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SPECIAL REPORT

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on

SUMMARY OF THE TOXICITY OF OCTYL ALCOHOL (2-ETHYL HEXANOL)

CONTAINS NO CBI

Carbide & Carbon Chemicals Corp. Industrial Fellowship No. 272-3

In single doses by mouth when administered as a 20 per cent dispersion in 1 per cent "Tergitol" 7, Octyl Alcohol was found to have an LD<sub>50</sub> for rats of 7 grams/kilo and for guinea pigs of 0.6 gram/kilo. This indicates a very great difference in species sensitivity to Octyl Alcohol and makes it impossible to draw any conclusions whatever about safe doses for the administration to humans.

Four-day poulticed skin applications to guinea pigs indicate that the LD<sub>50</sub> for guinea pig by skin absorption is approximately 30 grams/kilo. It should be remembered that the particular technic used does not give precise results when the LD<sub>50</sub> is above 5 grams/kilo. This indication is clear, however, that Octyl Alcohol has little toxicity when applied to the skin.

Octyl Alcohol was found to be only a mild skin irritant in that no more than slight temporary congestion was produced by five hours' continuous contact with human skin. This test did not consider possible allergic reactions. Eight-hour exposures were made using rats and guinea pigs and a mist of Octyl Alcohol produced by saturating air with the material at 74° C. and then cooling to room temperature. One exposure used dry Octyl Alcohol and another exposure used the Octyl Alcohol floating on water. Eyes and noses were irritated, but there was no corneal necrosis and no animal died. Microscopic examination of tissues removed 14 days after the exposure showed slight lung congestion, and in one animal out of 24 light cloudy swelling of the kidney. It appears from this that single exposures to vapors and mist from hot Octyl Alcohol should have no effect upon human subjects beyond minor eye and nose irritation.

In the rabbit eye 0.002 ml. produced corneal necrosis, while half this quantity did not. Octyl Alcohol should, therefore, not be splashed in the eye. This is the only hazard from single doses or single contact with the material which was revealed by the study.

Henry F. Smyth, Jr.

SENIOR INDUSTRIAL FELLOW

## MELON INSTITUTE OF INDUSTRIAL RESEARCH

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## SPECIAL REPORT

on

THE TOXICITY OF OCTYL ALCOHOL (2-ETHYL HEKANOYL)Carbide & Carbon Chemicals Corp. Industrial Fellowship No. 274-3Literature

No quantitative pharmacological data on Octyl Alcohol were found. Queries and Minor Notes (1) states in regard to its vapors, "While little is known of its toxic properties, its extensive use with apparent impunity prompts the belief that its toxicity for exposed workmen is of low order." This note further cites four references to show that Octyl Alcohol administered to experimental animals provokes a drop in arterial blood pressure, promotes diuresis, is a mild local anesthetic, and reduces the clotting time of blood.

Sample

The sample of Octyl Alcohol was received 2-14-39 from Fellowship 155.

TOXICITY BY MOUTHResults

Results are summarized in Table 1 and presented in more detail in Tables 2 and 3.

Table 1

Octyl Alcohol

Summary of Results with Single Doses by Mouth  
 Fed as dispersion in 1% "Tergitol" 7 solution, 1 ml = 0.20 gm

Dose in Gm/kg.	Male Albino Rats		Mixed Guinea Pigs	
	Rats Fed	Mortality	Pigs Fed	Mortality
18	4*	100%		
15	4	75		
12	12	83		
10	10	70		
8	10	70		
6	9	45		
5	4*	0		
1.26			6	100%
0.795			10	30
0.63			8	25
0.50			5	40
LD <sub>0</sub>	5 gm/kg.		0.2 gm/kg.	
LD <sub>50</sub>	7 "		0.6 "	
LD <sub>100</sub>	15 "		1.3 "	

\*Not in detailed tables

Symptoms and Gross Pathology

Death was usually rapid and was preceded by narcosis and low body temperature. Liver and spleen were congested and kidney was generally pale.

Discussion

The results of single doses by mouth were more irregular than those for any other material administered so far. There was an extremely wide spread between the LD<sub>50</sub>'s for guinea pigs and rats. It would appear that there is considerable variation in rate of absorption of Octyl Alcohol from the intestinal tract and a large species difference in sensitivity. The toxicity

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when administered by mouth is only moderate, but in view of the large species difference it would be very rash to estimate even roughly the probable safe human dose.

#### TOXICITY BY SKIN ABSORPTION

Four-day poulticed skin applications were made to 26 guinea pigs. A dosage of 20 grams/kilo killed no pigs; 30 grams/kilo killed 60 per cent of the pigs; and 50 grams/kilo killed 80 per cent of the pigs. The LD<sub>50</sub> is approximately 30 grams/kilo, but no details are given and little importance is attached to this figure because of the low precision of the test when the LD<sub>50</sub> is above 5 grams/kilo. The results indicate simply that Octyl Alcohol has little toxicity when applied to the skin, possibly due to poor absorption through the skin.

#### HUMAN SKIN IRRITATION

One subject wore a cotton pad saturated with Octyl Alcohol for five hours and obtained no irritation or pain, although there was slight congestion under the pad. That is to say, Octyl Alcohol is only a mild skin irritant. This test did not consider possible allergic reactions.

#### TOXICITY BY VAPOR INHALATION

Two preliminary animal exposures to vapors of Octyl Alcohol were discussed in the Annual Report of 11-30-39 and the monthly report of 12-31-39.

Each exposure lasted for eight hours and was produced by bubbling air through Octyl Alcohol maintained at 74° C. The resulting saturated atmosphere was cooled to room temperature so that the animals were exposed to a mist whose concentration was not determined. In one of the exposures dry Octyl Alcohol was used, and in the other the alcohol floated on water. Six rats and six guinea pigs were used in each exposure and no animals died. Eyes and noses were irritated but there was no corneal necrosis produced.

Microscopic examination of tissues removed from the animals fourteen days after the exposure showed slight lung congestion. One guinea pig showed, in addition, light cloudy swelling of the kidney. No rats showed any abnormality. It appears from this that single exposures to vapors and mist from hot Octyl Alcohol should have no effect upon human subjects beyond minor eye and nose irritation. Mild conjunctivitis would also be expected if the exposure were prolonged.

CORNEAL NECROSIS

In the rabbit eye 0.002 ml. produced corneal necrosis, while half this quantity did not. Octyl Alcohol should not be splashed in the eye.

SUMMARY

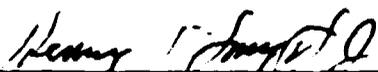
All the work mentioned in this report considered only single exposures or doses of Octyl Alcohol. Nothing is known of its possible cumulative action.

The only real hazard discovered is accidental splashing into the eye. Single exposures to vapors from hot Octyl Alcohol would be irritating to eye, nose and throat, but animal experiment indicates they would be otherwise harmless.

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Octyl alcohol is only a mild skin irritant and apparently is absorbed very little through the skin. In single doses by mouth its toxicity is not high but varies markedly in different species, so that predictions for humans are impossible.

Henry F. Smyth, Jr.

  
SENIOR INDUSTRIAL FELLOW

April 23, 1940-mah

Literature Cited

(1) J.A.M.A., 112, 2353, 6-3-39.

Table 2

## Oxyl Alcohol

Single Doses to Male Albino Rats

Fed by stomach tube as dispersion in 1% "Tergitol" 7, 1 ml = 0.20 gm.

Rat No.	Date Dosed	Grams Wt.	Weight Change in 14 Days	Dosage; Grams per Kilo	Dose in Grams	Dose in ml. of Dispersion	Days to Death
5085	8-2-99	76	-	15	1.14	5.7	0
5086	"	84	-	15	1.26	6.3	0
5087	"	92	-	15	1.38	6.9	0
5084	"	115	+ 73	15	1.70	8.5	-
5080	8-2	132	-	12	1.59	8.0	0
5082	"	105	-	12	1.26	6.3	2
5102	8-8	108	-	12	1.50	6.5	0
5103	8-8	81	-	12	.96	4.8	0
5104	"	121	-	12	1.46	7.3	0
5105	"	104	-	12	1.24	6.2	0
5106	"	105	-	12	1.26	6.3	0
5107	"	128	-	12	1.43	7.6	0
5108	"	96	-	12	1.14	5.7	0
5109	"	111	-	12	1.32	6.6	0
5081	8-2	92	+ 38	12	1.10	5.5	-
5083	"	116	+ 64	12	1.39	7.0	-
5074	8-2	128	-	10	1.28	6.4	0
5075	"	136	-	10	1.36	6.8	1
5077	"	127	-	10	1.27	6.3	0
5158	8-16	100	-	10	1.0	5.0	1
5159	"	107	-	10	1.07	5.1	1
5160	"	101	-	10	1.01	5.0	1
5161	"	84	-	10	.84	4.2	1
5076	8-2	124	+ 48	10	1.24	6.2	-
5078	"	108	+ 45	10	1.08	5.4	-
5079	"	100	+ 50	10	1.00	5.0	-

(Continued)

Table 2 Cont'd - Octyl Alcohol

Rat No.	Date Dosed	Grams Wt.	Weight Change in 14 Days	Dosage; Grams per Kilo	Dose in Grams	Dose in ml. of Dispersion	Days to Death
5098	8-8	94	-	8	.75	3.8	0
5099	"	102	-	8	.80	4.0	1
5100	"	104	-	8	.81	4.2	1
5101	"	94	-	8	.75	3.8	3
5175	8-22	104	-	8	.83	4.2	1
5339	9-15	88	-	8	.70	3.5	1
5340	"	67	-	8	.54	2.7	1
5173	8-22	102	+ 49	8	.82	4.1	-
5174	"	89	+ 51	8	.71	3.6	-
5176	"	131	+ 98	8	1.05	5.2	-
5342	9-15	69	-	6	.414	2.1	1
5343	"	74	-	6	.44	2.2	1
5345	"	145	-	6	.87	4.4	1
5349	"	83	-	6	.50	2.5	1
5344	"	151	+ 29	6	.90	4.5	-
5346	"	84	+ 48	6	.50	2.5	-
5346	"	98	- 1	6	.99	2.9	-
5348	"	98	+ 64	6	.99	2.9	-
5350	"	81	+ 61	6	.48	2.4	-
5052	7-20	100	+ 20	5	.50	2.5	-
5053	"	132	- 1	5	.66	3.3	-
5054	"	120	+ 45	5	.60	3.0	-
5055	"	132	- 19	5	.66	3.3	-

Table 1

Octyl Alcohol

Single Doses by Mouth to Mixed Guinea Pigs  
Administered by stomach tube as dispersion in 1% "Fergitol" 7  
1 ml. = 0.20 gm.

Pig No.	Sex	Date Dosed	Grams Wt.	Weight Change in 14 Days	Dosage in Grams/Kilo	Dose in Grams	Dose in ml. of Dis- persion	Days to Death
6764	M	3-13-40	241	-	1.26	0.30	1.5	1
6765	M	"	268	-	1.26	0.34	1.7	1
6766	M	"	226	-	1.26	0.28	1.4	1
6767	M	"	224	-	1.26	0.28	1.4	1
6762	F	"	236	-	1.26	0.30	1.5	1
6763	F	"	247	-	1.26	0.31	1.55	1
6806	F	3-20-40	222	-	0.795	0.177	0.88	1
6810	M	"	198	-	0.795	0.157	0.78	1
6725	F	3-6-40	265	-	0.795	0.210	1.05	5
6724	M	"	196	+ 14	0.795	0.156	0.78	-
6727	M	"	230	+ 50	0.795	0.183	0.92	-
6808	M	3-20-40	279	+ 70	0.795	0.222	1.1	-
6726	F	3-6-40	261	- 74	0.795	0.208	1.0	-
6805	F	3-20-40	252	+ 25	0.795	0.20	1.0	-
6807	F	"	228	+ 24	0.795	0.18	0.9	-
6809	F	"	260	+ 18	0.795	0.20	1.0	-
6812	F	3-20-40	246	-	0.63	0.155	0.78	5
6815	F	"	256	-	0.63 <sup>rx</sup>	0.161	0.80	1
6811	M	"	238	+ 34	0.63	0.150	0.75	-
6813	M	"	246	+ 25	0.63	0.155	0.78	-
6814	M	"	194	+ 17	0.63	0.122	0.61	-
6816	M	"	246	+ 43	0.63	0.154	0.77	-
6902	M	4-3-40	226	+ 55	0.63	0.142	0.71	-
6901	F	"	193	- 20	0.63	0.122	0.61	-
6903	F	"	188	-	0.50	0.094	0.47	1
6904	F	"	228	-	0.50	0.114	0.57	1
6905	F	"	236	- 32	0.50	0.118	0.59	-
6906	F	"	226	- 10	0.50	0.113	0.56	-
6908	F	"	194	+ 83	0.50	0.097	0.48	-

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