Contribution ID: **63** Type: **Poster**

# Spectrophotometric Evaluation of Sun Protection Factor (SPF) of Wild Sideritis raeseri under Variable Solvent and Temperature Conditions

Skin cancer, classified into basal cell carcinoma (BCC), squamous cell carcinoma (SCC) (both nonmelanoma), and melanoma, is the most prevalent form of cancer worldwide. The pathogenesis of skin cancer is multifactorial, but the main causative agent is ultraviolet (UV) radiation[1]. The growing interest in natural UV photoprotective agents highlights the significance of phytochemicals as potential sunscreens[2]. This study evaluated the endemic Albanian mountain tea (Sideritis raeseri) for its UV photoprotective properties, specifically the SPF, under various solvent environments[4], temperature storage, and at different times utilizing spectrophotometry (UV-VIS 756s ) and the Mansur method for SPF estimation.

The aqueous extracts of wild S. raeseri were first centrifuged, then filtered, and mixed in two different Erlenmeyer flasks with distilled water and a mixture of distilled water-ethanol as solvents in a ratio of 1:4 v/v. UV absorbance was measured for two different solvents (water and a mixture of water-ethanol) at different temperatures and over six consecutive days, in the 290–320 nm range, a critical window for erythemogenic UVB radiation[3].

Results showed that in the tea aqueous extracts stored at ambient temperature (29-31℃), the SPF value dropped gradually from 26.426 (the first day) to 17.930(sixth day).In contrast, the refrigerated tea aqueous extracts (4-6℃) dropped from 26.426 to 22.469, suggesting enhanced stability and photoprotective capacity at lower temperatures. Conversely, in the mixture of water-ethanolic solvent at ambient temperature, the SPF value drops from 23.281 to 13.387, while in the refrigerated one, the drop was from 23.281 to 16.958. These results underscore the dual role of temperature and solvent polarity in modulating the photoprotective efficacy of S. raeseri. The notable shield life preservation in SPF values at refrigerated conditions could be attributed to the reduced photodegradation of phenolic compounds. Our analysis confirms that the choice of solvent and temperature during extraction significantly affects the photoprotective potential of herbal extracts [4,5]. Refrigeration or cool storage helps preserve both chemical integrity and biological efficacy of phenolic compounds.

The SPF values suggest that S. raeseri extracts could be a valuable natural additive in topical sunscreen formulations where solvent selection and storage conditions must be optimized for maximal efficacy. It has enhanced performance in refrigerated water solvent extracts and less in water-ethanol solvents. This is particularly relevant for formulations seeking to minimize synthetic UV filters due to concerns over allergenicity and environmental toxicity [5].

Keywords: Sideritis raeseri, Sun Protection Factor (SPF), UV photoprotection, solvent effect, temperature stability

References

[1] Fabris MR, et al., An. Bras. Dermato.l 87, 36-43 (2012). [2] Mary K. Montes de Oca et al., Photochem. and Photobiol., 93, 956–974(2017)

[3] A. Mansur et al., An. Bras. Dermatol. 61, 121 (1986).

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009R1223 Official Journal of the European Union, REGULATION (EC) No 1223/2009

[5] C. Stiefel and W. Schwack, Intern. Journ. of Cosmet. Scie., 37, 2–30 (2015)

**Primary author:** Dr XHUVANI, Emil (University of Tirana, Physics Department)

**Co-authors:** Ms HIMA, Irdisa (University of Tirana); Dr KRISTO, Kejda (University of Tirana, Physics Department); Dr MEMA, Matilda (Polytechnic University of Tirana, Faculty of Mathematical and Physical Engineering, Department of Physics)

**Presenter:** Dr XHUVANI, Emil (University of Tirana, Physics Department)