

Kruševac, Srbija
30. maj - 1. jun 2018

8. SIMPOZIJUM

Hemija i zaštita životne sredine

sa međunarodnim učešćem

ENVIROCHEM 2018

8th SYMPOSIUM

Chemistry and Environmental Protection

with international participation

Knjiga izvoda

BOOK OF ABSTRACTS



Srpsko hemijsko društvo
Serbian Chemical Society



Sekcija za hemiju i zaštitu životne sredine
Environmental Chemistry Division

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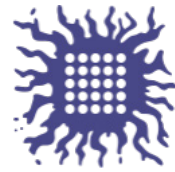
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Phthalate esters in glass jar metal lids from Serbian markets

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Phthalate esters are plasticizers which are used to impart flexibility in PVC resins but also in other resins such as polyvinyl acetates and polyurethanes. A wide range of consumer products contain specific members of this family of chemicals. Phthalate plasticizers are not chemically bound to PVC. Because of that they can enter the environment through losses during manufacturing processes and by leaching from final products [1]. Phthalate esters are suspected of having endocrine disrupting properties [2,3]. Exposure to high concentrations was shown to induce fetal death, cancer, liver and kidney injury and reproductive toxicity in animals [4,5,6]. Due to growing health concerns and environmental awareness, producers all over the world are increasingly forced to use non-phthalate plasticizers. However, phthalate esters are still found in many products, even in those which are used for food packaging and storage.

The aim of our study was investigation of glass jar metal lids for presence of phthalate esters. Different glass jars with screw-on metal lids were bought at supermarkets in Belgrade, Serbia. All metal lids had a plastic seal ring that goes between the glass lid and the rim of the jar.

The glass jars were washed according to the usual laboratory procedure, filled with distilled water, closed with screw-on metal lids and left upside-down for three days at room temperature. The water from glass jars was extracted with hexane. Hexane extracts were dried with Na₂SO₄, and evaporated to dryness under stream of nitrogen. Masses of all extracts were 0.2 mg. Procedural blank - a control sample containing distilled water in a glass jar without a metal lid was analyzed according to the same procedure. The resulting mass was negligible.

The extracts were analyzed by gas chromatography–mass spectrometry (GC–MS). GC–MS was conducted using an Agilent 7890A gas chromatograph (HP5-MS column, 30 m × 0.25 mm, 0.25 μm film thickness, He carrier gas, 1.5 cm³ min⁻¹), coupled to an Agilent 5975C mass selective detector (70 eV).

GC-MS analysis revealed that most of the compounds identified in these extracts were phthalate esters. However, the lids were divided into two distinct groups, based on the number of carbon atoms in the alcohol chain of the phthalate esters identified.

One group contained phthalate esters with long alkyl chains (9, 10 or more C atoms). The second group contained phthalate esters with short alkyl chains (usually 4C atoms) with different degree of branching. Typical for the second group of lids were also squalene and 13-docosenamide, common plastic additives.

It can be concluded that, regardless of the type of the containing phthalate esters, 0.2 mg of these compounds can migrate from the investigated metal lids into distilled water with which it is in contact, during three days at room temperature. Considering the composition of food products which are usually packed in this kind of containers but also the fact that the increased temperature is usually used during their production process, it can be presumed that migration of phthalate esters from metal lids into the food products contained in the glass jars might be even higher.

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