Bull. Environ. Contam. Toxicol. (1985) 35:65–67

Bulletin of Environmental Contamination and Toxicology

Organochlorine Residue Levels in Human Milk from Baghdad

Muthanna A. Al-Omar, Samira J. Tawfiq, and Nehla Al-Ogaily

Biological Research Center, Jadiriah, P.O. Box 2371, Baghdad, Iraq

The new trends in both agricultural practice and public health programs were shifted to non-persistent pesticides, yet the environmental pollution with persistent chlorinated hydrocarbon insecticides still recieve a major concern due to the presence of their residues in the environment and human body(Klein 1976).Most investigations in the field of biological monitoring of human body burden of persistent lipophilic pollutents are based on methods using adipose tissues or human milk(Jensen 1983), several studies have been done in this field, in different countries, but no previous work was established in Iraq.

The purpose of the present work is to investigate the degree of human contamination, in Baghdad, with organochlorine insecticides that have been used for several years before they were banned, as a continuation of the Iraqi National Pesticide Monitoring Program proposed by the Biological Research Centre-Baghdad in 1981.

MATERIALS AND METHODS

Fifty lactating women, in two maternity hospitals in Baghdad were the subject of this study, all were perminantly resident in Baghdad, 37 of them were housewives and none of the other 13 mothers was occupationally exposed to pesticides, 28 of them considered as younger women(age up to 30 years) the other 22 were considered as older women(age ranging from 31-45 years).Milk samples were collected from each donor by manual expression during the period June1983 -June 1984, in a chemically clean tubes and taken for analysis immediatly.

Analytical standards for chlorinated pesticides were obtained from Supelco Inc.(Supelco S.A.).All solvents were glass redistilled prior to use and tested by EC-GLC. Florisil was supplied by Merck (Merck Darmstadt, W.Germany) activated and stored according to the procedure described in the " Analysis of Pesticide Residues in Human and Environmental Samples"(U.S. Environmental Protection Agency 1980).

Each milk sample was extracted and cleaned up according to"Micro-method for the determination of chlorinated pesticides in human or

animal tissue and human milk" (U.S.Environmental Protection Agency 1980). Residues were detected by electron capture gas chromatography using a Pye-Unicam GCV instrument (Pye-Unicam, Cambridge, England), on a 1.5M x 4 mm i.d. glass column packed with 1.5% OV-17 + 1.95% OV-210 on Chromosorb W HP(100-120 mesh)(Chrompack, Holland), carrier gas was argon/methane mixture (90:10) at a flow rate of 30 ml/min. Results were confirmed by injection into a 10% DC-200 on Gas Chrom Q (80-100 mesh)(Chrompack, Holland) glass column, Further confirmation was carried out by TLC using silica gel and $AgNO_3$ spray for detection.

Recoveries from a fortified cow's milk sample at a 1ppm each level were in the range of 75-88% on this method.

RESULTS AND DISCUSSION

Table-1 shows the average levels of organochlorine insecticide residues detected in human milk samples, expressed on the basis of whole milk, they are residues of α-BHC, γ-BHC, aldrin, dieldrin, cis- and trans- chlordane, p,p'-DDE, o,p'-DDT, p,p'-DDT and p,p'-DDD.

Table-1: Organochlorine Residue Levels in Human Milk Samples.

Insecticide residues	Residue level in ppm(whole milk)		% of
	Maximum	Average	occurrence
α -BHC	0.125	0.020	98
β -BHC	0.117	0.021	84
γ -BHC	0.331	0.032	86
Aldrin	0.114	0.017	68
Dieldrin	0.809	0.030	66
cis-Chlordane	0.536	0.078	80
trans-Chlordane	0.482	0.034	68
p,p'-DDE	0.183	0.068	100
o,p'-DDT	0.166	0.032	76
p,p'-DDT	0.116	0.022	54
p,p'-DDD	0.256	0.023	42

All samples contained some insecticide residues, the highest average level detected is that of cis-chlordane(0.078 ppm) and p,p'-DDE (0.068 ppm) the latter being the most dominant residue that appeared in all samples examined, a fact mentioned also by Jensen (1983).

Miyazaki et al(1980) identified oxychlordane in human milk samples collected in Tokyo area, this mammalian metabolite which has also been previously reported by many other workers (Schwemmer et al 1970) and (Tashiro and Matsumura 1977) could not be detected quntitatively in this work since no distinct peak for this compound appeared on both columns.

Extreme values were noticed occasionally and considered as the maximum residue level detected(Table-1) among which dieldrin shows

the highest value (0.809 ppm) and aldrin was the lowest(0.114).

Remarkable differences in the residue levels with respect to age was also observed, younger women(under 30 years) showed higher levels as compared with older ones(over 31 years), this fact was mentioned also by Polishuk et al (1977) and Wilson et al (1973).

In general, levels detected in this work seems to be acceptable. Wilson et al (1973), Savage et al (1973), Curley et al (1969), Kodric-Smit et al (1980) and probably many others, found almost the same average concentrations for one or more of these compounds in other countries taking into consideration the basis on which reporting of the results was made.

REFERENCES

Curley A, Kimbrough R(1969)Chlorinated hydrocarbon insecticides in plasma and milk of pregnant and lactating women. Arch Environ Health 18:156-164

Jensen AA (1983) Chemical contaminant in human milk.Res Rev 89 1-128

Klein W (1976)Environmental pollution by insecticides. In: Metcalf RL and McKelvey JJ (ed)The future for insecticides: needs and prospects. John Wiley & Sons,New York

Kodric-Smit M, Smit Z, Olie K (1980) Organochlorine contaminants in human milk from Slavonia province. Pestic Monit J 14 No.1 p 1-2

Miyazaki T, Akiyama K, Kaneko S, Horii S, Yamagishi T (1980) Chlordane residues in human milk. Bull Environ Contam Toxicol 25:518-523

Polishuk Z, Ron M, Wasserman M, Cucos S, Wasserman D,Lemesch C(1977) Organochlorine compounds in human blood plasma and milk.Pestic Monit J 10:121

Savage EP, Tesari JD, Malberg JW,Wheeler HW, Bagby JR (1973) Organochlorine pesticide residues and polychlorinated biphenyls in human milk,Colorado 1971-1972. Pestic Monit J 7(1):1-5

Schwemmer B, Cochrane WP Polen PB (1970) Oxychlordane,animal metabolite of chlordane:isolation and synthesis.Science 169:1087

Tashiro S, Matsumura F (1977) Metabolic routes of cis- and trans-chlordane in rats.J Agric Food Chem 25:872-880

Wilson JW, Locker DJ, Ritzen CA, Watson JT,Schaffner W (1973) DDT concentrations in human milk. Amer J Dis Child 125:814

U.S. Environmental Protection Agency(1980) Analysis of pesticide residues in human and environmental samples. Watts R (ed) Health Effect Research Laboratory, Environmental Toxicology Division, Research Triangle Park, N.C. section 5,A(2)

Received August 10,1984, accepted August 29, 1984.