SHORT COMMUNICATION

INSECTICIDES SOLD IN THE STREETS OF ADDIS ABABA FOR DOMESTIC USE AND THE POSSIBLE PUBLIC HEALTH HAZARD ASSOCIATED WITH THE PRACTICE

Yilma Mekuria, M.Sc."Tamirat Tesfamariam, B.Sc, and Solomon Teferra, M.Sc.

ABSTRACT

Chemical analyses were performed to identify the insecticides sold in the streets of Addis Ababa by peddlers. Parat'"ion, a very toxic substance, and malathion, were identified in a number of the unlabelled liquid samples, while packages of powder bearing the lable "DDT" were confirmed to contain thu insecticide. Thu study assesses the possible hazards resulting from street vendors selling insecticides and living advice on their use and concludes that the practice u hazardous to the public.

INTRODUCTION

The study was conceived as a result of observations made in the main marketing zone of Addis Ababa, the Addis Ketema area of the sale by street vendors of liquid and powdered insecticides for household use. The vials of liquids, usually yellowish to brownish in color, were unlabelled while the powder was packaged in small paper bags bearirrg the label "DDT". The main purpose of the study was to appraise the public health hazard that niight arise from the uncontrolled sale by untrained people of insecticides with varying degrees of toxicity. To do this, the authors identified the insecticides sold in the vials and the adequacy of the instructions given by the vendors to buyers on dilution, application and precautionary measures.

MATERIALS AND METHODS

Insecticide samples were bought from unlicensed street vendors in Addis Ketema, a marketing zone in midwestern Addis Ababa by the authors, who posed as ordinary members of the community interested in the
preparations they sold for use against household pests. Information and advice given on dilution, storage and precautionary measures were noted down when provided voluntarily. Such advice was asked for if it was not
offered spontaneously. Qualitative analyses were done on 53 liquid samples, while quantitative analyses were done on 14 of those which were found to contain malathion or parathion. The parathion content was determined by the

Avere U-Norris (I) colorimetric method. A five millilitre aliquot (portion) of each sample was used for the analyses. The parathion-nitro brroup was reduced by zinc dust and hydrochloric acid. The resulting amine was diazotizcd and coupled with N-l naphthylcthylcne diamine to produce a color which was measured at 560 nanometers (nm).

Central Laboratory and Research Institute
P.O. Box 1242, Addis Ababa, Ethiopia

The presence of malathion in the samples was determined following the' method recommended by Sutherland (2). Impurities were rcmoved from the samples prior to their decomposition by alkili. A standard curve was prepared according to Norris et.al (3,4). The' yellow colour of the' malathion copper complex was measured at 418 nm.

For both malathion and parathion determinations, a Hitachi double-beam spectraphotometer (model 124 with recorder) was used.

RESULTS

A total of 55 liquid samples bottled in unlabelled vials and two paper packages of powder labelled "DDT" were bought. No advice was received concerning the storage, dilution or application of the two DDT samples.

In the case of 24 of the liquid samples purchased, instructions were given to dilute the insecticide "in one glass of water", without, however, the seller saying anything about the size of the glass or the need to carefully wash the glass afterwards if mixing was actually done in it. Another 15 liquid samples were to be diluted ill 0.5 litres of water, and a further 16 samples in simply "water", without any mention of a specific amount. The contents of the vials measured approximately 5, 10 or 15 millilitres but there was no relation between the amount in the vial and the amount of water in which it was to be diluted. Although advice, of some sort was given about dilution for all 55 samples, advice about application and precautionary measures to be taken was not provided in some instances (Table 1). fu 31 cases, nothing was said about storage, nor was anything mentioned in any of the cases about personal protection differing the application of the insecticides.

The results of chemical identification of the insecticides are also shown in Table 1 so that the appropriateness of the advice given can be considered vis-l-vis the actual contents of the preparation being sold. The results of analyses performed to identify the insecticides present in the liquid samples are presented in Table 2. Five of the "unknown " nine samples were found not to contain any organophosphates. It is possible that they contained noting but kerosene, which is the usual carrier used. Another two of these unknown samples contained unidentified organophosphates, while the remaining two were found to be not well sealed and hence unfit for analysis. Two packages of powder were found to contain DDT, as labelled, although no quantitative determination was done on them.

Quantitative chemical analyses were performed on 14 liquid samples. Four of these were found to contain 38.3 milligrams, 10.7 milligrams, 7.5 milligrams and traces, respectively, of malathion in 10 millilitres aliquots of the sample. The concentration of parathion found in the other ten samples is shown in Table 3.

DISCUSSION AND CONCLUSION

The vials of insecticides were all unlabelled, contrary to one of the most fundamental and universal mores of insecticide marketing and distribution that requires clear labelling. In the absence of labels the nature of the insecticide, its concentration and grade of toxicity are not known. Such information is the minimum requirement for protection of the public from accidental poisoning.

Different categories of insecticides have varying degrees of toxicity both to insects and to mammals. In the present study, olit of 53 liquid samples that were analysed, 33 (62.3%) were found to contain parathion,
although only traces in a few cases. This is one of the most toxic insecticides, and can be absorbed through the oral, respiratory and dennal routes (5,6). Hayes (5) has reported cases in which children five to six years of age, have died after having ingested only 2 milligrams of the insecticide, as well as an incident in which children died after bathing in a tub in a house that had

Advice received	Samples for which advice was given	Samples by type of insecticide			
		P	M	P+M	Unknown
Can be stored anywhere	24	16	0	2	6
Apply in closed rooms avoiding contamination of food and drink	12	9	0	2	1
Avoid contamination of utensils	12	7	0	0	5
Can be applied to hair but is very dangerous	15	8	5	1	1
Can be applied to hair but is dangerous if contaminates food	6	1	3	0	2

Note: P= parathion, M= malathion, Unknown= organophosphate other than parathion or malathion.

TABLE 2: Insecticides Identified by Analysis of Liquid Samples (N=55) Insecticide No. of Samples

Insectocide	No of Samples	Percentage of Total
Parathion	33	60.00
Malathion	10	18.18
Parathion		
+		
Malation	3	5.45
Unknown	9	16.36

TABLE 3: Results of Quantitative Analysis of Parathion Samples

No of samples	Concentration Range 10ml.
2	Trace
3	0.04 to 0.05 mg
3	0.10 to 0.56 mg
2	1.00 to 1.60 mg.

Note: Trace refers to concentrations below the range of quantitative determination by the method used.

previously been sprayed with parathion. In another instance reported by this author, people were poisoned as a result of using parathion for controlling lice.

It is known that the toxicity of organophosphorus insecticides is increased by the presence of certain impurities and that such impurities can arise during production, storage or formulation (7). The presence and proportion of isomalathion as an impurity in malathion, for example, affects considerably the toxicity level of that insecticide. It is therefore necessary to monitor the source of such products, to determine their quality upon importation and to ensure that they are properly stored and distributed to users.

In the present study, it is noteworthy that the directions given by vendors about the storage and application of the insecticides sold were, in all cases, totally misleading and quite contrary to usually prescribed precautionary measures. For example, it is alarming that advice was given about parathion stating that it could be stored anywhere and could be applied to the hair. No less frightening is the fact that vendors advised buyers to apply the insecticide in a closed room without warning them about the dangers of inhaling it or having it come in contact with the skin. In view of the foregoing considerations, it can only be concluded that the practice of laymen selling unlabelled insecticides and giving erroneous and misleading advice to the public is hazardous, to say the least, and should be prohibited. According to the World Health Organization (WHO) (6), hazard "expresses the probability that a compound will cause poisoning under the particular conditions of its application". WHO (7) strongly recommends legislative control of importation, repackaging, distribution and use of insecticides and other toxic and environmentally damaging substances.

Aknowledgements

The authors wish to acknowledge the finnancial and material support provided by the Central Laboratory and Research Institute for the study reported in the paper.

REFERENCES

1. Averell, P .R., and M. V. Norris. 1948. Estimation of small amounts of O,o-diethyl o-(P-nitrophenyl)
thio-phosphate.AnaL Chem. 20:753-756.
2. Sutherland, G.L. 1964. Malathion, In Analytical Methods for Pesticides, Plant Growth Regulators,
and Food Additives. Vol. 11 (ed. G. Zweig.) New York:Academic Press. pp. 289-292.
3. Norris M. V., W .A. Vial, and P .R. Averell. 1954. Colorimetric estimation of malathion residues.
J. Agr. Food Chem. 2:570-573.
4. Norris, M.V., E.W. Easter, L.T. Fuller and E.T. Kurchar. 1958. Colorimetric estimation of malathion residues in animal products. J. Agr. Food Chem. 6: 111-114.
5. Hayes, W J .1963. Clini(ial Handbook on Economic Poisons: Emergency Information on Treating
Poisoning. Washington, D.C.: U.S. Dept. of Health Education and Welfare. Public Health Service.
6. World Health Organization. 1967. Safe Use of Pesticides in Public Health. Technical Report Series No.356.Geneva: WHO.
7. World Health Organization 1979. Safe Use of Pesticides. Technical Report Series No.634. Geneva:WHO.