WHO Pesticide Residues Series, No. 1

1971 EVALUATIONS OF SOME PESTICIDE RESIDUES IN FOOD

THE MONOGRAPHS

The evaluations contained in these monographs were prepared by the Joint Meeting of the FAO Working Party of Experts on Pesticide Residues and the WHO Expert Committee on Pesticide Residues that met in Geneva from 22 to 29 November 1971.¹

World Health Organization

Geneva

1972


These monographs are also issued by the Food and Agriculture Organization of the United Nations, Rome, as document AGP-1971/M/9/1.

FAO and WHO 1972

1,2-DICHLOROETHANE

This pesticide was previously evaluated at the Joint Meeting in 1965 (FAO/WHO 1965c) and reviewed in 1967 (FAO/WHO 1968b). Very little new information on this pesticide has appeared since 1967. It was previously listed as ethylene dichloride.

Reference should be made to Appendix IV. It contains Section 3 of the report on the 1971 meeting (FAO/WHO 1972a) where general principles relating to residues of fumigants are discussed; also the Appendix contains information on some commercially available mixtures of fumigants.

RESIDUES IN FOOD AND THEIR EVALUATION

Use pattern

Post-harvest use on dry foodstuffs

1,2-dichloroethane has been widely used for many years, usually in admixture with carbon tetrachloride as a fumigant for bulks of raw cereals in bins or on floors. It is difficult to assess present world usage but this is probably much less than formerly.

Residues
1,2-dichloroethane is physically sorbed by foods more strongly than carbon tetrachloride but less markedly than 1,2-dibromomethane. There is no available evidence of any reaction with the food constituents. Studies with the isotopically labelled fumigant have not been made and would probably be necessary to demonstrate any reaction, which, if occurring, must be very small in amount.

The effect of processing to flour and broad has been studied by Wit et al., (1969). There were some discrepancies between the results reported by the different participating laboratories but the general picture emerged that, starting with grain which had been aired for several weeks after fumigation and which then contained 10 to 25 ppm of 1,2-dichloroethane, the amounts found in white flour are usually between 2 and 11 ppm and in bread were usually below 0.05 ppm.

Methods of residue analysis

Methods using gas-chromatography have now replaced earlier chemical methods. Heuser and Scudamore (1968) obtained satisfactory extraction of cereals and wheat flour by shaking at room temperature with a 5:1 by volume acetone and water mixture. Aliquots of the supernatant liquid were injected into the gas-chromatograph and determined by a flame ionization detector. This procedure was developed by Heuser and Scudamore (1969) into a multi-residue scheme and it was found that a B-ionization detector gave the highest response to 1,2-dichloroethane giving a method which will determine 0.1 ppm.

National tolerances (as reported to meeting)

Australia, Canada and the United States of America all exempt ethylene dichloride from the requirement of a tolerance on the grounds that no hazard will remain when the food reaches the consumer.

Appraisal

1,2-dichloroethane has been extensively used as a post-harvest fumigant for many years. It is usually applied in a mixture with carbon tetrachloride, with small proportions of other fumigants sometimes added. The main use is on bulks of raw cereals. 1,2-dichloroethane is physically sorted on these foods but there is no evidence of any chemical breakdown or reaction. There is evidence of a substantial reduction in the amount of residual fumigant when the grain is milled and baked into bread. Analytical methods are available which will determine 0.1 ppm of 1,2-dichloroethane.

There is a little direct information on the amounts of residual 1,2-dichloroethane appearing in commercial samples or in food reaching the consumer. From the available information on the occurrence of unchanged 1,2-dichloroethane in or on raw cereals or cereal products after fumigation in accordance with good practice it appears that the following amounts need not be exceeded and it is recommended that these residue levels be used as guidelines:

In raw cereals at point of entry into a country or when supplied for milling, provided that the
commodity is freely exposed to air for a period of at least 24 hours after fumigation before sampling

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<tr>
<td>50</td>
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<tr>
<td>10</td>
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In milled cereal products which will be subjected to baking or cooking

In bread and other cooked cereal products (i.e. at or about the present limit of determination)

Further work desirable

Additional data on residues of unchanged 1,2-dichloroethane occurring in food in commercial practice.

REFERENCES


Heuser, S. G. and Scudamore, K. A. (1968b) Determination of residual acrylonitrile, carbon disulfide, carbon tetrachloride and ethylene dichloride after fumigation. Chem. and Ind., 1154-1157


Lynn, G. E. and Vorkes, F. A. (1957) Symposium: Residues in foods and feeds resulting from fumigation of grains with the commoner liquid formulations of carbon disulfide, carbon tetrachloride, ethylene


See Also:

- Toxicological Abbreviations
  - Dichloroethane, 1,2- (EHIC 176, 1995, 2nd edition)
  - Dichloroethane, 1,2- (EHIC 62, 1987, 1st edition)
  - Dichloroethane, 1,2- (ICSC)
  - Dichloroethane, 1,2- (FAO Nutrition Meetings Report Series 48a)
  - Dichloroethane, 1,2- (WHO Food Additives Series 30)
  - Dichloroethane, 1,2- (Pesticide residues in food: 1979 evaluations)
  - Dichloroethane, 1,2- (CICADS 1, 1998)
  - Dichloroethane, 1,2- (IARC Summary & Evaluation, Volume 71, 1999)