PHYTOCHEMICAL SCREENING AND ANTIOXIDANT ACTIVITY OF *Castanea sativa* EXTRACTS AND ITS POTENTIAL FOR SUNSCREEN FORMULATION

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ABSTRACT

PHYTOCHEMICAL SCREENING AND ANTIOXIDANT ACTIVITY OF *Castanea sativa* EXTRACTS AND ITS POTENTIAL FOR SUNSCREEN FORMULATION

The efficacy and safety of conventional sunscreen formulations has been a subject of concern due to the potential adverse effects of synthetic ingredients and their limited protection against a broad spectrum of harmful UV radiation. In light of these challenges, there is a growing need to explore alternative natural ingredients with enhanced photoprotective properties. *Castanea sativa*, commonly known as sweet chestnut, is a promising candidate with its rich composition of bioactive compounds and potential antioxidant activity. This study aimed to perform phytochemical screening, investigate the antioxidant properties, and evaluate the potential of *Castanea sativa* extract in sunscreen formulation. Extraction method used was maceration with ethanol as the solvent, indicates 15.54% of extraction yield percentage. Phytochemical screening was conducted to identify the phytochemical compounds present in *Castanea sativa* extract which resulting the presence of phenols, tannins, saponins, flavonoids and alkaloids which also contributed to the extract's antioxidant potential. The antioxidant properties were assessed using radical scavenging activity, measured by the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay, and determination of the IC_{50} value. The results revealed a relatively moderate antioxidant activity of the *Castanea sativa* extract, as evidenced by the IC_{50} value obtained which is 71 ppm in comparison of ascorbic acid IC_{50} which is 8 ppm. To evaluate its potential in sunscreen formulation, few tests was conducted. The pH reading obtained for F1, F2 and F3 was 5.695 - 5.852 respectively which in range safe skin pH. The spreadability for F3 is the most preferable among the formulation which is 4.15 cm. For centrifugation test, the separation between 2 phases for all three formulations was approximately 2 mm. The highest sun protection factor (SPF) value obtained was 15.3 from F3 which demonstrated the efficacy of *Castanea sativa* extract as a natural ingredient for sunscreen formulations. These findings highlight the significant antioxidant properties of *Castanea sativa*, as well as its potential application in sunscreen formulations, making it a promising candidate for the development of natural and effective skincare products.

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