#090301
2-11-81

STUDY 38

CHEMICAL: METHOMYL, LANNATE, NUDRIN

FORMULATION: 00-Active Ingredient

FICHE/MASTER ID: None

CITATION: Knaak, J.B., T. Jackson, A.S. Fredrickson, L. Rivera, K.T. Maddy, and N.B. Akesson. 1980. Safety effectiveness of closed-transfer, mixing-loading, and application equipment in preventing exposure to pesticides. Arch. Environ. Contam. Toxicol. 9:231-245.

DIRECT RVW TIME = (MH) START-DATE END DATE

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CONCLUSIONS:

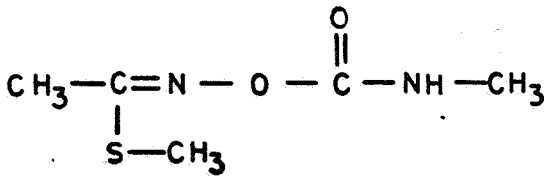
Exposure

1. This study is scientifically valid.

2. A closed transfer system for mixing and loading pesticides can be very effective in maintaining low exposure levels. Airborne methomyl levels were not detectable (detection limit unspecified) exception the day that a water-soluble bag accidentably broke. Workers were exposed to an estimated 1,332 $\mu g/m^3$ when the bag broke. Airborn methomyl levels near tractor applicators ranged from 0.0 to 7.5 $\mu g/m^3$.

MATERIALS AND METHODS:

METHOMYL, LANNATE, NUDRIN



S-Methyl-N-[(methylcarbamoyl)oxy]thioacetimidate

A closed-transfer system for mixing and loading pesticides, including methomyl (Lannate 8 oz pks; Lannate Liquid; Nudrin), was tested for effectiveness in reducing worker exposure. A schematic of the closed system is shown in Figure 1. Liquid pesticide formulations were transferred from their original containers to a measuring tank via the closed system. Pesticides formulated as powders were introduced into a powder box, the lid was closed and water was used to wash the powder into the mix or vehicle tank. Pesticides were diluted with water in a spray or mix tank. Hoses and centrifugal pumps were used to transfer the spray mixture from the mix tank to aircraft tanks when aerial applications were used. Rear-mounted spray boom rigs were used for ground applications.

Airborne residues were measured July 18-22 around the California work sites of four mixer-loader-applicators and one mixer-loader. Scientists placed sampling apparatus near workers at each job site. Samples were taken with high volume air samplers at 0.566 m^3/min, fitted with a combination filter head of glass fiber and XAD-4 Amberlite resin.

Airborne methomyl during application and between applications was sampled through impingers mounted on tractors. Air was pulled through the impingers at 0.014 m /min by small vacuum pumps. Methomyl was trapped on glass fiber filters and in an ethylene glycol trap. Impingers were turned on at the start of a workday and turned off when the day's work was completed.

The glass fiber filters were extracted with acetone, and aliquots were then analyzed by gas or liquid chromatography.

The amberlite resin was twice extracted with acetone and aliquots were evaporated to dryness. The residue was dissolved in ethylacetate. Aliquots were analyzed by gas chromatography (GC) with a recovery rate of 90%. (Knaak et al., 1980. Arch. Environ. Contam. Toxicol. 9:217-229).

The ethylene glycol solutions were diluted with Na_2SO_4 solution and extracted with dichloromethane. Aliquots of the extract were analyzed by by GC (100% recovery) and by high pressure liquid chromatography.

2

REPORTED RESULTS:

Results of the air monitors are shown in Table 1. Methomyl was not detected (limit of detection not reported) in the air during mixing and loading operations except on the day when one of the water-soluble bags broke during transfer.

During application, the concentrations of methomyl picked up the tractor-mounted impingers was 0-7.5 $\mu g/m^3$.

These was no correlation found between the amount collected by the samplers and the amount being applied day-to-day.

DISCUSSION:

Information on weather conditions during applications is lacking. Also the formulations used were only mentioned on the day that the water-soluble bag broke. It is not clear which formulations were mixed or applied on other days.

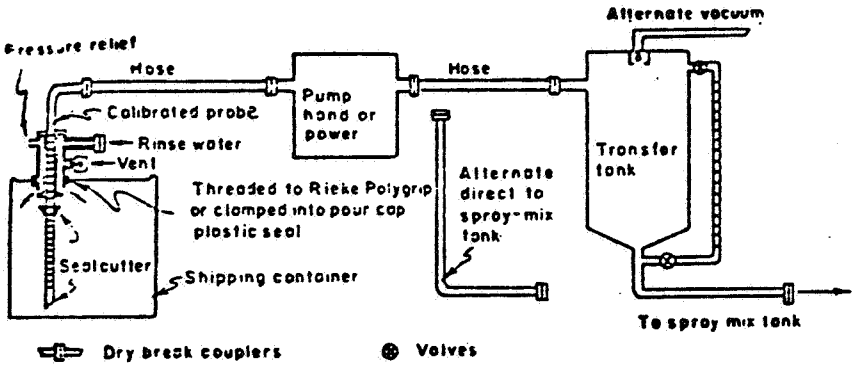


Figure 1. Closed-transfer system for pesticide mixing-loading.

Table 1. Methomyl residues during closed transfer, mixing, loading (T,M,L) and application.

Date	No. of lbs used	Airborne residues	
		During T,M,L ($\mu g/m^3$)	During application ($\mu g/m^3$)
7/18	55.7	ND (5)[a]	3.6
7/19	76.9	ND (5)	7.5
7/20	18.9	8.1[b]	--
	2.3	1,332.0[b]	--
	39.6	ND (3)	--
	60.8	--	3.9
7/21	31.4	ND (3)	0.0

[a]ND, not detected; numbers in parentheses represent the number of batches monitored.

[b]These high values correspond to the accidental opening of one of the water-soluble bags while being placed in the powder box.