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**Development and evaluation of natural sunscreen using *Wrightia antidysenterica* and *Nyctanthes arbor-tristis* flower extracts.**

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**Abstract**

Due to the link between sun exposure and skin deterioration, the application of sunscreen becomes essential, particularly in Sri Lanka, which experiences higher levels of solar radiation. *Wrightia antidysenterica* and *Nyctanthes arbor-tristis* are two floral species found abundantly throughout the country and are renowned for their exceptional traditional medicinal properties. These flowers contain polyphenolic compounds that exhibit noteworthy antioxidant activity, which is associated with sun protection abilities. This study aimed to formulate herbal sunscreen using the above flowers and evaluate their efficacy and stability. The maceration and sonication techniques were used to prepare the extracts (using ethanol, methanol, ethanol-water mixture as solvents) for each flower. Qualitative phytochemical screenings were carried out following the standard protocols. Quantitative analysis was done for phytochemicals using gravimetric and spectroscopic methods. Evaluation of anti-oxidant capacity was done by 2, 2-Diphenyl-1-picrylhydrazyl (DPPH) and Ferric Reducing Anti-oxidant Power (FRAP) assays. Five sunscreen formulations (F1-F5) were prepared from each extract by incorporating different concentrations of each extract based on oil in water (o/w) methodology, and further formulations were evaluated for the quality and the stability (pH, viscosity, homogeneity, thermal stability and long-term stability). The effectiveness of the sunscreens was assessed through the spectroscopic method, which determines the sun protection factor (SPF). The qualitative phytochemical analysis of the extracts from both species revealed the existence of crucial phytochemicals, including flavonoids, terpenoids, polyphenols, diterpenes, glycosides, and saponins, which have significant sun protection properties. The IC<sub>50</sub> values were computed for the methanolic extract of *W. antidysenterica*, ethanolic extract of *W. antidysenterica*, and ethanolic extract of *N. arbor-tristis*, which were found to be 126.34 µg/mL, 144.17 µg/mL, and 160.23 µg/mL, respectively. Additionally, the mean values of the Ferric Reducing Antioxidant Power assay (FRAP) were 706.07 ± 3.49, 562.43 ± 2.46, and 164.47 ± 8.52, respectively, indicating that these extracts contain significant natural antioxidants. Out of the various formulations that were prepared, SPF values of (23.10 ± 0.09, 23.45 ± 0.08), pH values of (6.23, 6.14), and viscosity of (44358, 45563 centipoises) were observed for F4 and F5. The thermal stability, and homogeneity conditions were in good state. In conclusion, the identified floral species possess significant sun protection activity and have potential for use in the production of sunscreen. However, to facilitate commercialization, in vivo investigations need to be conducted.

**Keywords:** DPPH assay, FRAP assay, Phytochemical Screening, Sun Protection Factor (SPF), Sunscreen

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