



"Gheorghe Asachi" Technical University of Iasi, Romania



APPLICATION OF FOURIER TRANSFORM INFRARED SPECTROSCOPY FOR THE CHARACTERIZATION OF SUSTAINABLE COSMETICS AND INGREDIENTS WITH ANTIOXIDANT POTENTIAL

Anca Maria Juncan^{1,2*}, Florinela Fetea³, Carmen Socaciu³

¹*"Babeş-Bolyai" University of Cluj-Napoca, Faculty of Chemistry and Chemical Engineering,
Arany Janos Str. 11, 400028, Cluj-Napoca, Romania*

²*S.C FARMPREV SRL, Suceava Str. 24-26, 400219, Cluj-Napoca, Romania*

³*University of Agricultural Sciences and Veterinary Medicine, Calea Mănăştur 3-5, 400372, Cluj-Napoca, Romania*

Abstract

The aim of this study is to elaborate a survey on the efficiency of three anti-aging cosmetic formulations by applying Fourier Transform Infrared Spectroscopy (FTIR) with Attenuated Total Reflection (ATR) in order to characterize and identify the specific recognition markers of the active ingredients. FTIR (ATR) spectrometry in specific regions was applied also to the ingredients used in these products, depending on their role in the specific cream. Comparing the different composition of the creams, depending on the ratio of lipophylic to hydrophylic ingredients, of emollient-emulsifier type ingredients, antioxidant and active ingredients, it has been noticed identification of differences between the natural (α -tocopherol acetate) and the synthetic antioxidant (BHA) by characteristic markers.

The antioxidant potential of α -tocopherol acetate and of BHA, usually used in cosmetic formulations or added in a controlled way, at known levels of concentration in a standard cream, were evaluated by the DPPH method. Their antioxidant effect could not be demonstrated in our experiments with controlled concentrations (below 1% and even higher), added to complex mixtures with lipids. Higher sensibility methods, like electronic spin resonance (ESR) could probably deliver additional information about the antioxidant potential of some complex mixtures, like anti-aging creams.

Key words: anti-aging products, antioxidants, cosmetic formulations, DPPH method, FTIR analysis

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* Author to whom all correspondence should be addressed: E-mail: anca_juncan@yahoo.com; Phone: +40-264-434194; Fax: +40-264-484712.