



THE TRAVELERS ENGINEERING DIVISION

CHEMICAL REACTIONS

diethyl hexyl adipate

DEST. BY:	
CDR	☒
GVE	☒
JTG	☒
JLN	☒
SAR	☒
BW	☒
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MEAT WRAPPERS' SYNDROME (ASTHMA)

Reports of eye and nose irritations, cough, chest pains, and breathing difficulties have been made among workers handling polyvinyl chloride plastic wrap - especially in supermarket meat departments. The source of exposure to the workers handling the wrapping material results from the thermal decomposition products that are produced in the process of cutting the plastic wrap with a hot wire at temperatures to 450 degrees Fahrenheit.

Studies performed by such groups as NIOSH and the Environmental Health people in the State of Washington show that the makeup of the thermal decomposition products is not exactly known. However, low concentrations of hydrogen chloride have been found as well as significant quantities of plasticizer, such as di-ethyl hexyl adipate, and some other minor constituents. It appears that the plasticizer may be the primary irritant to the human system. The exact chemical makeup and cause of Meat Wrappers' Asthma has not been fully identified as yet. However, vinyl chloride monomer (a gas) which is used in making polyvinyl chloride has not been found to be one of the contaminants produced in this process. Although the exact cause of the asthmatic conditions as exhibited by meat-wrapper workers may not be known, precautions can be taken to prevent employee exposures:

- Replace hot wire cutting devices with mechanical cutting devices.
- Do not assign employees with histories of respiratory ailments to the meat-wrapping areas.
- Keep the temperature of the cutting and sealing devices as low as possible to prevent fume production, possibly below 300 degrees Fahrenheit.
- Be sure the meat-wrapping area has good air circulation and the cutting and sealing operations have local exhaust and ventilation to prevent the fumes from reaching the worker's breathing zone.
- Do not allow workers to smoke in the meat-wrapping environments. They should thoroughly wash their hands before smoking.
- Be sure all tools and wrapping aids are cleaned and inspected to insure proper operation in compliance with manufacturer's specifications with regard to tension adjustments and temperature controls.

RSV 0016118

Results of the investigations show that exposure to the thermal decomposition products of polyvinyl chloride plastic wrap causes upset stomachs, eye irritations, coughing, and wheezing to many exposed employees.

It has been reported that some allergenists feel that certain employees exposed to the thermal breakdown products can become sensitized. Therefore, employees who become sensitized to the fumes should be removed from the exposure.

RSV 0016119

Reference	Animal	Strain or type	Sex	Preparation and dose	Site and route	Animals with tumors	Survival	Duration of experiment
Scalia, H., 1956	50 mice	White	M	100% soln. ¹⁰⁰ once daily, 6 d./wk. for 52 wks.	Skin	0	22 at 52 wks	52 wks.
Scalia, K., et al., 1957	50 mice	Albino	M	100% 6 times a wk. ¹⁰⁰	Skin	0		24 wks.
1023. POLYVINYL RESIN								
Notldurft, H., 1956	95 rats			17 mm. disc implanted (8 per rat)	S.C.	76	sarcomas	23 mos.
	Rats			Tablet of compressed powder, implanted (10 per animal)	S.C.	0		25 mos.
	76 rats			17 mm. perforated disc implanted (8 per rat)	S.C.	33	sarcomas	23 mos.

224. PROPARGYL METHANESULFONATE HC=CCH₂OSO₂CH₃								
Roe, F. J. C., 1957	20 mice ¹⁰⁰	Albino "S"	M	10 wkly. paintings of 0.3 ml. at	Skin	4 (total of 10 shown at 10		20 wks.
222. POLYVINYL CHLORIDE (CH₂=CHCl)								
Oppenheimer, B. S., et al., 1953	Rats			Film embedded under skin	S.C.	Tumors ¹⁰⁰		1-2 yrs.
Oppenheimer, et al., 1955	27 rats	Wistar	M	Perforated film, 1.5 cm. in width, 0.04 mm. in thickness.	S.C., abdominal wall.	0		
Oppenheimer, et al., 1955	Rats	Wistar	M	Plain film, 1.5 cm. in width, 0.04 in thickness.	S.C., abdominal wall.	17 (38.6%) ¹⁰⁰	44 at 189 d.	At least 727 d.
	15 rats	White	M & F	1.6X1.6 cm. & 0.1 cm. thick film folded to 0.4X0.8X0.2 cm. packet.	Implant near r. kidney.	0	9 at 12 mos	18 mos.
Kogan, A. Kh., and Tugurina, V. N., 1959	15 rats	White	M & F	1.6X1.6 cm. & 0.1 cm. thick perforated film.	Implant near r. kidney.	Tumors ¹⁰⁰	8 at 12 mos	18 mos.
Kogan, A. Kh., and Tugurina, V. N., 1959	20 rats	White	M & F	1.6X1.6 cm. & 0.1 cm. thick intact film.	Implant near r. kidney.	Tumors ¹⁰⁰	7 at 11 mos, 5 between 10-18 mos.	18 mos.
Kogan, A. Kh., and Tugurina, V. N., 1959	37 rats	White	M & F	As capsule of film	Attached to r. kidney.	Tumors ¹⁰⁰	16 at 7 mos	19 mos.
Kogan, A. Kh., and Tugurina, V. N., 1959	20 rats	White	M & F	3.2X3.2 & 0.2 cm. thick film cut to small pieces of 0.1X0.2 cm.	Implant near r. kidney.	0	4 between 11-17 mos.	17 mos.
Musell, F. B., et al., 1959	35 rats	Wistar	M & F	4 mm. X 5 mm. & 0.16 mm. thick film	S.C. implant	Tumors ¹⁰⁰	30 at 300 d	Up to 800 d.