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COMPARATIVE DETERMINATIONS OF THE VOLATILITY OF SOME ORGANIC PHOSPHORUS INSECTICIDES

Riassunto. — Sono state eseguite determinazioni comparative di volatilità dei seguenti insetticidi organici fosforati:

Malathion puro (99,5%), malathion tecnico (95%), malathion tecnico (86-90%), diazinone (tipo usato nella preparazione delle formulazioni), parathion (98,8%).

Tali determinazioni sono state effettuate misurando le perdite di peso di strati sottili dei suddetti prodotti, mantenuti in termostato con circolazione ad aria a 35° C., per 1, 7, 15, 30, 60 e 90 giorni.

Résumé. — On a fait une détermination comparée de la volatilité des insecticides organiques phosphorés suivants:

Malathion pur (99,5%), malathion technique (95%), malathion technique (86-90%), diazinon (type dont on se sert pour la préparation des formules), parathion (98,8%).

Ces déterminations ont été effectuées par la mesure en poids de couches très minces de ces produits, en les tenant dans un thermostat à circulation d'air à 35° C., pendant 1, 7, 15, 30 60 et 90 jours.

Summary. — The volatility of the following phosphorus organic insecticides has been determined for the purpose of comparison:

Malathion (pure grade 99,5%), Malathion (technical grade 95%), Malathion (technical grade 86-90%), Diazinon (as used in the formulations), Parathion (pure grade 98,8%).

These determinations were carried out on thin layers of the above compounds, which were kept in a thermostat with circulation of air at 35° C., for 1, 7, 15, 30, 60 and 90 days respectively.

Zusammenfassung. — Vergleichende Flüchtigkeitsbestimmungen nachstehender organischer Phosphorinsektizide wurden durchgeführt:

Reines Malathion (99,5%), technisches Malathion (95%), technisches Malathion (86-90%), Diazinon (zur Herstellung von Formulierungen benutzte Qualität), Parathion (98,8%).

Die Bestimmungen wurden ausgeführt, indem die Gewichtsverluste dünner Schichten der genannten Substanzen gemessen wurden, und zwar wurden diese Schichten in einem Thermostat mit Luftzirkulation bei 35° C., für 1, 7, 15, 30, 60 und 90 Tage gehalten.

I wish to make a brief report of the preliminary results obtained in some tests on the « Comparative determinations of the volatility of some organic phosphorus insecticides ». The purpose of these tests is to investigate the residual life of some of the new organic phosphorus insecticides, such as malathion and diazinon used in insect control, particularly, against resistant houseflies.

The insecticides tested are:

Malathion (pure grade 99,5%).

Malathion (technical grade 95%).

Malathion (technical grade 86-90%).

Diazinon (as used in the formulations).

Parathion (pure grade 98,8%).

I also tested parathion, not because it is used as a residual, but to compare the results obtained for the new insecticides, with an already well known product of the same group.

The conditions of the determinations were the same that we followed for the « Comparative determinations of the volatility of some chlorinated organic insecticides » (1). Thus: I prepared 1% ethyl ether solutions of each product. 2 ml of each solution (i.e. 20 mg of each product), was distributed in a thin layer on a watch glass 10 cm in diameter, previously dried and weighed. After the evaporation of the ether in the air, the watch-glasses were placed in a large air thermostat, where the temperature was maintained constantly at 35° C. In the upper part of the thermostat were two holes to permit the circulation of air.

The watch glasses were weighed at intervals of 1, 7, 15, 30, 60 and 90 days of exposure in the thermostat.

The results obtained are reported in Table 1 and Figure 1.

(1) Abstracts of 12th International Congress of Pure and Applied Chemistry - New York, September 1951, p. 501.

Table 1

WEIGHT LOSS ON 20mg OF SOME ORGANIC PHOSPHORUS INSECTICIDES KEPT IN A THERMOSTAT AT 35°C.

Insecticide	A = weight of residue mg B = weight loss %	Days of stay in thermostat					
		1	7	15	30	60	90
MALATHION (pure grade 99,5%)	A	20,00	20,00	20,00	18,43	15,30	11,80
	B	0,00	0,00	0,00	7,85	23,50	41,00
MALATHION (technical grade 95%)	A	20,00	19,45	18,80	17,27	14,20	11,45
	B	0,00	2,75	6,00	13,65	29,00	42,75
MALATHION (technical grade 86-90%)	A	20,00	19,40	18,50	16,87	13,60	10,15
	B	0,00	3,00	7,50	15,65	32,00	49,25
DIAZINON (as used in the formula- tions)	A	17,10	8,10	4,50	4,17	3,50	2,80
	B	14,50	59,50	77,50	79,15	82,50	86,00
PARATHION (pure grade 98,8%)	A	20,00	19,20	18,10	15,80	11,20	7,60
	B	0,00	4,00	9,50	21,00	44,00	62,00

WEIGHT LOSS ON 20mg OF SOME ORGANIC PHOSPHORUS INSECTICIDES KEPT IN A THERMOSTAT AT 35°C

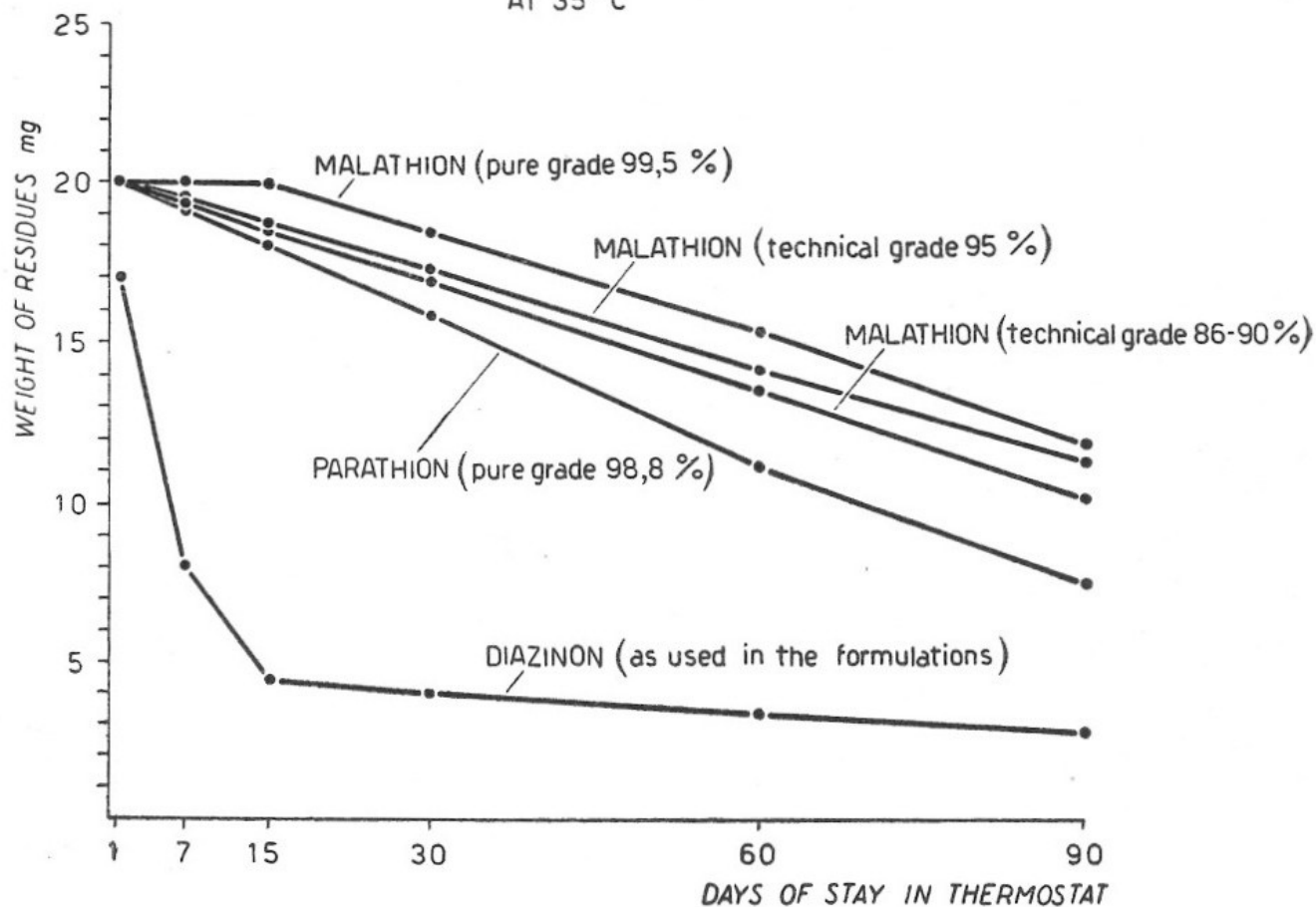


Fig. 1

As can readily be observed, under our experimental conditions, the diazinon shows a very high volatility. The malathion appears less volatile, its volatility being less as its purity is higher.

The high volatility of diazinon might explain the low content in cholinesterase found by Dr. Mosna in the blood of workers spraying diazinon. On account of its high volatility the operators would be apt to breathe a larger quantity of the product.

I wish to conduct further investigations, and particularly to repeat the same determinations with the various formulations as used in the field, to determine if the chemical results agree with field behavior. But I have thought it might be well to communicate these first results, as a useful indication for the scientist engaged in insect control, and particularly, in resistant fly control.