CPMA

COLOR PIGMENTS MANUFACTURERS ASSOCIATION, INC.

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April 23, 2007

Mr. Steven Johnson
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Ave., NW
Ariel Rios Bldg., 1101 A
Washington, DC 20462
(202) 564-4700

Re: Voluntary High Production Volume Program Test Plans for DMSS

Dear Mr. Johnson:

I am writing on behalf of the Color Pigments Manufacturers Association, Inc. ("CPMA") regarding our participation in the High Production Volume ("HPV") voluntary chemical testing program.

Enclosed is a test plan for 1,4-Cyclohexanedicarboxylic acid, 2,5-dioxo-, dimethyl Ester (also known Dimethyl Succinyl Succinate, as CAS NO.: 6289-46-9, ("DMSS")), prepared by the CPMA Quinacridone Committee.

The CPMA is an industry trade association representing color pigment companies in Canada, Mexico, and the United States. CPMA represents small, medium, and large color pigments manufacturers throughout Canada, Mexico and the United States, accounting for 95% of the production of color pigments in North America. Color pigments are widely used in product compositions of all kinds, including paints, inks, plastics, glass, synthetic fibers, ceramics, colored cement products, textiles, cosmetics, and artists' colors. Color pigment manufacturers located in other countries with sales in Canada, Mexico, and the United States and suppliers of intermediates, other chemicals and other products used by North American manufacturers of color pigments are also members of the Association.

In our letter of February 3, 2006 to Mr. Charles Auer, we reviewed the specific pigments and intermediates that CPMA had previously agreed to represent, with reservations, in the HPV program. As indicated in our earlier letters, CPMA reserved the right to defer the review of any chemical under the HPV program where that chemical or analog has been the subject of another commitment to either the EPA HPV program or other similar international programs.

300 North Washington Street, Suite 102 • Alexandria, Virginia 22314 • (703) 684-4044 • FAX: (703) 684-1795
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CPMA further reserved the right to withdraw from this commitment should the HPV program, when and if finalized, proved to be different from that understood, from time to time, by CPMA. Since all of the pigments and intermediates represented by CPMA have been used in international commerce for many years, there is extensive data available from a variety of published and unpublished sources.

Sufficient information has been identified and incorporated in the enclosed test plan to allow for completion of the Environmental Protection Agency voluntary HPV program endpoints for DMSS, a limited use intermediate compound, without further redundant and unnecessary testing.

All questions should be addressed to me at:

Color Pigments Manufacturers
Association, Inc.
300 North Washington Street
P.O. Box 20839
Alexandria, Virginia 22320-1839

Telephone: 703-684-4044
Facsimile: 703-684-1795
Attn: J. Lawrence Robinson, President

Thank you for your attention. Please call if there are any questions or comments.

Sincerely.

J. Lawrence Robinson
President

Enclosures

HIGH PRODUCTION VOLUME (HPV) CHALLENGE PROGRAM

TEST PLAN
FOR
1,4-Cyclohexanedicarboxylic acid, 2,5-dioxo-, dimethyl ester
(Dimethyl Succinyl Succinate)
(CAS NO.: 6289-46-9)

PREPARED BY:
COLOR PIGMENT MANUFACTURERS ASSOCIATION, INC.
QUINACRIDONE COMMITTEE

April 23, 2007

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OVERVIEW

The Quinacridone Committee ("QC") of the Color Pigment Manufacturers Association, Inc. (CPMA) and its member companies hereby submits for review and public comment the test plan for 1,4-Cyclohexanedicarboxylic acid, 2,5-dioxo-, dimethyl ester ("Dimethyl Succinyl Succinate") (CAS NO.: 6289-46-9) ("DMSS") under the Environmental Protection Agency's (EPA) High Production Volume (HPV) Challenge Program. It is the intent of the QC and its member companies to use existing data, and predictive computer models to adequately fulfill the Screening Information Data Set (SIDS) for the various physicochemical, environmental fate, ecotoxicity test, and human health effects endpoints.

DMSS is a stable solid. This chemical is used only as an intermediate in the production of color pigments. The chemical is completely consumed in the reaction process. There are only a few facilities numbering less than five in North America which use DMSS. This chemical is a closed system intermediate and is considered insoluble in water.

TEST PLAN SUMMARY

CAS NO.: 6289-46-9	Information	OECD Study	Other	Estimation	GLP	Acceptable	New Testing Req.
STUDY	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
PHYSICAL-CHEMICAL DATA							
Melting Point	Y	-	-	N	N	Y	N
Boiling Point	N\A	-	-	-	N	Y	N
Vapor Pressure	Y	-	-	Y	N	Y	N
Partition Coefficient	Y	-	Y		N	Y	N
Water Solubility	Y	Y	-	Y	Y	Y	N
ENVIRONMENTAL FATE ENDPOINTS							
Photodegradation	Y		-	Y	N	Y	N
Stability in Water	N\A		Y			Y	N
Biodegradation	Y	Y	Y			Y	N
Transport between Environmental Compartments	Y		-	Y	N	Y	N
(Fugacity)	Y			Y		Y	N
ECOTOXICITY							
Acute Toxicity to Fish	Y		Y-		Y	Y	N
Acute Toxicity to Aquatic Invertebrates	Y			Y	Y	Y	N
Toxicity to Aquatic Plants	Y			Y		Y	N
TOXICOLOGICAL DATA							
Acute Toxicity	Y		Y	-	Y	Y	N
Repeated Dose Toxicity	N\A			-	N	Y	N
Genetic Toxicity – Mutation	Y	Y	Y	-	Y	Y	N
Genetic Toxicity – Chromosomal Aberrations	N/A			Y-	N	Y	N
Developmental Toxicity	N/A			-	N	Y	N
Toxicity to Reproduction	N/A			-	N	Y	N

TEST PLAN DESCRIPTION FOR EACH SIDS ENDPOINT

A. Physicochemical

Melting point - A measured value for this endpoint is available from existing data.

Boiling Point - A value for this endpoint was obtained using an unpublished study.

Vapor Pressure - A value for this endpoint was obtained using an unpublished study.

Partition Coefficient - A value for this endpoint was obtained using a computer estimation-modeling program within EPIWIN

Water Solubility - A measured value for this endpoint is available from existing data.

Conclusion: All end points have been satisfied by utilizing data obtained from the various physical chemical data modeling programs within EPIWIN or using measured values. The results of the various computer estimation models within EPIWIN have been noted by the Agency as acceptable in lieu of actual data or values identified from textbooks. No new testing is required.

B. Environmental Fate

Photodegradation - A value for this endpoint was obtained using AOPWIN, a computer estimation-modeling program within EPIWIN (1)

Stability in Water - A value for this endpoint was obtained from an unpublished study.

Biodegradation - A value for this endpoint was obtained from an unpublished study.

Fugacity - A value for this endpoint was obtained using the EQC Level III partitioning computer estimation model within EPIWIN.

Conclusion: given the very limited use and exposure potential to this chemical, all endpoints have been filled with data utilizing acceptable methodologies and of sufficient quality to fulfill these endpoints. No new studies are being proposed.

C. Ecotoxicity Data

Acute Toxicity to Fish - This endpoint is filled by data from an unpublished study.

Acute Toxicity to Aquatic Invertebrates - A value for this endpoint was obtained using ECOSAR, a computer estimation-modeling program within EPISUITE (1)

Toxicity to Aquatic A value for this endpoint was obtained using ECOSAR, a computer estimation-modeling plants program within EPISUITE (1)

Bioaccumulation This endpoint is filled by data from a GLP study for the surrogate substance.

Conclusion: All end points have been satisfied by utilizing data obtained from the various physical chemical data modeling programs within EPIWIN or using measured values. The results of the various computer estimation models within EPIWIN have been noted by the Agency as acceptable in lieu of actual data or values identified from textbooks. No new testing is required.

D. Toxicological Data

Acute Toxicity - This endpoint is filled by oral exposure data from various published and unpublished references to studies.

Repeat Dose Toxicity - This endpoint is not required for a closed system intermediate.

Genetic Toxicity

Mutation - This endpoint is filled by an unpublished study.

Aberration - no data.

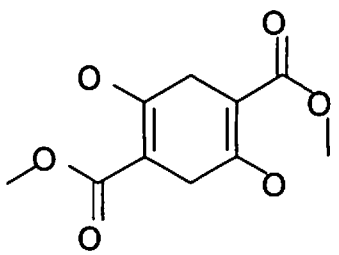
Developmental Toxicity - no data

Reproductive Toxicity - No data. The substance is insoluble.

Conclusion: All endpoints have been satisfied with data which are of sufficient quality to conclude that no additional testing is needed.

Common Name: Dimethyl Succinyl Succinate

Structure:



Chemical Name: 1,4-Cyclohexanedicarboxylic acid, 2,5-dioxo-, dimethyl ester

Melting Point: 153-155 °C
Boiling Point: Solid powder
Density 650 kg/m^3
Vapor Pressure .00004 hPa at 50 °C
Acute Toxicity: LD50>15,000 mg/kg (Rat)

SIDS DATA SUMMARY

Physical Chemical Endpoints
Data assessing the various physicochemical properties (melting point, boiling point, vapor pressure, partition coefficient, and water solubility) for DMSS was obtained from actual studies or estimations using the models within EPIWIN. These data indicate the substance is stable solid at room temperature.

Environment

For the environment, estimations and analysis of Dimethyl Succinyl Succinate indicates that: This substance is largely insoluble in water. This substance was not readily biodegradable (20% after 28 days) [OECD TG301D]. The bioconcentration potential is low. The log Pow is estimated at -1.99. The fugacity model (Mackay level III) suggests that if released to water, the majority of the substance, greater than 98%, would remain in the water compartment. In an acute toxicity test to fish, the LC50 was greater than >500 mg/L (Brachydanio rerio) [OECD 203] In an acute toxicity test to bacteria, the EC 50 was greater than 1000 mg/L.

Acute Toxicity

The potential to induce toxicity in mammalian species following acute oral exposure to these chemicals is extremely low , measured LD_{50} is >15,000 mg/kg.

Health

This substance was not mutagenic in bacteria up to 10,000 ug/plate, with and without activation [OECD 471]. Based on standard rabbit tests, the substance is not irritating to the skin and eyes.

Conclusion

All prudent and necessary endpoints have been satisfied with data or acceptable estimations, which are of sufficient quality to conclude that no additional testing is needed. Since this substance is an intermediate consumed completely in the production of specific high performance color pigments at a very limited number of facilities, exposure to this product in use is no at all likely.

EVALUATION OF DATA FOR QUALITY AND ACCEPTABILITY

The collected data were reviewed for quality and acceptability following the general US EPA guidance (3) and the systematic approach described by Klimisch *et al.* (4). These methods include consideration of the reliability, relevance and adequacy of the data in evaluating their usefulness for hazard assessment purposes. This scoring system was only applied to ecotoxicology and human health endpoint studies per EPA recommendation (5). The codification described by Klimisch specifies four categories of reliability for describing data adequacy. These are:

1. Reliable without Restriction: Includes studies or data complying with Good Laboratory Practice (GLP) procedures, or with valid and/or internationally accepted testing guidelines, or in which the test parameters are documented and comparable to these guidelines.

2. Reliable with Restrictions: Includes studies or data in which test parameters are documented but vary slightly from testing guidelines.

3. Not Reliable: Includes studies or data in which there are interferences, or that use non-relevant organisms or exposure routes, or which were carried out using unacceptable methods, or where documentation is insufficient.

4. Not Assignable: Includes studies or data in which insufficient detail is reported to assign a rating, e.g., listed in abstracts or secondary literature.

REFERENCES

1. EPIWIN, Version 3.10, Syracuse Research Corporation, Syracuse, New York.

2. US EPA. (1999). The Use of Structure-Activity Relationships (SAR) in the High Production Volume Chemicals Challenge Program. OPPT, EPA.

3. USEPA (1998). 3.4 Guidance for Meeting the SIDS Requirements (The SIDS Guide). Guidance for the HPV Challenge Program. Dated 11/2/98.

4. Klimisch, H.-J., Andreae, M., and Tillmann, U. (1997). A Systematic Approach for Evaluating the Quality of Experimental Toxicological and Ecotoxicological Data. *Regul. Toxicol. Pharmacol.* 25:1-5.

5. USEPA. 1999. Determining the Adequacy of Existing Data. Guidance for the HPV Challenge Program. Draft dated 2/10/99.

I. General Information

CAS Number: (Dimethyl Succinyl Succinate) CAS NO.: 6289-46-9
Name: 1,4-Cyclohexanedicarboxylic acid, 2,5-dioxo-, dimethyl ester

II. Physical-Chemical Data

A1. Melting Point

Test Substance

Test substance:	Dimethyl Succinyl Succinate
Remarks:	

Method

Method:	Measured
Remarks:	

Results

Melting point value:	152-154 °C
Remarks:	

References Hoechst AG (1994) EG-Sicherheitsdatenblatt TTR (27.05.1994)

Other

Data is consistent with melting points for the class of substances and other available measurements

B. Boiling Point

Test Substance

Test substance: DMSS
Remarks:

Method

Method: Decomposition
Remarks:

Results

Boiling point value: >400 °C
Remarks:

References Hoechst AG (1994) EG-Sicherheitsdatenblatt TTR (27.05.1994)

Other

C. Vapor Pressure

Test Substance

Test substance: Dimethyl Succinyl Succinate

Remarks:

Method

Method: Measured

Remarks:

Results

Vapor pressure value: .00004 hPa at 50 °C

Temperature:

Remarks:

References

Hoechst AG (1989) Produktingformation , Abt. Verkauf Feinchemikalien (Marz 1989)

Other

D. Partition Coefficient

Test Substance

Test substance: Dimethyl Succinyl Succinate

Remarks:

Method

Method: Estimation

Remarks:

Results

Log P_{OW}: -1.99 at 25 °C

Remarks:

References EPISUITE, KOWIN, Version 1.41, Syracuse Research Corporation, Syracuse, New York.

Other

E. Water Solubility

Test Substance

Test substance:	Dimethyl Succinyl Succinate
Remarks:	

Method

Method:	Measured Value
Remarks:	

Results

Value:	300mg/l
Temperature:	20 °C
Description:	insoluble
Remarks:	pH 6.2 at 6.7 g/l

References Hoechst AG (1994) EG-Sicherheitsdatenblatt TTR (27.05.1994)

Other

III. Environmental Fate Endpoints

A. Photodegradation

Test Substance

Test substance: Dimethyl Succinyl Succinate

Remarks:

Method

Method: Estimate

Test type: Water\sunlight

Remarks:

Results

Temperature:

Degradation Rate

Half-life

Ozone reaction: 1.136 days ,(`12 hour day ;1.5E6 cm3/molecule-sec) 13.629 hours

Remarks:

Conclusions

References AOP WIN Version 1.91, EPISUITE,, Syracuse Research Corporation, Syracuse, New York.

Other

B. Stability in Water

Test Substance

Test substance:	Dimethyl Succinyl Succinate
Remarks:	

Method

Method:	Estimation
Test type:	Hydrolysis
GLP:	no
Remarks:	

Results

Half-life:	pH 7 >2.373 years, pH 8 >86.67 days
Percent hydrolyzed in 5 days (120 hs) at 50 °C :	
Remarks:	

Conclusions Solubility at pH 4 - 22%, pH 7 - 23%, pH 9 50%

Data Quality

Remarks:

References HYDROWIN, Version 1.67, EPISUITE, Syracuse Research Corporation, Syracuse, New York.

Other

C. Biodegradation

Test Substance

Test substance: Dimethyl Succinyl Succinate

Remarks:

Method

Method: OECD 301 D

Test type: Ready Biodegradability : Closed Bottle Test
GLP: no
Year: 1988
Remarks:

Results

Results: 20% after 28 days, DOC 15mg/L
Remarks:

Conclusions Not readily degraded

Data Quality

Remarks:

References Hoechst AG (1988) Unveroffentl. Unters (Ber.-Nr. V88-881, See also Hoechst AG (1994) EG-Sicherheitsdatenblatt TTR (27.05.1994)

Other

D. Transport between Environmental Compartments (Fugacity)

Test Substance

Test substance: Dimethyl Succinyl Succinate

Remarks:

Method

Test type: Estimation

Model used: Level III Fugacity Model; EPIWIN:EQC from Syracuse Research Corporation

Remarks:

Results

Model data and results:

Distribution (%)	
Air	3.85 e-005
Water	43.5
Soil	33.9
Sediment	0.00883

Remarks: Since no experimental values were available the physical chemical values utilized in this model were default parameters from within EPIWIN.

Conclusions

References

Meylan, W. (1993). User's Guide for the Estimation Programs Interface (EPI), Version 3.10, Syracuse Research Corporation, Syracuse, New York 13210. The Level III model incorporated into EPIWIN is a Syracuse Research Corporation adaptation of the methodology described by Mackay *et al.* 1996; *Environ. Toxicol. Chem.* **15(9)**, 1618-1626 and 1627-1637.

Other

IV. Ecotoxicity

A1. Acute Toxicity to Fish

Test Substance	DMSS
Test substance:	Purity >99.9%
Remarks:	
Method	OECD 203
Method:	Semistatic
Test type:	yes
GLP:	1992
Year:	Brachydanio rerio
Species/strain:	Exposure solutions, temperature, pH, dissolved oxygen
Analytical monitoring:	96-Hours
Exposure period:	
Remarks:	
Results	
Nominal concentration:	
Measured concentration:	500 mg/L
Endpoint value:	156.5 mg/L
Biological observations:	LC_{50} >500 mg/L
Statistical methods:	
Remarks:	

Conclusions

Substance is not toxic

Data Quality

Reliability:

Remarks:

Reliable without restrictions

References

Hoechst AG (1988) Unveroffentl. Unters (Ber.-Nr. V92.0430)

Other

A2. Acute Toxicity to Bacteria

Test substance:	Dimethyl Succinyl Succinate

Remarks:

Method

Method:	Internal Method
Test type:	Aquatic
GLP:	unknown
Year:	1988
Species/strain:	Activated Sludge
Analytical monitoring:	
Exposure period:	
Remarks:	

Results

Nominal concentration:	
Measured concentration:	
Endpoint value:	
Biological observations:	EC 50 >1000 mg/L
Statistical methods:	
Remarks:	

Conclusions

Substance is not toxic to bacteria

Data Quality

Reliability:	
Remarks:	Reliable with restrictions

References

Hoechst AG (1988) Unveroffentl. Unters (Ber.-Nr. V88-881, See also Hoechst AG (1994) EG-Sicherheitsdatenblatt TTR (27.05.1994)

Other

B. Acute Toxicity to Aquatic Invertebrates

Test Substance

Test substance:	Dimethyl Succinyl Succinate
Remarks:	

Method

Method:	Estimation
Test type:	
GLP:	
Year:	
Species/strain:	Daphnid
Analytical monitoring:	
Exposure period:	48 Hours
Remarks:	

Results

Nominal concentration:	
Measured concentration:	
Endpoint value:	LC50 7.75 e+ 005
Reproduction	
Biological observations:	
Statistical methods:	
Remarks:	

Conclusions

Conclusions based on model application of maximum solubility, LC 50 is higher than the tested solubility of DMSS.

Data Quality

Reliability:	
Remarks:	

References

ECOSAR, Version .99h, EPIWIN v 3.10, Syracuse Research Corporation, Syracuse, New York, Company supplied data.

Other

C. Toxicity to Aquatic Plants

Test Substance

Test substance:	Dimethyl Succinyl Succinate
Remarks:	

Method

Method:	Estimation
Test type:	EPISUITE
GLP:	
Year:	
Species/strain:	Algae
Endpoint basis:	
Exposure period:	96 Hours
Analytical procedures:	
Remarks:	

Results

Nominal concentration:	
Measured concentration:	
Endpoint value:	EC_{50} 323.692 mg/L
NOEC:	
Biological observations:	
Was control response satisfactory:	
Statistical Methods:	
Remarks:	

Conclusions Endpoint value is higher than the measured solubility for DMSS

Data Quality

Reliability:	
Remarks:	

References ECOSAR, Version .99h, EPIWIN v 3.10, Syracuse Research Corporation, Syracuse, New York, Company supplied data.

Other

D. Toxicity to Bacteria

Test Substance

Test substance:	Dimethyl Succinyl Succinate
Remarks:	

Method

Method:	Activated sludge
Test type:	Aquatic
GLP:	
Year:	1988
Species/strain:	Bacteria
Endpoint basis:	
Exposure period:	
Analytical procedures:	
Remarks:	

Results

Nominal concentration:	
Measured concentration:	
Endpoint value:	
NOEC:	EC_{50} >1000 mg/L
Biological observations:	
Was control response satisfactory:	
Statistical Methods:	
Remarks:	

Conclusions

Endpoint value is higher than the measured solubility for DMSS

Data Quality

Reliability:	
Remarks:	

References

Hoechst AG (1988) Unveroffentl. Unters (Ber.-Nr. V88-881, See also

Other

Hoechst AG (1994) EG-Sicherheitsdatenblatt TTR (27.05.1994)

V. Toxicological Data

A. Acute Toxicity

Test Substance

Test substance:	Dimethyl Succinyl Succinate
Remarks:	Purity 99%

Method

Method:	Acute lethality; Other
Test type:	LD_{50} estimate
GLP:	No (Pre-GLP)
Year:	1977
Species/strain:	Rat\Wistar
Route of exposure:	Oral gavage
Dose levels:	Unknown
Remarks:	

Results

Value:	LD_{50} = >15,000, mg/kg.
Deaths at each dose:	
Remarks:	

Conclusions Material would be considered as not toxic.

Data Quality

Reliability:	Reliable with restrictions
Remarks:	

References Hoechst AG (1977) Unveroffentl. Unters (Ber.77.0068)

Other

B. Repeated Dose Toxicity

Test Substance

Test substance: Insoluble closed system intermediate
Remarks: Further study is not warranted at this time

Method

Method:
Test type:
GLP:
Year:
Species/strain:
Route of exposure:
Duration of test:
Exposure levels:
Sex:
Exposure period:
Post-exposure observation period:
Remarks:

Results

NOAEL (NOEL):

Conclusions

Data Quality

Reliability:
Remarks:

References:

C. Genetic Toxicity - Mutation

Test Substance

Test substances:

Remarks: Dimethyl Succinyl Succinate

Purity 99.9%

Method

Method:
Test type:
GLP: Ames Test
Year: Ames
Species/strain: Yes
Metabolic activation: 1992
Concentration tested: Salmonella typhimurium TA100,TA1537,TA1535,TA98
Remarks: With and Without
4 - 10,000 ug/plate

Results

Result:
Cytotoxic concentration: Negative
Precipitation concentration:
Genotoxic effects
With activation:
Without activation:
Statistical methods: Negative
Remarks: Negative

Conclusions

Data Quality

Reliability:
Remarks:

Reliable without restrictions,

References

Hoechst AG (1992) Unveroffentl. Unters (Ber.92.0517)

D. Genetic Toxicity – Chromosomal Aberrations

Test Substance

Test substance: DMSS insoluble closed system intermediate, no evidence of mutangenicity or acute toxicity, further study is not warranted

Remarks:

Method

Method:
Test type:
GLP:
Year:
Species/strain:
Exposure period:
Remarks:

Results

Result:
Genotoxic effects:
Concentration tested
Statistical methods:
Remarks:

Conclusions

Data Quality

Reliability:
Remarks:

References

Other

E. Developmental Toxicity Insoluble site limited intermediate

Test Substance

Test substance:

Remarks:

Method

Method:

GLP:

Year:

Species/strain:

Sex:

Route of exposure:

Exposure levels:

Actual doses received:

Exposure period:

Duration of test:

Remarks:

Results

Maternal toxicity NOEL:

NOEL for teratogenicity:

NOEL for fetotoxicity:

Parental toxic responses:

Fetal toxic responses dose:

Statistical Methods:

Remarks:

Conclusions

Data Quality

Reliability:

Remarks:

References

Other

F. Toxicity to Reproduction

Test Substance

Test substance:

Remarks:

Method

Method:
GLP:
Year:
Species/strain:
Sex:
Route of exposure:
Exposure levels:

Exposure period:

Duration of test:
Remarks:

Results

Maternal toxicity NOEL:
Parental toxic responses:
Fetal toxic responses dose:
Statistical Methods:
Remarks:

Conclusions

Data Quality

Reliability:
Remarks:

References

Other

Acute toxicity

Test substance:	Dimethyl Succinyl Succinate
Remarks:	

Method

Method:	Irritation to the rabbit eye
Test type:	eye irritation
GLP:	unknown
Year:	1977
Species/strain:	rabbit
Route of exposure:	
Dose levels:	
Remarks:	

Results

Value:	negative non-irritating
Remarks:	

Conclusions nonirritating

Data Quality

Reliability:	un-assignable
Remarks:	

References Hoechst AG (1977) Unveroffentl. Unters (Ber. 77.0069)

Other

Acute toxicity

Test substance:	Dimethyl Succinyl Succinate
Remarks:	

Method

Method:	Skin irritation to the rabbit (FDA)
Test type:	Skin irritation
GLP:	unknown
Year:	1977
Species/strain:	rabbit
Route of exposure:	Patch test
Dose levels:	
Remarks:	

Results

Value:	negative not irritating
Remarks:	

Conclusions

Data Quality

Reliability:	un-assignable
Remarks:	

References Hoechst AG (1977) Unveroffentl. Unters (Ber. 77.0069)

Other