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PREPARATION AND STABILITY EVALUATION OF A PHARMACEUTICAL FORMULATION CONTAINING SEED OIL AND FRUIT PEEL EXTRACT OF *CALOPHYLLUM BRASILIENSE* CAMBESS

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Aligned with the global trend toward sustainability and upcycling — reusing waste and by product in new production cycles — the native species *Calophyllum brasiliense* Cambess, Calophyllacae (guarandi) have demonstrated significant potential as a sustainable and medicinal raw material. However, one of the main challenges associated with natural products is their stability over time and under varying environmental conditions. This study aims to evaluate the behavior of a clean pharmaceutical formulation incorporating seed oil and crude extract fruit peel from *C. brasiliense*, from the point of manufacture through to the end of its shelf life. The selected formulations were emulsions composed exclusively of natural ingredients, including glycerin, Lexgard®, Natrosol, seed oil, and fruit peel extract from guarandi. To characterize the emulsions, assessments were conducted on physical and thermal stability, pH, general appearance, and emulsion type on the day of manufacture. After 90 days, the initial tests were repeated, and additional evaluations were performed, including spread ability and optical microscopy. Two emulsion samples were developed, sample A: containing 10% guarandi seed oil and sample B: containing 10% guarandi seed oil combined with 5% guarandi fruit peel extract. Both formulations were oil-in-water emulsions. Initial pH values were 6.0 for Sample A and 7.5 for Sample B, which decreased to 5.0 and 4.1, respectively, after 90 days. Initially, both samples exhibited a smooth, glossy, lump-free, homogeneous texture with a characteristic plant odor. After 90 days, only sample B showed alterations, including the presence of lumps and a heterogeneous appearance. Under physical and thermal stress conditions, both emulsions were stable on the first day. However, after 90 days, sample B failed both tests. Regarding spread ability, sample A demonstrated superior performance in terms of coverage area and responsiveness to applied pressure. Microscopic analysis revealed that both emulsions maintained rounded, uniform, and discrete droplets of the dispersed phase. Based on these findings, it is concluded that the developed emulsions were stable at the time of manufacture. However, by the end of the shelf life, particularly the formulation containing both oil and extract, the initial characteristics were not preserved. Further studies are required to obtain more comprehensive data.

Keywords: *Calophyllum brasiliense, upcycling, pharmaceutical formulation*

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