

Simultaneous determination of Benzophenone and its Analogues (UV filters) in water and soil by gas chromatography-mass spectrometry

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Benzophenone is an UV-absorbing agent that has been used in industry and medicine for more than 30 years. Its twelve derivatives, designated benzophenone-1 through benzophenone-12, are widely used today in cosmetic products as a photostabilizer, a sunscreen in lotions, and hair sprays to protect the skin and hair from UV irradiation. In addition, benzophenone is used in the manufacture of a fragrance ingredient, insecticides, agricultural chemicals, and pharmaceuticals and is an additive for plastics and coatings.

This study describes a procedure for the simultaneous enrichment, separation and quantification of seven major benzophenone analogues (benzophenone, benzhydrol, *p*-hydroxybenzophenone, 2-hydroxy-4-methoxybenzophenone, 2,4-dihydroxybenzophenone, 2,2'-dihydroxy-4-methoxybenzophenone and 2,3,4-trihydroxybenzophenone) in water and soil samples. Samples were extracted with ethyl acetate and methanol for 20 mins and the organic solvent was reduced to dryness. Analytes were derivatized with *N*-methyl-*N*-(trimethylsilyl)trifluoroacetamide (MSTFA) and determined by gas chromatography-mass spectrometry in selected ion monitoring mode. Under optimal conditions, recoveries from real samples were 60-125%, and detection limit obtained were ranged between 5-10 ng/L for all the selected compounds. The established method was successfully applied to environmental water and soil samples for the determination of the target benzophenone analogues.