

MONITORING OF PHTHALIC ACID ESTERS IN TWO REGIONS OF THE CZECH REPUBLIC

Monika Siatková – Alžbeta Jarošová – Radka Daňková

Department of Food Technology, Faculty of Agronomy, MENDELU, Zemědělská 1, 613 00 Brno, Czech Republic

1. INTRODUCTION

Phthalates are esters of phthalic acid. They have applications in many industries. They are used as plasticizers for plastics, such as polyvinyl chloride (PVC) (GIMENO et al., 2014). Phthalates can enter the body by inhalation, food intake and absorption through the skin (PAN et al., 2014). Phthalic acid esters are considered dangerous pollutants because of their mutagenicity and carcinogenicity. They are also classified as endocrine disruptors. These substances are ubiquitous in the environment (BARRECA et al., 2014).

3. MATERIAL AND METHODOLOGY

Six samples from the Central Bohemian Region and four samples from the Region Plzeň, which were taken in collaboration with the Central Institute for Supervising and Testing in Agriculture, were analysed within the study. All samples were samples of arable soil. Analysis of samples was carried out in duplicate. The method developed by Jarošová et al. (1999) was used, which is optimized for the needs of analysing soil samples. Frozen samples were thawed and about 10 g of soil was taken from each of them. Subsequently, these 10 g of soil were frozen solid again and then lyophilised, followed by ultrasonic extraction using acetone-hexane mixture (1:1), three times for the period of 5 minutes. The combined extracts were filtered, evaporated on a rotary vacuum evaporator, and dried under nitrogen. The extracts were then transferred into vials using hexane (3 ml). Next, they were purified with a concentrated sulphuric acid (96 %) and then with a hydrated sulphuric acid (65 %). Purified samples were finally dried under nitrogen and supplemented with acetonitrile to make a volume of 1 ml for HPLC determination. Analysis of phthalates was performed using HPLC with UV detection at a wavelength of 224 nm. All samples were sprayed twice. The quantity of the samples sprayed was 10 μ l. The Zorbax Eclipse C8 column was used. Results were evaluated based on the calibration curve in the Agilent ChemStation software for LC and LC/MS systems.

5. CONCLUSION

If we compare the values obtained with values referred to in the Methodological Advice of the Ministry of Environment based on RSL (Regional Screening Levels) values issued by USEPA (United States Environmental Protection Agency), then none of these values was exceeded within this study (values for DEHP: 120 mg.kg^{-1} in dry matter for industrially used areas, and 35 mg.kg^{-1} in dry matter for other areas; values for DBP: 62 000 mg.kg^{-1} in dry matter for industrially used areas, and 6 100 mg.kg^{-1} in dry matter for other areas).

2. OBJECTIVE

The work was aimed at monitoring the phthalic acid esters, di-n-butyl phthalate and di(2-ethylhexyl) phthalate in soil samples in two regions of the Czech Republic: the Central Bohemian Region and Region Plzeň.



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4. RESULTS

DBP concentration ranged from 0.08 to 0.84 mg.kg^{-1} in dry matter and, DEHP concentration ranged from 0.07 to 0.66 mg.kg^{-1} in dry matter.



6. REFERENCES

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