

ORGANOCHLORINE PESTICIDES AND THEIR RESIDUES IN SOIL SAMPLES OF BELSHI AREA, ALBANIA

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Abstract

Organochlorine pesticides are stable, lipophilic, and toxic compounds, classified as persistent organic pollutants. Pesticides can reach the soil directly or indirectly. Sources of pesticides in soil, apart from their use as fertilizer, pertain to water irrigation practices, soil slope and atmospheric deposits. The aim of this study was to investigate concentrations of organochlorine pesticides and their residues in soil samples of Belshi area, located in Central Albania. This area is known for its agricultural activity which dates back from 1945 when pesticides use for pest control was common.

Soil samples, from twelve different agricultural areas of Belshi, were taken in August 2021. Ultrasonic extraction assisted by hexane/dichloromethane mixture was used for the isolation of organochlorine pollutants from soil samples. The Clean-up procedure was realized in a Florisil column. Qualitative and quantitative analysis of pesticides and polychlorinated biphenyls was realized in Varian 450 GC, a gas chromatograph equipped with a μ -ECD detector, and a capillary column Rtx-5 was used for separating organochlorine pollutants.

Organochlorine pesticides were detected in all analyzed soil samples. The highest level of contamination was found for the M9 station. The differences between stations could be related to plant types, soil slope, the intensity of pesticide use and the physical-chemical properties of pesticides. The distribution of pesticides, especially of beta heptachlor (HCH) and dieldrin was highest in specific areas. Also high levels of lindane and its isomers levels were found in analyzed soil samples followed by endosulfanes, aldrines, heptachlores. Nevertheless, the organochlorine pesticide levels in the Belshi area were comparable to other areas in Albania.

The organochlorine pesticide concentrations in the study area resulted to be moderate/lower than the threshold according to Albanian and EU standards. The level of pesticides in soil is directly related to human health and there is a need for continuous monitoring of its concentration in the soils by the authorities. It is recommended to perform analysis of pesticides and other contaminants in soil samples by GC/MS/MS technique.

Key words: Organochlorine pesticides, Pesticide residues, Soil samples, Belshi area, GC/ECD.