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DETERMINATION OF ORGANOCHLORINE PESTICIDES RESIDUES FROM LARD

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Abstract: The determination of residues of organochlorine pesticides from lard was done with a gas chromatograph, with electron capture detection. The permitted maximum level was surpassed for a single organochlorine compound.

INTRODUCTION

The synthetic organic pesticide have toxic action not only on pests and diseases, but also on useful animals and insects; there is also the risk that man itself to be affected, due to the toxic residues ingested with food. The organochlorine pesticides interact with coenzymes, disturb the protein synthesis, and inhibit the nucleotides synthesis; studies concerning the pesticides toxicology showed that they can have mutagenic effects because of their ability to induce transformations in genetic code, somatic cells and sexual cells. Numerous researches enlighten the fact that these pesticides, especially DDT and its metabolites, have the capacity to pass through the placenta. It has been appreciated that the pesticides present a toxic action on gonads more powerful than carbamates and organophosphoric compounds. The influence on gonads can be both direct and indirect, through changes induced in sexual hormones metabolism.

MATERIAL AND METHODS

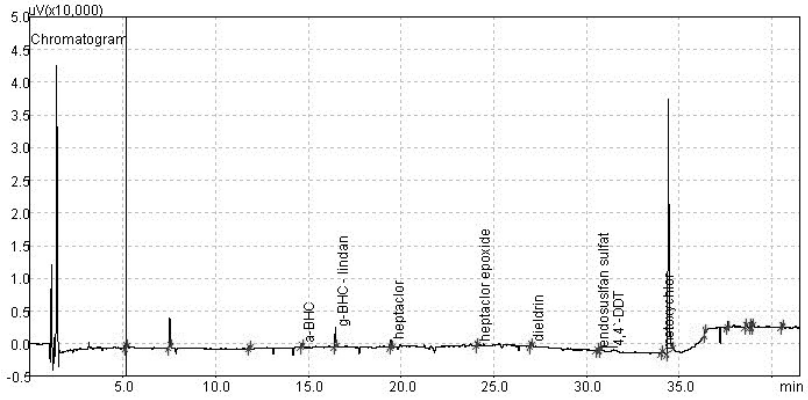
The experimental work was done on fat material: lard for household use. In order to determine the organochlorine pesticides, were used: a GC-2010 gas chromatograph equipement with an electron capture detection ECD and a RESTEK model capillary chromatographic column (phase RTx-5, with 0,4 µm thick film layer, 20 m length and inside diameter of 01,8 mm). The sample pesticides were extracted with a mixture acetonitrile: ethylene chloride then partitioned with acetonitrile: petrol ether, purified on a florisile column; the eluted solution was concentrated in a rotary device and then followed the actual determination.

Three elution systems were used (A,B,C).

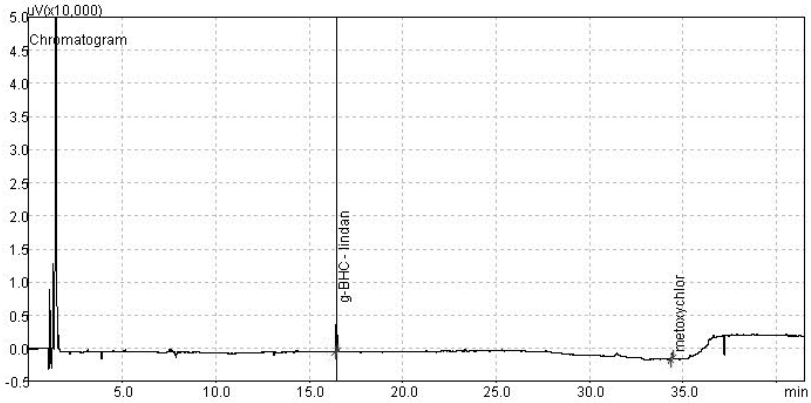
The working standard solution contain 20 compounds.

RESULTS AND DISCUSSIONS

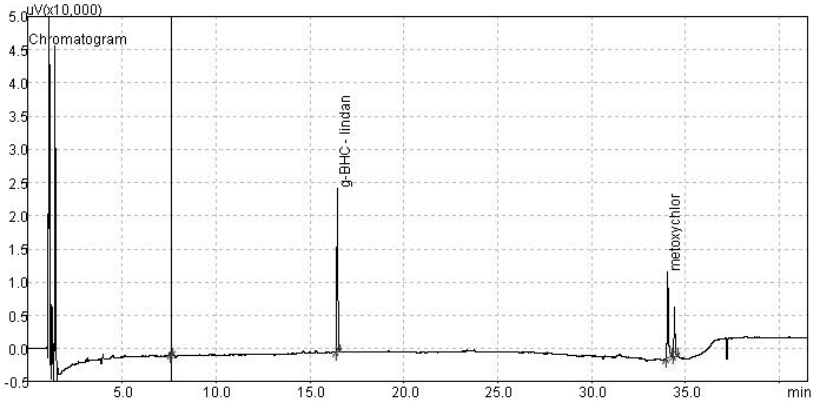
As shown in Table 1, 8 organochlorine compounds were identified: a-BHC, gBHC-lindane, Heptachlor, Heptachlor epoxide, Dieldrin, 4,4- DDT, Endosulfane sulphate, methoxychlor. There has been observed a very good reproducibility of retention times in all three elution systems. The maximum permitted limit was overrun only for methoxychlor (0,149 ppm compared to 0,01 ppm – the legal Maximum Limit).



Elution system A



Elution system B



Elution system C

Table 1

No crt.	UM	OCL compunds	Elution system A	Elution system B	Elution system C	Sum	MPL
1.	ppm	a BHC	0,0011	0	0	0,0011	0.2
2.	ppm	b BHC	0	0	0	0	
3.	ppm	gBHC- lindan	0,0076	0,0184	0,0659	0,0929	1
4.	ppm	d BHC	0	0	0	0	
5.	ppm	Heptaclor	0,0036	0	0	0,0036	0.2
6.	ppm	Aldrin	0	0	0	0	
7.	ppm	Heptaclor epoxide	0,0011	0	0	0,0011	0.2
8.	ppm	g clordan	0	0	0	0	
9.	ppm	Endosulfan	0	0	0	0	
10.	ppm	a clordane	0	0	0	0	
11.	ppm	4,4- DDE	0	0	0	0	
12.	ppm	Dieldrin	0,0011	0	0	0,0011	0.2
13.	ppm	Endrin	0	0	0	0	
14.	ppm	4,4 DDD	0	0	0	0	
15.	ppm	Endosulfan II	0	0	0	0	
16.	ppm	4,4- DDT	0,0017	0	0	0,0017	1
17.	ppm	Endrin aldehyde	0	0	0	0	
18.	ppm	Endrin ketone	0	0	0	0	
19	ppm	Endosulfan sulfat	0,0014	0	0	0,0014	0.1
20.	ppm	metoxychlor	0,0031	0,0060	0,143	0,149	0.01

CONCLUSIONS

- It has been achieved a very efficient system for extraction and purification of pesticides, allowing to be quantitatively identified;
- *a-BHC, Heptachlor, Heptachlor epoxide, Dieldrin, 4,4- DDT* and *Endosulfane sulphate* compounds were determined only in the elution system A;
- *g-BHC- lindane* and *methxychlor* compounds were determined in all three elution systems;
- for the method were determined several quality parameters: repeatability and reproducibility, both for Retention Time and for quantitative values;

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