

Wacker Chemicals (USA), Inc.

WACKER

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Express Mail

Wacker Chemicals (USA), Inc.
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TWX 643 444
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November 25, 1991

86920000195



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TSCA Document Processing Center (TS-790)
Office of Toxic Substances
U.S. ENVIRONMENTAL PROTECTION AGENCY
401 M Street, S.W.
Washington, DC 20460

Att: PAIR and [REDACTED]

Re: FR 42688/August 29, 1991
Preliminary Assessment Information and
Health and Safety Data Reporting

Listed Substances: 2,4-Pentanedione (CAS # 123-54-6)
Chloroacetaldehyde (CAS # 107-20-0)

Dear Sir/Madam:

In reference to the above mentioned final rule, Wacker Chemicals (USA), Inc. would like to submit the required data for two chemicals imported by our company which were listed in this Federal Register Notice. Wacker Chemicals (USA), Inc. is the 100% subsidiary of Wacker-Chemie GmbH of Munich, Germany.

Enclosed please find our completed PAIR forms for 2,4-Pentanedione and Chloroacetaldehyde. Both forms contain data which is confidential business information.

In addition, we are submitting the only unpublished health and safety study in our possession for the above listed substances. This report is an Acute Inhalation Toxicity study for Chloroacetaldehyde in rats which was performed in 1986-87. Please note that this study was submitted to EPA under TSCA Section 8(e) on March 24, 1987 (refer to 8EHQ-0387-0600).

WACKER

Wacker does not possess any unpublished studies for 2,4-Pentanedione.

At this time I would like to confirm that Wacker does not have any ongoing studies involving the two listed chemicals, nor do we have any future plans to initiate further studies.

Should you have any questions, please do not hesitate to call me at (203) 966-9999, at your convenience.

Sincerely,
WACKER CHEMICALS (USA), INC.

Sally L. Jaime
Sally L. Jaime
Regulatory Affairs

SLJ/cac
encls.

civo Institutes Inc

CONTAINS NO CBI

Netherlands organization
for applied scientific
research

DOCUMENT RECEIVED
91 NOV 26 PM 3: 58



division for nutrition and
food research Inc

p.o. box 360
3700 AJ zeist
netherlands

Report no. V 87.094/261236

ACUTE (one-hour) INHALATION TOXICITY
STUDY OF CHLORACETALDEHYDE IN RATS

Author : Ir J.H.E. Arts

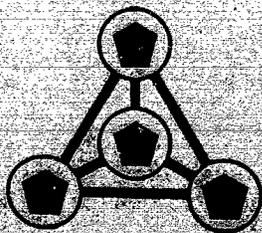
At the request of : Wacker-Chemie GmbH,
: Prinzregentenstrasse 22
: D-8000 Muenchen 22, F.R.G.

Project number : B86-1236

Start of the study : December 17, 1986

End of the study : January 21, 1987

Date : February, 1987



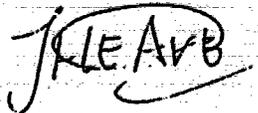
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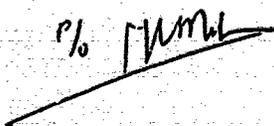
AUTHENTICATION

This report was prepared by:



Ir J.H.E. Arts

date: March 6, 1987



Dr A. Zwart
Study director

date: March 6, 1987

On behalf of Dr V.J. Feron,
Head, Dept. Biological Toxicology,



Drs P.G.J. Reuzel

date: March 6, 1987

TNO QUALITY ASSURANCE UNIT (TOXICOLOGY)
P.O. Box 360, 3700 AJ Zeist, the Netherlands

STATEMENT OF GLP COMPLIANCE

On : Acute (one-hour) inhalation toxicity study of chloracetaldehyde
in rats.

Report no.: V 87.094/261236

Date : February, 1987

The study was carried out under conditions of good laboratory practice.
Within reason there have been no circumstances that might have affected the
quality and integrity of the study.

Date of general process
inspection:

Date of report
to management:

December 1, 1986

December 1, 1986

December 3, 1986

December 3, 1986

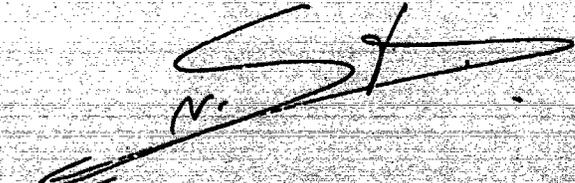
December 17, 1986

December 17, 1986

Final report audit:

February 17, 1987

February 18, 1987



Drs S. van Straten
Quality Assurance Manager

date: *March 6, 1987.*

SUMMARY

1. The acute inhalation toxicity of chloroacetaldehyde was studied by exposing different groups of 5 male and 5 female rats one single time for a period of 1 hour to test atmospheres containing chloroacetaldehyde at a concentration between 0.14 and 8.47 g/m³ in air.
2. From the results of the present study it appeared that the 1hLC50 of chloroacetaldehyde for the combined male and female responses was between 0.65 and 0.78 g/m³, the most near to the former value. As a result of the narrow range between these values it was not possible to give a better estimate of the 1-hour LC50 value with 95% confidence limits.
3. Animals which died shortly after exposure showed signs of oedema and atelectasis in the lungs after autopsy, in most cases accompanied by a hydro-thorax which could be explained by an induced hypertension. These findings together with oedema and atelectasis in lungs were signs of an impairment of lung functioning. Air in stomach as well as in intestine was due to mouth breathing.

ACUTE INHALATION TOXICITY STUDY OF CHLORACETALDEHYDE IN RATS

1. PURPOSE OF THE STUDY

It was requested by Wacker-Chemie GmbH, to carry out an acute inhalation toxicity study into the effects of monochloroacetaldehyde (in the rest of this study: chloroacetaldehyde) in rats. Groups of male and female rats were to be exposed for a period of one hour to test atmospheres containing the appropriate concentration of chloroacetaldehyde.

2. MATERIALS AND METHODS

2.1 Material

Chloroacetaldehyde was delivered by the sponsor. One brown coloured bottle containing one kilogram of a clear fluid packed in a polystyrene barrel arrived on October 3, 1986. It contained a 45.4% (w/w) solution of chloroacetaldehyde as specified by the sponsor (see annex).

2.2 Test animals

Thirty-five male and thirty-five female SPF-reared rats (Bor:WISW) were obtained from Winkelmann, Versuchstierzucht GmbH & Co KG, Borcheln, F.R.G. At the beginning of the study the mean body weight of the males was 168 g and that of the females 141 g. They received the Institute's stock diet for rats and unfluoridated bottled tap water ad libitum. The nutrient composition of the diet and the levels of the various contaminants are determined periodically in batches of the stock diet and in samples of drinking water.

2.3 Exposure chamber

Animals were exposed in a horizontally placed glass tube of the Institute's design. This allows observation of all animals during exposure. The animals were housed individually. Ports at the entry and exit allow sampling of the test atmosphere. The capacity of the chamber is about 0.015 m³. The exposure chamber was ventilated with 1.2 m³ air/hr. Relative humidity and temperature were measured at least once per hour.

2.4 Generation of the test atmosphere

A chloroacetaldehyde test atmosphere was generated by delivering appropriate quantities of the test material to an evaporator at the inlet port of the chamber.

2.5 Analysis of the test atmosphere

The concentration of chloroacetaldehyde in the test atmosphere was determined by vapour phase infrared spectrometry and calibrated in a closed loop system. The exposure concentration was calculated as the mean of the recorded concentration during the entire exposure period.

2.6 Conduct of the study

Seven groups of rats, each consisting of 5 males and 5 females, were exposed one single time for a period of 1 hour. Each group was exposed to chloroacetaldehyde at one concentration level between 0.14 g and 8.47 g test material/m³ in the atmosphere.

During exposure the animals were housed individually to minimize filtration of the inspired air by the adjacent animal's fur as a result of crowding.

During the exposure the animals were deprived of water and food.

Immediately after the exposure, the survivors were returned to their living cages (5 males or 5 females to a cage) and were held for an observation

period of two weeks. The living cages were suspended in an open rack in an animal room. The temperature and relative humidity in the room were controlled at $22 \pm 3^{\circ}\text{C}$ and 30-70%, respectively.

The rats were inspected for reactions to treatment during the exposure, and once each day during the observation period. They were held under a 12-hour light and 12-hour dark cycle. Body weights were recorded just prior to exposure and at days 1, 2, 4, 7, and 14. At the end of the observation period the rats were killed and examined for gross pathological changes.

2.7 Statistical procedure

The statistical program used was written by Dr W.F. ten Berge DSM, the Netherlands, according to Finney (Finney, D.J., Probit Analysis, Cambridge Univ. Press, 3rd ed 1971).

3. RESULTS

3.1 Analytical results

The mean actual concentrations of chloroacetaldehyde in the test atmospheres during the different exposures are given in Table 1.

The temperature of the test atmospheres was controlled at $22 \pm 2^{\circ}\text{C}$. Relative humidity was between 51-91%.

3.2 Behaviour and clinical signs

Shortly after the start of the 1-hour exposure period the rats were restless. After a while they were sitting mostly in hump-back position rubbing their snouts. They kept their eyes closed. Three to five minutes after start of the exposure the rats showed salivation. Especially in those animals exposed to higher concentrations the nares became wet and nasal discharge could be observed. Heads and breasts also became wet and filthy.

In the highest concentration groups all animals showed laboured respiration, accompanied by dyspnea and mouth breathing. Relative humidity was very high during exposure to high concentrations of chloroacetaldehyde partly due to the high amount of water in the test material. Mortality occurred during (in the two highest concentrations groups) and shortly after exposure usually within some hours or within one or two days. These animals often had blood stains around nose and mouth. During some days after the exposure the survivors of the highest concentration groups were breathing wheezingly. Two animals of the second highest concentration group became blind. Mortality figures are given in Table 1.

3.3 Body weights

Some males and females showed decreased body weights the first days after exposure, which is a normal observation in this type of experiment. Most of the survivors gained weight in a normal way, although two animals lost weight considerably.

Group mean body weights are given in Table 2.

3.4 Gross pathology

The animals which died during the exposure or during the first two days of the observation period showed oedema in the lungs, sometimes accompanied by atelectasis and in most cases accompanied by a hydro-thorax. Frequently the stomachs of these rats were observed to be filled with air, and to a lesser extent also the intestine was filled with air. Sometimes a thrombus in the heart area was found. In some animals of the three lowest concentration groups which were killed at the end of the observation period oedema was observed in the lungs.

4. CONCLUSIONS

From the mortality figures found in this acute inhalation toxicity study it was estimated that an exposure of male and female rats during 1 hour to a test atmosphere containing chloroacetaldehyde resulted in a LC50 value between 0.65 and 0.78 g/m³. As a result of the steep concentration-effect curve and natural variability between groups it was not possible to give an exact LC50 value with 95% confidence intervals. According to the decrease in weight in some animals of the lower concentration groups during the observation period which probably would have resulted into death, the LC50 value was estimated to be close to 0.65 g/m³.

The presence of a hydro-thorax could be explained by an induced hypertension. This finding together with oedema and atelectasis in lungs pointed at an impairment of lung functioning. The stomach, caecum as well as intestine observed to be filled with air were caused by mouth breathing.

5. DEVIATIONS FROM THE PROTOCOL

The following items differ from the protocol but have been processed according to the OECD guidelines:

- The air entering the chamber was controlled at 22±2°C instead of 22±3°C.
- The temperature in the room during the observation period was controlled at 22±3°C instead of 21±3°C.
- The rats were inspected for reactions to treatment during the observation period once each day instead of twice a day and once a day during weekends.
- Body weights were recorded just prior to exposure and at days 1,2,4,7 and 14 instead of just prior to exposure and at days 1,3,5,7 and 14.

6. RETENTION OF RECORDS

All raw data and the master copy of the final report have been filed in the archives of the Department of Biological Toxicology under the reference: chloracetaldehyde 1hLC50.

TNO-CIVO TOX. NUTR. INST.

1987-02-27/KH

Table 1 - Concentration of chloracetaldehyde in test atmosphere and corresponding mortality rates

Group code	Concentration g/m ³	Mortality males (%)	Mortality females (%)	Mortality total (%)
A	8.47	100	100	100
B	0.14	0	0	0
C	1.91	100	100	100
D	0.99	100	100	100
E	0.51	40	20	30
F	0.65	40	40	40
G	0.78	100	100	100

Table 2 - Group mean-weights of rats exposed to chloroacetaldehyde in air

Group code	Mean body weight (g) at day						
	0*	[min,max]**	1	2	4	7	14
<u>Males</u>							
A	172(5)	[168,177]	—(0)	—(0)	—(0)	—(0)	—(0)
B	180(5)	[162,189]	179(5)	188(5)	202(5)	215(5)	249(5)
C	164(5)	[158,170]	152(1)	146(1)	—(0)	—(0)	—(0)
D	177(5)	[176,181]	156(5)	—(0)	—(0)	—(0)	—(0)
E	171(5)	[159,178]	149(5)	143(4)	159(4)	178(4)	223(3)
F	157(5)	[154,161]	135(5)	131(4)	147(3)	158(3)	174(3)***
G	155(5)	[150,158]	142(5)	130(1)	—(0)	—(0)	—(0)
<u>Females</u>							
A	152(5)	[143,159]	—(0)	—(0)	—(0)	—(0)	—(0)
B	147(5)	[138,152]	146(5)	149(5)	153(5)	156(5)	170(5)
C	139(5)	[135,144]	131(2)	—(0)	—(0)	—(0)	—(0)
D	147(5)	[139,154]	130(5)	—(0)	—(0)	—(0)	—(0)
E	143(5)	[141,146]	126(5)	126(4)	136(4)	140(4)	137(4)***
F	130(5)	[126,135]	114(5)	111(3)	123(3)	139(3)	155(3)
G	128(5)	[125,132]	114(5)	102(1)	093(1)	—(0)	—(0)

* = Just before exposure

— = No weight available (100% mortality)

() = Number of animals

** = Minimum and maximum weight just before exposure

*** = One animal lost much weight

Analysercertifikat

Order-Nr.
L/C-Nr.
I/L-Nr.

! Versandauftrag-Nr. ! Versandanzeige-Nr.
! 2509979 v. 23.09.86 ! 541 228 v. 01.10.86
! ! !
! ! !

Für: Centraal Instituut voor Voedingsonderzoek TNO., Attn. Dr. Lina, Utrechtseweg 48
NL - Zeist, N i e d e r l a n d e

Produkt: Chloracetaldehyd 45 %ige Lösung
1 kg in 1 Glasflasche

Chloracetaldehyd

45,4 %

Spezifikation
(min 45,0 %)

Burghausen 17.11.86

WACKER-CHEMIE GmbH
Werk Burghausen
Abteilung D

PA-11-20