MASTER'S THESIS

Determination of phthalate acid ester in bottled water

(Public version)

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Phthalic acid esters (PAEs) are a group of chemicals derived from phthalic acid. They are volatile compounds which can cause adverse health problems. They are said to have estrogenic effects and are a group of concern due to their elevated presence on the environment.

PAEs are used in cosmetics, medicines, personal care products etc. They are also used as plasticizers; they are added to plastic polymers to increase their elasticity and flexibility. As they are not chemically bonded to the polymer, they can leak out to the environment. In case of bottled water, PAEs can migrate from the plastic container to drinking water.

One of the objectives of this study is to develop an automated method to determine PAEs in bottled water by using SPME arrow with gas chromatography couples to mass spectrometry. SPME arrow is a novel method with little publications available in comparison with other extraction techniques. It is designed to improve quantification limits and robustness in comparison with SPME.

In this study, chromatographic separation and detection were optimized. After that, optimum parameters were obtained for PAEs extraction from bottled water using two different commercial SPME arrow. The best SPME arrow coating was used for a quantification method which was later validated and applied to real samples. By using the data obtained from real samples a risk assessment study was conducted to determine the risk by PAEs from bottled water consumption.

Risk assessment studies are conducted to create awareness of the hazard a substance or a group of compounds have and their probability (risk) to affect human health.