

ORGANOCHLORINE PESTICIDES IN BREAST MILK

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Abstract

Organochlorine pesticides are highly lipophilic and stable resulting both in their persistence in the environment and their tendency to pass up the food chain. Residues of these compounds are detectable in breast milk and have been monitored since the 1950s. Exposure data to organochlorine pesticides (OCPs) of mothers' breast milk samples were measured in different locations in Tirana and mothers have completed questionnaires about their diet. Milk samples were collected from mothers aged 18-40 years mothers involved in the study were nursing either their first or second child. The samples are taken at random. There are set 21 organochlorine pesticides including: dieldrin, aldrin, endrin, lindan, chlordane, heptachlor, DDT, HCH, - HCH, - HCH, BCH, Heptachlor epoxide, op-DDE, Endosulphan, pp-DDE, op-DDT, pp-DDD, pp-DDT, -Endosulphan, Captane, Methoxychlor, Mirex. In this work, are detected PCB 36.84%, lindan 31.5%, HCH31.5%, Heptachlor15.78%, Endosulphan 15.78%, endrin 10.52%, dieldrin 10.52%. The samples have been examiated by the methods of FAO, with gaschromatography ECD detector, and the results are frequently used to assess degradation in the environment as well as risks to recipient infants. The measurements have been calculated in µg/kg levels. As a food, breast milk is unique. It is manufactured entirely for an individual consumer with some of its constituents driven by its recipient. It can form the sole source of nutrition for a considerable period of an infant's life.

Keywords : pesticides, organochlorine, breast milk.

Introduction

Organochlorine pesticides are chlorinated hydrocarbons which are widely used in agriculture since 1940 and for mosquito control. Organochloride pesticides term (OCP), refers to a wide range of organic chemicals that contain chlorine and sometimes some other elements. Characteristic for these compounds was sustainability. Some organochlorine are volatile and some may be contained in the ground or in the air particles. This feature is already widely recognized as a problem, because the chemicals can be distributed in the environment, which remain long after their use. They degrade slowly and as being soluble in fat, accumulate in the food chain ending up in our body fat. The use of pesticides became very important as an effort to control the damage of crops and also for a high quality product and to feed growing populations. Unfortunately, the use of pesticides is abused. The environment is contaminated with pesticides, because of their massive use in agriculture and public health sectors. People, as part of the food chain, are constantly exposed through consumption of these fish products, meat and vegetables. There is a strong correlation in women between concentrations of organochlorine pesticides and their adipose tissue in late pregnancy and fatty parts of their milk. Infants can be exposed through breast milk and may expose the fetus through the placenta in the uterus. Organochlorine pesticides were found in samples of human milk worldwide, in both rural and urban areas and in countries at all stages of development. Breast milk contains lipid soluble compounds that are present in maternal adipose tissue. Organochlorine pesticide contamination in breast milk are a major concern for the health of the neonate. Organochlorine pesticides pose numerous health risks. At high levels, they are toxic to the nervous system, resulting and other signs of acute poisoning. Organochlorine pesticides are widely distributed, which pollute the environment continuously (Kind et al., 2001, Smith, 1999).

Materials and method

Samples were taken at the QSUT (Hospital University Center "Mother Teresa", Tirana) in the pediatric hospital, at random. Sampling is done to those mothers who were four weeks after childbirth. Mothers had their first child or their second and the age varies 18-40 years (FAO, 1992).

Reagents

Acetonitrile high purity for use in Gas chromatograph.

Aluminium oxide is washed with alcohol and Hexan.

Petroleum ether 40-60 ° C

Diethyl Ether

Sodium sulfate anhydrous

Saturated sodium chloride solution

Florisil activate by heating at 130 ° C for 5 hours.

The extraction method

Extraction

Samples were taken after stored in the refrigerator and are extracted within 7 days (long enough before denatured milk). Once the weight of the sample was taken, samples are mixed in the blender with acetonitrile, distilled water, aluminum oxide, as fat adsorbs on aluminum oxide and fat soluble pesticides pass in acetonitrile. Then filter supernatant. The filtrate elute twice with petroleum ether and distilled water. Drain extract with anhydrous sodium sulphate. The total eluate passes on rotavapor until a certain amount.

Preparation of the Florisil column

Microcolumn is prepared by placing a glass wool and adding 4cm Florisil, wet florisil with petroleum ether. Add all of the sample concentrate using petroleum ether to rinse, than add 15% diethyl ether in petroleum ether. The eluate passes on concentrator and concentrate on a steam bath. Inject 2µL of each sample into a gas chromatograph. (Bercher et al. 1995).

Analysis on GC

ECD Dedector temperature 350°C

RTX 5 column (30mX0.5mm) temperature 240°C

Split speed 19m / s

Make up gas ,N₂with a flow of 4.4 psi

He with a flow of 5.6 psi

The amount of sample injected 2µl

Time's run 34.16min

Concentrations of calibration curves were constructed for 0.05µg/ml levels, 0.1 µg / ml, 0.2 µg / ml, 0.3 µg / ml, 0.4 µg / ml. According to the Regulation of the European Committee the

LODs of organochlorine pesticides in breast milk are at 10µg/kg. Are analyzed 21 organochlorine pesticides, including: Dieldrin, Aldrin, Endrin, Lindane, chlordane, heptachlor, DDT, -HCH, HCH, -HCH, BCH, Heptachlorepoxyid, op-DDE, endosulphan, PP-DDE, op-DDT, pp-DDD, pp-DDT, -endosulphan, captane, Methoxychlor, Mirex. Samples were analyzed based on method suggested by FAO, by gas chromatograph 3400CX VARIAN, ECD detector. The injection was carried out manually (Tutu, 2011). Results are used to assess environmental degradation and hazards to infants.

Results and discussion

The measurements were performed on 19 samples in percentage by: lindan31.5%, HCH31.5%, Heptachlor15.78%, 15.78% endosulphan, endrin 10.52%, 10.52% Dieldrin. Data obtained from tests performed are presented in Table 1. Figure 2 gives the amount of organochlorine pesticides in samples of breast milk of mothers. In most samples organochlorine pesticides were not detected or their levels were below the limit of detection apparatus. The most contaminated sample was M18 and found that levels come of captane pesticides. In other sample with highest levels come from the presence of lindane and other HCH states. Figure 3 shows the profile of organochlorine pesticides in samples of breast milk. Note that their profile is built from Captane, Lindane, HCH's, HCB and DDT's. This is because the previous uses of pesticides and use of foods that are contaminated .

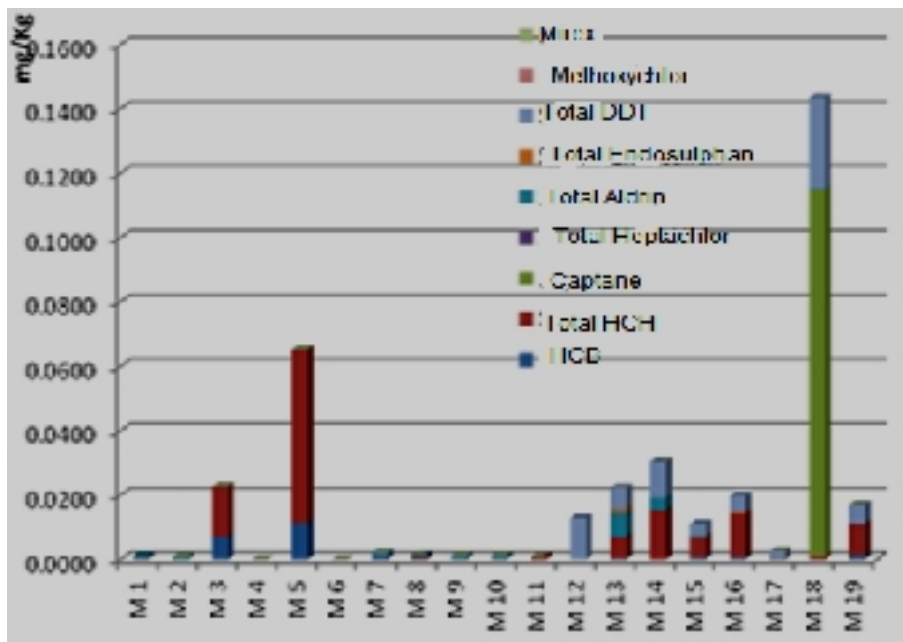


Figure 2. The amount of organochlorine pesticides in samples of breast milk

Table 1 (a) levels of measured concentrations

	HCB µg/Kg	Total HCH µg/Kg	Captane µg/Kg	Total Heptachlor µg/Kg	Total Aldrin µg/Kg
M 1	0.1	0.2	<LOD	<LOD	0.6
M 2	0.1	<LOD	<LOD	<LOD	0.6
M 3	7	15.8	<LOD	<LOD	<LOD
M 4	<LOD	<LOD	<LOD	<LOD	<LOD
M 5	11.4	53.9	<LOD	<LOD	<LOD
M 6	<LOD	<LOD	<LOD	<LOD	<LOD
M 7	0.3	<LOD	<LOD	0.5	1.2
M 8	0.1	0.6	<LOD	0.4	0.5
M 9	<LOD	0.1	<LOD	<LOD	0.9
M 10	<LOD	0.1	<LOD	<LOD	0.9
M 11	<LOD	0.7	<LOD	<LOD	<LOD
M 12	<LOD	<LOD	<LOD	<LOD	<LOD
M 13	0.3	6.5	<LOD	0.2	7.6
M 14	<LOD	15.5	<LOD	<LOD	3.7
M 15	0.7	5.9	<LOD	<LOD	0.7
M 16	0.7	13.5	<LOD	<LOD	<LOD
M 17	<LOD	0.2	<LOD	<LOD	0.1
M 18	<LOD	1	11.4	<LOD	0.2
M 19	1.2	9.9	<LOD	<LOD	<LOD

Tabela 1(b) levels of measured concentrations

	Total Endosulph an µg/Kg	Total DDT µg/Kg	Metoxychlor µg/Kg	Mirex µg/Kg
M 1	<LOD	<LOD	<LOD	<LOD
M 2	<LOD	<LOD	<LOD	<LOD
M 3	<LOD	<LOD	<LOD	<LOD
M 4	<LOD	<LOD	<LOD	<LOD
M 5	<LOD	<LOD	<LOD	<LOD

M 6	<LOD	<LOD	<LOD	<LOD
M 7	<LOD	0.2	<LOD	<LOD
M 8	<LOD	<LOD	<LOD	<LOD
M 9	<LOD	0.2	<LOD	<LOD
M 10	<LOD	0.2	<LOD	<LOD
M 11	<LOD	<LOD	<LOD	<LOD
M 12	<LOD	12.9	<LOD	<LOD
M 13	1.3	6.3	<LOD	<LOD
M 14	<LOD	11.2	<LOD	<LOD
M 15	0.2	3.5	<LOD	<LOD
M 16	0.8	4.7	<LOD	<LOD
M 17	<LOD	2.4	<LOD	<LOD
M 18	<LOD	28.2	<LOD	<LOD
M 19	<LOD	5.8	<LOD	<LOD

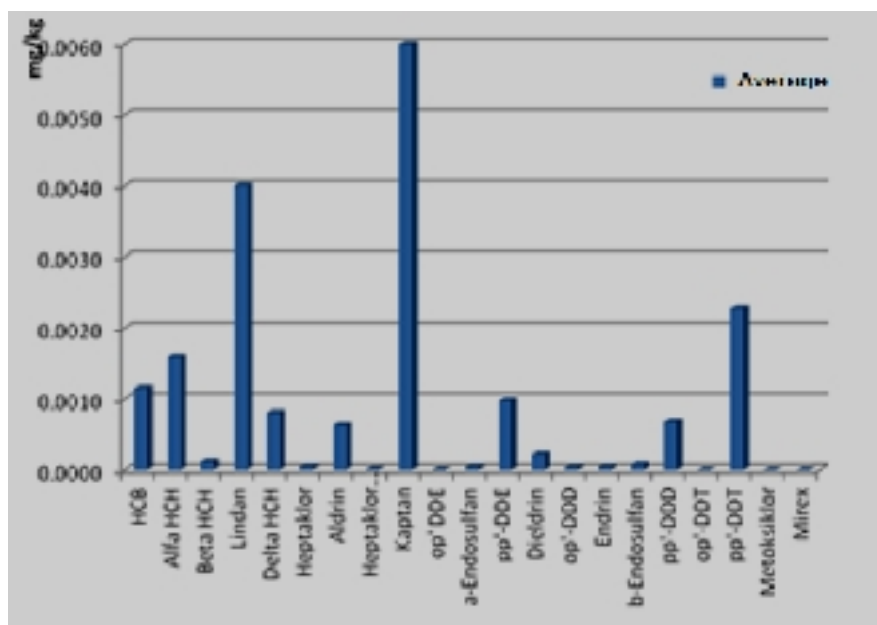


Figure.3.Profile of organochlorine pesticides in samples of breast milk

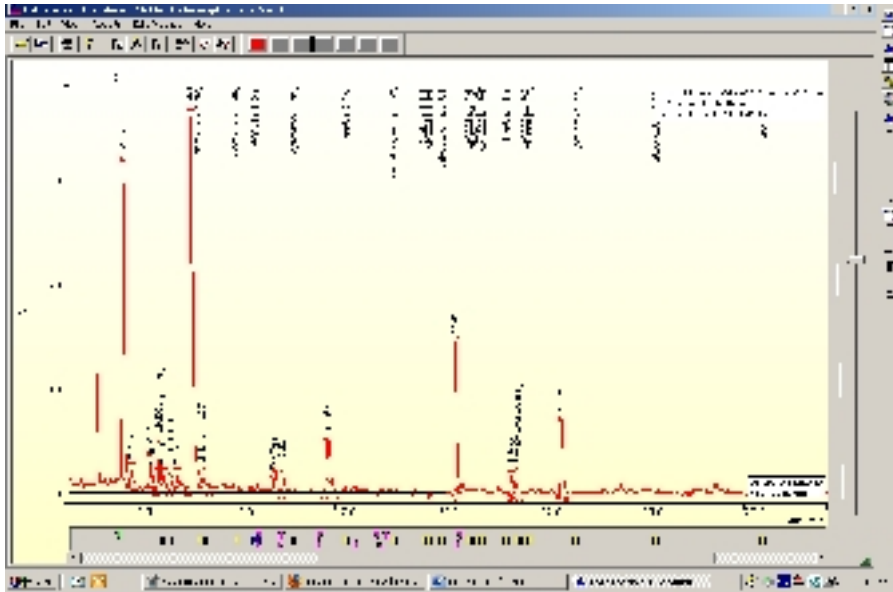


Figure 4. Submission of chromatogram of one sample.

Recommendations

Contamination of breast milk is an important indicator for future potential public health and environmental problems.

Is very important in food consumption to select products with low content of fat or fat-free, because these accumulate in the fat component.

Children are at greater risk from exposure to pesticides because of their small size, relative to their size, children eat, drink, and breathe more than adults. Bodies and organs. are growing rapidly, which makes more susceptible, in fact, children exposed to pesticides may be eventual while in the womb. Bio-health checks are important to women during breast-milk.

Conclusions

Our study clearly shows that breast milk is a road, a contamination source for breastfeeding. Most of the samples contained lindane, HCH, endosulphan. Other pesticides and their derivatives were also found. The concentration of organochlorine molecules in milk mainly depends on the accumulation of fatty tissue in the mother and their subsequent mobilization. Reports on infant exposure to environmental contaminants through breast milk have questioned the safety of breastfeeding. Every living thing can be equally exposed contaminated by pesticides. The good news is that there has been a long way in reducing harmful chemicals in the environment, and therefore, in breast milk. PCBs, DDT and metabolites dioxin levels have declined in recent years in many countries. But many of these chemicals, called persistent organic pollutants, persist in our environment and in breast milk. Other chemicals are not as resistant, but people are exposed to them enough that they can be a concern in breast milk. Each level of chemicals in breast milk is a potential concern for the health of mother and child.

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