New Approaches in Biological Science

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Chapter – 13

FORMULATION OF AN ANALGESIC BALM USING INVASIVE PLANT LEAF EXTRACT OF *CHROMOLAENA ODORATA* (L.) R.M. KING AND H. ROB.

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Abstract

This study explores the formulation and evaluation of a pain-relieving balm infused with *Chromolaena odorata* ethanolic leaf extract, traditionally recognized for its analgesic properties. Four different balm formulations were developed by varying the concentrations of menthol oil and *C. odorata* extract. Phytochemical screening confirmed the presence of key bioactive compounds including alkaloids, flavonoids, saponins, and steroids. The balms underwent extensive evaluation for pH, spreadability, solubility, washability, phase separation, and stability. Results showed favorable physical properties, with a pH of 5, good spreadability, no phase separation, and maintained stability over 50 days at room temperature. Organoleptic analysis confirmed acceptable appearance, odour and texture, while microbial testing indicated no contamination. Patch and hedonic tests further validated the safety and user acceptance of the formulations. The findings highlight the potential of repurposing the invasive plant *C. odorata* into a sustainable, natural topical analgesic, supporting both ecological management and alternative healthcare solutions.

Introduction

Pain is a natural defence mechanism vital for survival. It alerts the body to potential harm, encourages protection of injuries, and helps individuals avoid future risks. Pain is a complex and subjective experience involving sensory, emotional, and cognitive components, influenced by individual physiological, psychological, and environmental factors (Edita *et al.*, 2013). Effective pain management is a major focus in healthcare, particularly for conditions such as injuries, arthritis, and headaches. Pain