RISK ASSESSMENT FOR HEALTH OF PESTICIDES FROM FOOD IN ROMANIA, 2002

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ABSTRACT

The intensive pollution of environment as well as the synthesized of new chemical substance which are introduced on the market, drive to the chemical pollution of food, so that some chemical substances can be toxic, mutagenic or carcinogenic having the negative effects upon human health. The aim of the present study was to investigate the variation of organochlorine pesticide residues in some foods on Eastern Romania area in 2002 period. The organochlorine pesticide residues were analyzed using gas chromatography method. DDT-total and HCH-total were determined in milk, meat, fish, vegetables, daily diets sampled on Eastern Romania area. The pesticide residues were found in all analyzed samples. Generally, a wide variation between individual samples was observed. The mean residues levels of HCH-total varied between 144.2 ?g/kg (vegetables) and 824.3 ?g/kg (meat products). DDT-total varied between 108.2 ?g/kg (vegetables) and 759,7 ?g/kg (meat products). The results obtained emphasized that the organochlorine pesticide residues are present in all analyzed foods.

INTRODUCTION

The concern about environmental contamination by persistent organochlorine pesticides used both in agriculture and vector control has led many countries to investigate the magnitude of their own environmental pollution. Pesticides play an important role in agriculture as well as in pest control. In view of adverse health effects frequently inadequate pesticide application such as poor health protection or excessive dosage is responsable. In addition, health effects are also reported in cases of indoor low-dose pesticide applications carried out under correct safety conditions.

Even since humans have become aware that health is inseparably liked to an impact and healthy environment, the control and reduction of pollution have become the focus of worldwide concern. For instance, numerous human activities represent possible sources of pollution: industrial processes, transportation industrial and municipal waste disposal and incineration and waster water treatment.

Investigations on possible health and environmental hazards involved have led many industrial countries to restrict or bon the use of these chemicals (pesticides, and others) and enforce the tolerance levels for the residues in food and human body.

The authors present the research results obtained in 2001 -2002 period of some chemical pollutants with cancer risk (organochlorine pesticides residues) in some food from Eastern Romania area.

MATERIALS AND METHOD

In 2002 period were analyzed the organochlorine pesticide residues in foods from Eastern Romania area.
Organochlorine pesticide residues: DDT total [(op+pp') DDE, DDD, DDT] and HCH total (alpha, gamma, beta, delta) were analyzed used gas-chromatographic method.
A HP/ GC-ECD was equipped with column (680 HP). Injector and detector temperatures were 240ºC and 325ºC respectively. Column temperature was 200 ºC. One µl was injected. Carrier gas was nitrogen (pressure in column = 1.8 at).
Food analyzed were: meat products – salami, dairy products – milk, cheese, cream, vegetables – lettuce, carrot, potatoes, cabbage and fruits - apples

RESULTS

Organochlorine pesticides residues were found present in all analyzed samples. Generally, a wide variation between individual samples was observed. The results were examined in relation to differences in living conditions with regard to agricultural activities, dietary habits and reported use of pesticides in the various sampling areas.
The mean levels of organochlorine pesticide residues in food in Eastern Romania area are present in Table 1, Table 2, Table 3, Table 4.

Table 1 presents the mean levels of organochlorine pesticide residues in food (meat product, dairy product and vegetables) in Romania area, in 2002. The mean levels of HCH/total varied between 144.2 µg/kg (vegetables) and 824 µg/kg (meat) and the mean levels of DDT-total varied between 108.2 µg/kg (vegetables) and 759.7 µg/kg (meat)

Tabel 1 – The mean organoclorurate pesticide residues in food**,** 2002, µg/kg

Produs	Nr. samples	HCH- total	DDT-total	Total Pesticides
Meat products	**39**	**824.3**	**759.7**	**1584.0**
Dairy products	**30**	**514.8**	**314.1**	**828.9**
Vegetables and fruits	**50**	**144.2**	**108.24**	**252.44**

a. Meat products

Table 2 presents the mean levels of organochlorine pesticide residues in meat products (some assortment of salami). The mean levels of HCH total were 824.3 µg/kg and DDT total were 759.7 µg/kg.

Tabel 2- The mean of the organochloride pesticide residues, **in meat products,** 2002, µg/kg

Product (salami)	Nr. samples	HCH- total	DDT-total	Total Pesticide
Salam de vara	10	902,9	288,7	1191,6
Parizer	10	945,9	1532,7	2478,6
Cârnati casa	10	638,5	603,8	1242,3
Carne tocata	9	810,0	613,5	1423,5
Total meat products	**39**	**824,3**	**759,7**	**1584,0**

The mean levels of isomers of HCH (alfa, beta, gamma, delta) are present in Fig.2. The mean levels of alfa HCH isomer was 429.7µg/kg and the mean levels of beta HCH isomer was 217.6 µg/kg in meat products

Fig.2 – The mean of HCH- total and isomers, in meat products, 2002, µg/kg

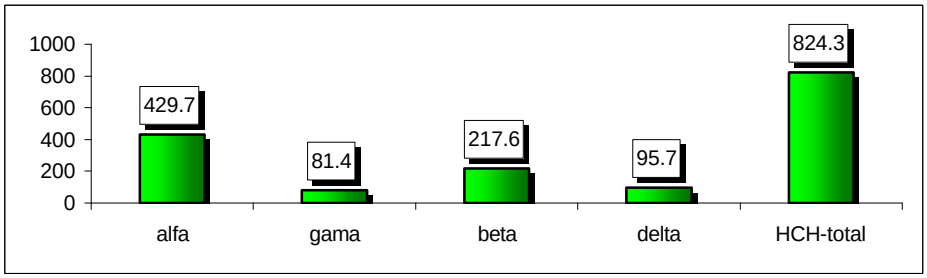
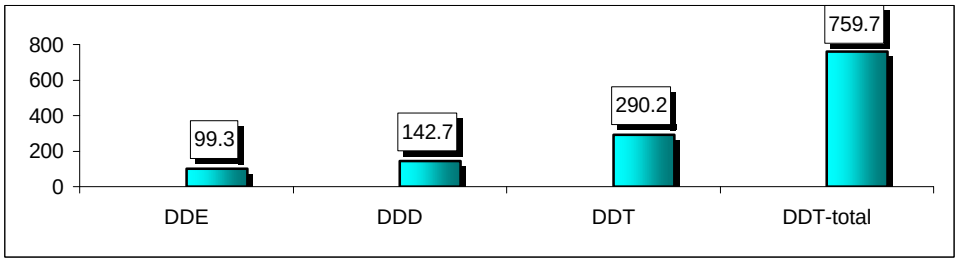


Fig.3 presents the mean levels of the metabolites of DDT: (op+pp)DDE,(op+pp) DDD, (op+pp)DDT, in some assortment of salami analyzed in 2002.The mean levels of (op+pp) DDT metabolites were 290.2 µg/kg and the mean levels of (op+pp) DDD were 142.7 µg/kg in meat products

Fig.3 - The mean of DDT- total and metabolits, in meat products, 2002, µg/kg



b. Dairy products

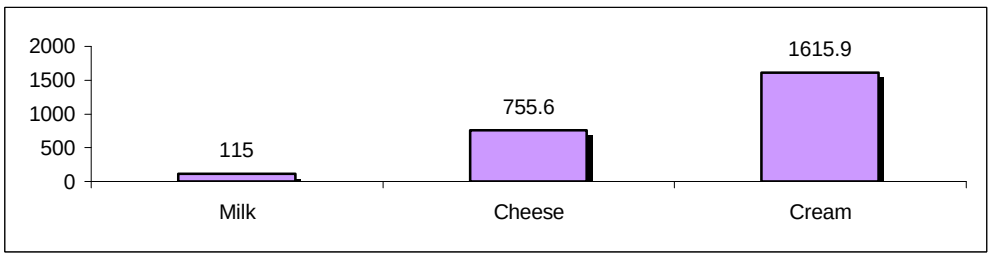
Table 3 presents the mean levels of organochlorine pesticide residues in dairy products (milk, cream, cheese). The mean levels of HCH total were 514.8 µg/kg and DDT total were 314.1 µg/kg.

Tabel 3 - The mean of the organochloride pesticide residues, in dairy products, 2002, µg/kg

Product	Nr. samples	HCH-total	DDT-total	Total Pesticides
Milk	10	67,2	47,8	115,0
Cream	10	936,6	679,3	1615,9
Cheese	10	540,5	215,1	755,6
Total dairy products	**30**	**514,8**	**314,1**	**828,9**

The high mean levels of the pesticide residues were in the cream samples (1615.9 µg/kg) and the low mean levels were in the milk samples (115 µg/kg), Fig. 4.

Fig.4 - The mean of total organochloride pesticide residues, in dairy products, 2002, µg/kg



The mean levels of isomers of HCH (alfa, beta, gamma, delta) are present in Fig.5. The mean levels of alfa HCH isomer was 196.8 µg/kg and the mean levels of beta HCH isomer was 154.1 µg/kg in dairy products

Fig.5 – The mean of the HCH-total and izomers, in dairy products, 2002, µg/kg

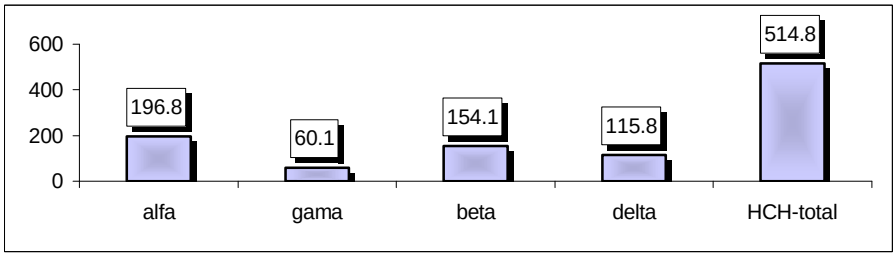
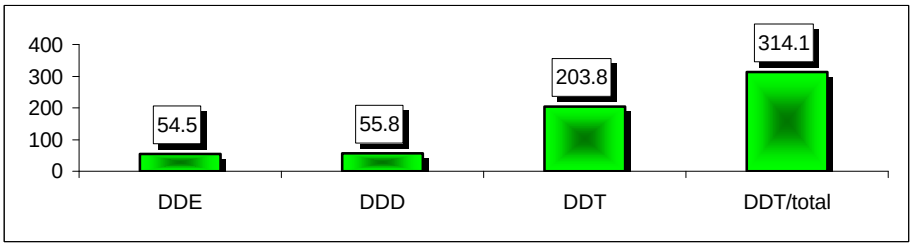


Fig.6 presents the mean levels of the metabolites of DDT: (op+pp)DDE,(op+pp)DDD, (op+pp)DDT, in some assortment of dairy products analyzed in 2002.The mean levels of (op+pp) DDT metabolites were 203.8 µg/kg and the mean levels of (op+pp) DDD and (op+pp)DDE) were 55.8 µg/kg and 54.5 µg/kg respectively in dairy products.

Fig.6 – The mean of the DDT-total and metabolits, in dairy products, 2002, µg/kg



c. Vegetables and fruits

Table 4 presents the mean levels of organochlorine pesticide residues in vegetables and fruits. The mean of HCH total and DDT total residues varied between 120.4 µg/kg (potatoes) and 169.8 µg/kg (carrot) for HCH total and 92,8 µg/kg (carrot) and 197.8 µg/kg (potatoes) for DDT total. In the apple the mean residues of HCH total were 148.5 µg/kg and DDT total were 32.1 µg/kg, Fig.7.

Tabel 4 - The mean of the organochloride pesticide residues in **vegetables**, 2002, µg/kg

Product	Nr. samples	Total HCH	Total DDT	Total Pesticide
Lettuce	10	123,4	114,6	238,0
Carrot	10	169,8	92,8	262,6
Potatoes	10	120,4	**197,8**	**318,2**
Cabbage	10	158,9	103,9	262,8
Apple	10	148,5	32,1	180,6
Total vegetables	**50**	**144,2**	**108,24**	**252,44**

The mean levels of isomers of HCH (alfa, beta, gamma, delta) in vegetables are present in Fig.8. The mean levels of alfa HCH isomer were 87.0 µg/kg and the mean levels of beta HCH isomer were 37.1 µg/kg in vegetables and fruits.

Fig.7 -The mean of the organochloride pesticide residues, in **vegetables**, 2002, µg/kg

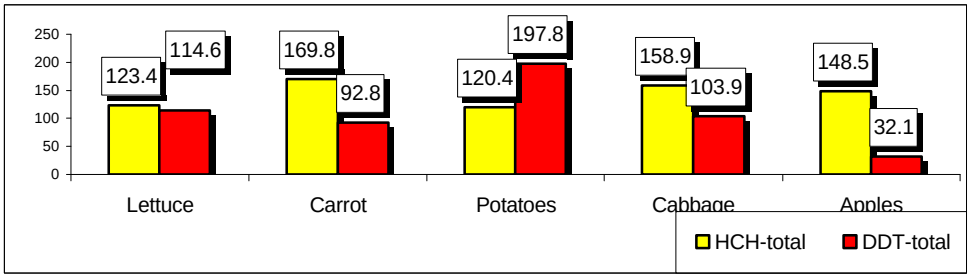


Fig.8 - The mean of HCH - total and izomers, in **vegetables**, 2002, µg/kg

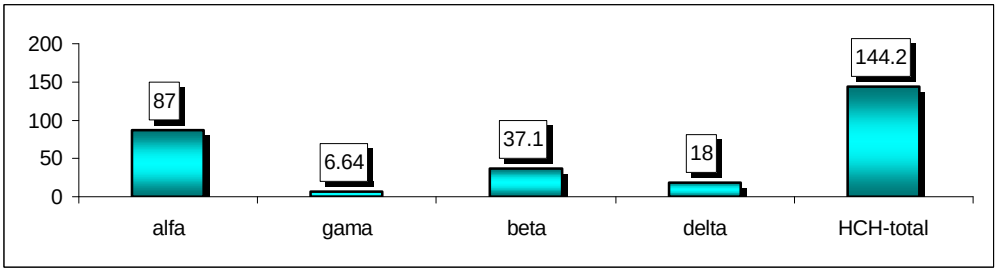
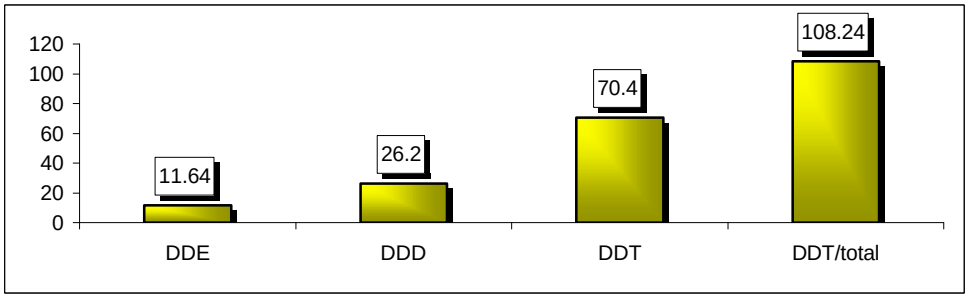


Fig.9 presents the mean levels of the metabolites of DDT: (op+pp)DDE,(op+pp) DDD, (op+pp)DDT, in some assortment of vegetables and fruits. The mean levels of (op+pp) DDT metabolites were 70.4 µg/kg and the mean levels of (op+pp) DDD and (op+pp)DDE) were 26.2 µg/kg and 11.64 µg/kg respectively in vegetables.

Fig.9 – The mean of the DDT-total and metabolits, in **vegetables**, 2002, µg/kg



CONCLUSIONS

1. The results gives emphasis that the organochlorine pesticide residues are present in all food analyzed.
2. The presence of these pollutants in food required to continue the analyzed of these in the aim respected MAL and the reduction their presence in food.
3. The determinations of the chemical pollutants in food are important in environmental monitoring for the prevention, control and reduction of pollution as well as for occupational health, legal decisions and epidemiological studies.

REFERENCES

1. C. HURA, Chemical contaminants in food and human body (in English), Ed. CERMI, Iasi, Romania (2002).
2. C. HURA, Chemical contaminants in Romania, 2001, Ed. CERMI, Iasi, Romania (2002).
3. C. HURA, Chemical contaminants in Romania, 2002, Ed. CERMI, Iasi, Romania (2003).
4. OMS, Recommandation pour l'etudes de quantites de contaminants chimique apportees par l'alimentation. (1996)