal, Nasal cavity
Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Skeletal muscle, femoral, Spinal cord, thoracic, Thymus
Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-52(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1102 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-53(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1103 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-54(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1104 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Pancreas Atrophy, acinar, focal: minimal

Pituitary Aberrant craniopharyngeal tissue: minimal with cyst

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-55(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1105 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Stomach Erosion/Ulcer, glandular stomach: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Lung (bronchus), Mammary gland, inguinal, Nasal cavity
Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Skeletal muscle, femoral, Spinal cord, thoracic, Thymus
Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-56(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1106 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-57(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1107 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Lung (bronchus), Mammary gland, inguinal, Nasal cavity
Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-58(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1108 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-59(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1109 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-60(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 1110 Female DMS 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-61(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2101 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

Stomach Erosion/Ulcer, glandular stomach: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Skeletal muscle, femoral, Spinal cord, thoracic, Thymus
Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-62(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2102 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Intestine,cecum Cell infiltration,mucosal: minimal, mononuclear

Following tissues : Not remarkable

Adrenal, Aorta,thoracic, Bone+Bone marrow,femoral, Bone+Bone marrow,sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine,duodenum
Intestine,jejunum, Intestine,ileum(Peyer's patch), Intestine,colon
Intestine,rectum, Kidney, Lymph node,mesenteric, Lymph node,submandibular, Liver
Lung(bronchus), Mammary gland,inguinal, Nasal cavity, Oviduct, Optic nerve
Ovary, Parathyroid, Pancreas, Pituitary, Salivary gland,submandibular
Salivary gland,sublingual, Skin,inguinal, Sciatic nerve, Spleen, Stomach
Skeletal muscle,femoral, Spinal cord,thoracic, Thymus, Tongue, Trachea, Thyroid
Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-63(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2103 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-64(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2104 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Ovary Atrophy: mild

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-65(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2105 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Lung (bronchus), Mammary gland, inguinal, Nasal cavity
Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-66(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2106 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-67(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2107 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-68(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2108 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Lung (bronchus), Mammary gland, inguinal, Nasal cavity
Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-69(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2109 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Eye Dysplasia,retinal: minimal

Liver Microgranuloma: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum(Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Lung(bronchus), Mammary gland, inguinal, Nasal cavity
Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-70(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 2110 Female Corn oil 0 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Lung (bronchus) Aggregation, alveolar macrophage: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Mammary gland, inguinal, Nasal cavity, Oviduct
Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-71(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS)
in rats

Individual gross and histopathological findings

Animal No. 3101 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-72(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3102 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-73(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3103 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-74(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3104 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-75(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3105 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-76(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3106 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-77(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3107 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-78(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 3108 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-79(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS)
in rats

Individual gross and histopathological findings

Animal No. 3109 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-80(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS)
in rats

Individual gross and histopathological findings

Animal No. 3110 Female DMS 5 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-81(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4101 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-82(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4102 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-83(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4103 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-84(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4104 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-85(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4105 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-86(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4106 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-87(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4107 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-88(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4108 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-89(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4109 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-90(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 4110 Female DMS 15 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

No tissues examined

Appendix 10-91(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5101 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-92(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5102 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-93(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5103 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Lung (bronchus) Aggregation, alveolar macrophage: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Mammary gland, inguinal, Nasal cavity, Oviduct
Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-94(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5104 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Lung (bronchus) Aggregation, alveolar macrophage: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Mammary gland, inguinal, Nasal cavity, Oviduct
Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-95(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5105 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-96(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5106 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Liver Microgranuloma: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Lung (bronchus), Mammary gland, inguinal, Nasal cavity
Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-97(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5107 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-98(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5108 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

Kidney Cyst: 1 present, left
2x2x2mm

Other tissues Not remarkable

Histopathology:

Kidney Cyst: mild, cortical

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-99(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5109 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

All tissues Not remarkable

Histopathology:

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Spleen, Stomach, Skeletal muscle, femoral, Spinal cord, thoracic
Thymus, Tongue, Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

Appendix 10-100(1/1) A 90-day oral gavage toxicity study of dimethyl sulfide (DMS) in rats

Individual gross and histopathological findings

Animal No. 5110 Female DMS 50 mg/kg/day Day 92 End of administration period

Gross pathology:

Stomach Focus, dark red, glandular stomach: 1 present
1x1mm

Other tissues Not remarkable

Histopathology:

Spleen Hematopoiesis, extramedullary: minimal

Stomach Erosion/Ulcer, glandular stomach: minimal

Following tissues : Not remarkable

Adrenal, Aorta, thoracic, Bone+Bone marrow, femoral, Bone+Bone marrow, sternal
Cerebellum, Cerebrum, Esophagus, Eye, Harderian gland, Heart, Intestine, duodenum
Intestine, jejunum, Intestine, ileum (Peyer's patch), Intestine, cecum
Intestine, colon, Intestine, rectum, Kidney, Lymph node, mesenteric
Lymph node, submandibular, Liver, Lung (bronchus), Mammary gland, inguinal
Nasal cavity, Oviduct, Optic nerve, Ovary, Parathyroid, Pancreas, Pituitary
Salivary gland, submandibular, Salivary gland, sublingual, Skin, inguinal
Sciatic nerve, Skeletal muscle, femoral, Spinal cord, thoracic, Thymus, Tongue
Trachea, Thyroid, Urinary bladder, Uterus, Vagina, Zymbal gland

信頼性保証書（1/3）

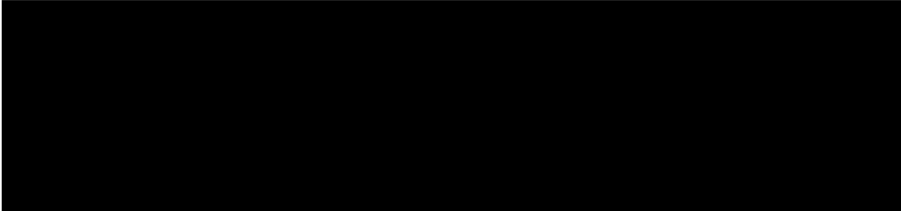
試験番号 : [REDACTED]

試験表題 : ジメチルスルフィドのラットを用いた 90 日間反復経口投与毒性試験

本試験は以下に示す GLP 基準を遵守して実施されたことを保証致します。

- 「新規化学物質等に係る試験を実施する試験施設に関する基準」
(平成 23 年 3 月 31 日：薬食発 0331 第 8 号、平成 23・03・29 製局第 6 号、
環保企発第 110331010 号)

なお、調査は下記の通り実施致しました。



試験における調査

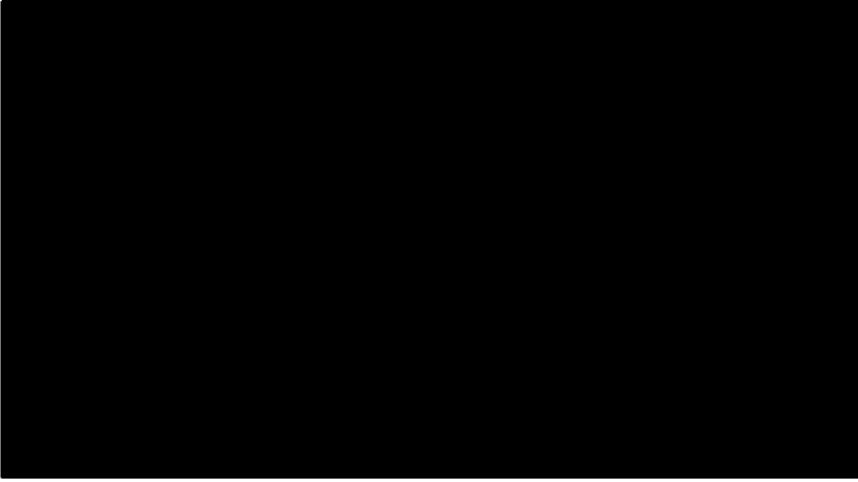
項目	担当者	調査日	試験責任者及び 運営管理者への 報告日
試験計画書	[REDACTED]	[REDACTED]	[REDACTED]
作業予定表・ コンピュータプロトコール			
改善確認			
調製・保存（被験物質）			
投与液の濃度確認			
群分け			
投与・一般状態の観察			

信頼性保証書 (2/3)

項目	担当者	調査日	試験責任者及び 運営管理者への 報告日
眼科学検査			
尿検査 (尿量・色調・定性・沈渣)			
尿検査 (電解質)			
採血・剖検			
血液学検査 (血液凝固検査)			
病理組織学検査 (切り出し)			
中間報告書			
生データ (投与液の濃度確認)			
測定レポート			
(投与液の濃度確認：案)			
生データ			
(入荷～剖検・病理、飼育関係、 被験物質関係)			
改善確認			
測定レポート			
(投与液の濃度確認)			
最終報告書草案・図・表・付表			
改善確認			
最終報告書			

信頼性保証書 (3/3)

プロセス調査

項目	試験番号	担当者	調査日	試験責任者及び 運営管理者への 報告日
動物入荷				
検疫・馴化				
体重・摂餌量測定				
血液学検査・ 血液化学検査				
病理組織学検査 (包埋・薄切・染色)				