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Monitoring of Chloro-Organic Compounds Residues with Analytical Methods at Parks of Bees in Albania

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Abstract: Bees and honeybee products can be contaminated from different sources. The contamination can arise from beekeeping practices or from the environment. They are: the heavy metals lead, cadmium and mercury, radioactive isotopes, organic pollutants, pesticides (insecticides, fungicides, herbicides and bactericides), pathogenic bacteria and genetically modified organisms. The use of the chloro-organics compunds has began earlier with the pesticide DDT since the years 1930. The presence of the residues of these compounds of synthesis include PCB in all the sectors of the application (industry, agriculture, army and especially in farming on all species up to aquaculture in the same biosphere. The presence of the features of biocumulation in environments as aquatic (sediment, water, invertebrates and vertebrates) has characterized in the following years their limited use in agriculture moreover in open systems. The ability to be acumulated in the fatty tissue at the vertebrates and in the chitinous tissue at the arthropods (including bees) as well as the low speed of degradation of some isomers PCB and metabolites TCDD, DDE, DDD, HCB etc.) characterize the accumulation in the biologic tissues including the chitinous tissue in the concentration of the organisms during the food chain. The signs of the presence of PCB in the presence of the live organisms are numerous. Many sources of literature show the dipendence of the presence of PCB and DDE and some pathological forms before all in the formation of chitina and the rate of reproduction in the bees. The heavy damages are being observed in the parks placed in the vicinity of ex military areas of chemical specialities. These data coincided with the study as well. In the study was taken in consideration taking and analysing of bee samples from the parks near the military areas (they stored and used the chemical substances of the group of chloro-organics in Polican, (Skrapar), Bodar, (Permet) and Linze (Tirane). Researchers were taken for the samples 30 bee per apiary in 10 apiaries for each park altogether 30 samples. The samples were analyzed for the presence of residues of the cholorganics compunds by the means of GC (Gas Chromatography Methods). The results indicated that only the samples taken from the bee parks close to the ex military area of Bodar, Permet apeared trace of the containing of chloro-organics components.

Key words: Chloroorganic compounds, residue, bee, honeybee, GC Methods

INTRODUCTION

Honey and bee products as well as honey wax have the image of being natural, healthy and clean. However, today bee products are produced in an environment, polluted by different sources of contamination. In the recent past, news about contaminated honey has been distributed by the mass media. Such messages will damage the good image of honey. Thus, it is of utmost importance for beekeepers to localize and exclude the different contamination sources. In this research an attempt will be made to cover all major contaminants of bee products. This knowledge should be then transferred to the beekeepers, so that they can produce clean bee products (Kubik *et al*., 1999). A popular study for beekeepers, summarizing the most important contamination issues, without going into details has been published elsewhere (Bogdanov, 2003). There are very few special residue limits for honey making it difficult to discuss the toxicological importance of residues. However, an attempt will be made to evaluate the residue hazards of the different residues.

The main ones are acaricides: lipophylic synthetic compounds and non-toxic substances such as organic acids and components of essential oils and antibiotics used for the control of bee brood diseases, mainly tetracyclines, streptomycine, sulfonamides and chloramphenicol. Other substances used in beekeeping play a minor role: para-dichlorobenzene used for the control of wax moth and chemical repellents. The degree

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of contamination of honey, pollen, beeswax, propolis and royal jelly by the different contaminants is reviewed (Gattavecchia and Celli, 2002).

The most common insecticides that have been examined in European honeys include: Organochlorines (OC) such as lindane and its isomers, Hexachlorocyclohexane (HCH), aldrin, dieldrin, endrin, DDT isomers, heptachlor, heptachlor epoxide, methoxychlor, endosulfan. Many OC are no longer used in agriculture but are still present in the environment (Blasco *et al*., 2003).

MATERIALS AND METHODS

The study was taken in consideration taking and analysing of bee samples from the parks near the military areas (they stored and used the chemical substances of the group of chloro-organics in Polican (Skrapar), Bodar (Permet) and Linze (Tirane). For the samples were taken 30 bees per apiary in 10 apiaries for each park altogether 30 samples. The samples were analyzed for the presence of residues of the cholorganics compunds by the means of GC (Gas Chromatography Methods) (Bonmatin *et al*., 2003).

The problems of contamination with PCB and other chloro-organic derivates are in the first order in the aquatic avifauna dhe before all after the alarming frequentation followed by the risks of stationary and migratory fauna.

In the stationary and migratory fauna the presence of anthropogenetic contaminants from which DDE and PCB. Simple bioisolators are frequent depending on the changes in the field of reproduction, fertility, ovo deposition, growth in mortality rate of the embryo of birds in the 1st day of their life with changes in the biological. In the chlorganic elements which have given a greated level of the residues has resulted the Polychlorinated Biphenyls (PCB) as well as the chlorure derivates of the biphenyles. They are presented with a benzene ring with a connection through by a single connector without atoms of mediate oxygen which are not replaced in the orthoplan position (Fig. 1).

The samples were taken from the parks of three areas in equal numbers with 300 samples from each apiary and from 10 avieries for each park. Taking of samples was made accidentally where the bees after they were taken were sacrificed and then was followed by the process of comminution in mortar. The comminutioned material was assembled and weighted for the three groups of samples and were submitted to the analytic procedure by the means of GC in order to measure the level of chloroorganics in each group of samples (Selami *et al*., 2011).

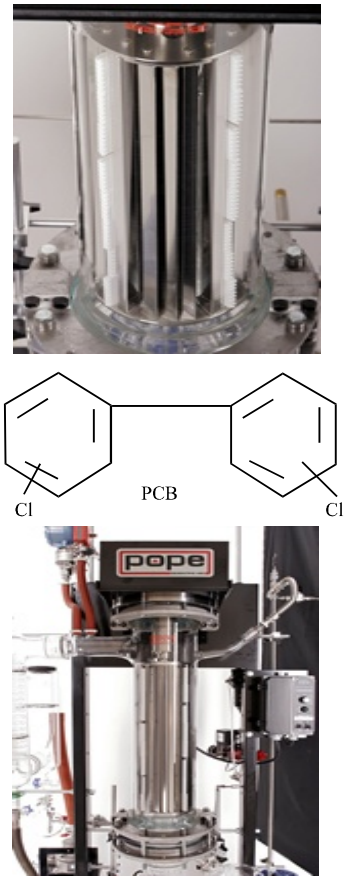

Fig. 1: Presentation of the chemical structure of PCB's and equipment to approach GC/MS

The tests were performed in the lab of Wild Survejance Albania known as reference laboratory as like as Institute of Veterinary and Safety-Food, Tirane, Albania. The basic principle of this method stands on the afflux of the mobile phase under the pressure through the hot tube covered in a stationary liquid stationary phase with a supporter. The samples were placed in the head of the colon where they stay in low temperature. In continuation the temperature is kept constant or is programmed with gradual rising. Each of the colons spreads the mixture relying on the relative length which is spent through its components in the stationary phase. Monitoring the colon's effluent it is transported out with different dedectors.

RESULTS AND DISCUSSION

With regard to the monitored results it results that almost all the samples did not present loads with residues of chloro-organic components. Exception make only the samples taken from the bee parks near the military installation in the region of Bodar and Permet. More

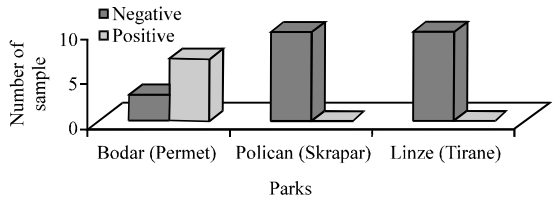

Fig. 2: The comparative presentation of the level of chloro-organic residues in the bee parks

concretely from the 10 samples taken from this area in 7 of them appeared loads with tracks from the chloro-organic components. The data taken in continuance researchers shall represent them with the Fig. 2.

It is thought that the presence of the load of residues with chloro-organic components found with Analytical Toxicology Methods with GC in the bee park near the military installation in Bodar, Permet in level trace comes as a result of a very close distance of the park with the drilling field with the poisonous substances with chororganic basis (Selami *et al*., 2011). Their slow acumulation and biodegradation continues to release chemical loads on the surrounding vegetation and in the region where the park is installed (Salter, 2003).

In the other two regions the absence of residues comes as a reslut of the big distance between the park and the military installation. The distance has been greater that the possibility of taking the chemical loads.

CONCLUSION

The possibility for loads with toxical substances of the group of chloro-organics of the parks and their product is small. Beekeepers can take successfuly measures to prevent the contamination of bee products from beekeeping source as in all cases there are ecological alternatives. A HACCP (Hazard Analysis and Critical Control Point) System for the control of contamination sources should be developed and applied to beekeeping. The present review provides the foundations for the establishment of such a system as it covers all major bee product contaminants. Alternative bee pest control strategies and minimal use of synthetic chemicals in beekeeping can keep bee products clean and safe. The introduction of organic beekeeping is an ecological means to avoid all major contamination sources for the production of high quality bee products, free of toxic contaminants.

The performance of this study strengthens the health security of the parks and above all the food safety of honey. In these circumstances the honey produced at us in addition to the high nutritive, dietetic and medical qualities will have also a safety from the toxic chloro-organic residues. From the prelevations of the samples as a conclusion researchers can say that the honey produced and is being traded in the market as far as concerning the chloro-organic residues is clean from the above residues thus creating opportunities for the interior consuming and premises for its exporting.

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