

## METHODS OF SEPARATION, PRECONCENTRATION AND DETERMINATION OF BENZOPHENONE AND ITS DERIVATIVES

*Destruction of the ozone layer enhances the intensity of solar radiation to the Earth and leads to impair the immune system of humans and other living organisms. Sunscreen cosmetics usage can prevent or minimize the negative effects of ultraviolet (UV) light. Benzophenone (BP) and its derivatives are widely used as chemical UV - filters that are able to protect living organisms, different substances and materials from harmful effects of direct sunlight.*

*Benzophenones may be found in many sunscreens and daily cosmetics: creams, lipsticks, shampoos, shower gels. Diphenylketones also are added as additives to some dyes, enamels, pigments, polymers. Some benzophenone's derivatives, for example, 2-hydroxy-4-methoxybenzophenone are used as UV stabilizers in food industry. Unsubstituted benzophenone is used in perfume industry as smell fixator.*

*The toxicology of diphenylketones has been studied briefly, but recent investigations shows that these compounds cause a negative impact on human health. It is known that they can be accumulated in human body, causing destruction of the endocrine system, allergic effects: swelling of the mucous membranes, sore throat, skin irritation and even skin cancer.*

*As a result of frequent usage of various products, benzophenones can be released into environment, especially into natural waters, soil and human body.*

*Due to the negative impact on living organisms, chemical UV filters are considered as emerging environmental contaminants. Content of benzophenones in different materials is regulated by Environmental Protection Agency (EPA, USA), US Food and Drug Administration (FDA), European Food Safety Authority, (EFSA), European Scientific Committee on Consumer Safety (SCCS) and allowed concentration range makes up 0.05–10.0 %. For example, concentration of benzophenone-3 in sunscreens products is up to 10% in Europe and up to 6% in the USA. The concentration of benzophenone-3 in everyday makeup can vary from 0.05 to 0.5%.*

*Benzophenones are usually determined by gas chromatography, gas chromatography coupled with mass spectrometry, high performance liquid chromatography with fluorescence and mass spectrometric detection. Since benzophenones exist in the environment in micro- and nanoquantities, they need to be separated and preconcentrated before analysis. There are many modern methods for sample preparation and determination of diphenylketons in various complex matrices (liquid, and solid phase extraction, different types of microextraction). In this paper the modern methods of separation, preconcentration and determination of benzophenones in various types of matrices are critically reviewed.*

*Key words: benzophenones, UV filters, sample preparation, analysis.*