

Utilization of the ethyl acetate fraction of *Zanthoxylum rhetsa* bark extract as an active ingredient in natural sunscreen formulations

ABSTRACT

Sunburn, premature skin aging, skin cancers and suppression of the immune system are linked to exposure of the skin to UV light. In recent years, plant extracts are becoming a popular active ingredient in natural sunscreen formulations. In the present study, the ethyl acetate fraction of *Zanthoxylum rhetsa* bark (commonly called as Indian prickly Ash) was used as an active ingredient in two sunscreen cream formulations (F1 and F2). Primarily, the constituents present in the active fraction were identified using LC–MS/MS analysis. Coumaric acid, benzoic acid, p-hydroxybenzoic acid and its isomers, hesperitin, trihydroxyoctadecenoic acid and columbamine were identified in the ethyl acetate fraction of *Z. rhetsa* bark extract. The UV protection properties of the formulated creams were evaluated by assessment of parameters such as their SPF values (F1: 3.60 ± 0.28 , F2: 6.90 ± 0.57), UVA effectiveness (moderate for both test formulations) and critical wavelengths (F1: 365.4, F2: 360.3). Moreover, the physicochemical and microbial count of the formulated creams was also assessed based on various parameters such as colour, pH, centrifugation, viscosity and microbial load over a storage period of 28 days. Both formulations showed pseudo plastic behaviour and were stable at all conditions except for samples kept at 40 °C. Altogether, these results suggested that the ethyl acetate fraction of *Z. rhetsa* bark has great potential to reduce exposure to harmful UVA/UVB radiations and may be utilized as an active ingredient in natural sunscreen formulation.

Keyword: *Z. rhetsa*; Sunscreen; Formulations; UVA/UVB; SPF; LC–MS/MS