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ASSESSING THE ANTI-INFLAMMATORY POTENTIAL OF *Kyllinga nemoralis* EXTRACT AND DEVELOPMENT OF HYDROGEL DERMAL PATCH

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ABSTRACT

ASSESSING THE ANTI-INFLAMMATORY POTENTIAL OF *Kyllinga nemoralis* EXTRACT AND DEVELOPMENT OF HYDROGEL DERMAL PATCH

Skin inflammation is a common condition that affects individuals across all age groups, often leading to discomfort and a diminished quality of life. There remains a pressing need for alternative treatments that are both effective and associated with fewer side effects. In this research, the development of topical non-steroidal anti-inflammatory drugs (NSAIDs) derived from natural products offers a promising avenue, particularly for resource-limited settings such as Malaysia. This study investigates the anti-inflammatory potential of *Kyllinga nemoralis* extract and its incorporation into a hydrogel-based dermal patch. Anti-inflammatory activity was evaluated using a heat-induced egg albumin denaturation assay. The extract exhibited 19.76% inhibition at a concentration of 31.25 µg/mL, with an IC_{50} value of 194.63 µg/mL. While showing moderate efficacy compared to diclofenac, the extract demonstrated a saturation-like response at higher concentrations. GC-MS phytochemical profiling confirmed the presence of bioactive derivatives, including terpenoids, phenylpropanoids, and flavonoids. The extract was successfully formulated into a pectin-based hydrogel dermal patch. Among the tested formulations, FPC2 (1% extract) exhibited a smoother texture and demonstrated a higher release rate, reaching a concentration of 12 µg/mL at physiological pH. These findings indicate that *Kyllinga nemoralis* extract has significant potential as a natural topical NSAID for managing skin inflammation.

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