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Biotechnology Approach: A Tool of Enhancement of Sticky Mucilage of Pulicaria Incisa (Medicinal Plant) for Wounds Treatment

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Abstract : Depending of the chemical substances responsible for the pharmacological effects, a future therapeutic drug might be produced by extraction from whole plants or by callus initiated from some parts. The optimized callus culture protocols now offer the possibility to use cell culture techniques for vegetative propagation and open minds for further studies on secondary metabolites and drug establishment. In Algerian traditional medicine, Pulicaria incisa (Asteraceae) is used in the treatment of daily troubles (stomachache, headhache., cold, sore throat and rheumatic arthralgia). Field findings revealed that many healers use some fresh parts (leaves, flowers) of this plant to treat skin wounds. This study aims to evaluate the healing efficiency of artisanal cream prepared from sticky mucilage isolated from calluses on dermal wounds of animal models. Callus cultures were initiated from reproductive explants (young inflorescences) excised from adult plants and transferred to a MS basal medium supplemented with growth regulators and maintained under dark for for months. Many calluses types were obtained with various color and aspect (friable, compact). Several subcultures of calli were performed to enhance the mucilage accumulation. After extraction, the mucilage extracts were tested on animal models as follows. The wound healing potential was studied by causing dermal wounds (1 cm diameter) at the dorsolumbar part of Rattus norvegicus; different samples of the cream were applied after hair removal on three rats each, including two controls (one treated by Vaseline and one without any treatment), two experimental groups (experimental group 1, treated with a reference ointment "Madecassol® and experimental group 2 treated by callus mucilage cream for a period of seventeen days. The evolution of the healing activity was estimated by calculating the percentage reduction of the area wounds treated by all compounds tested compared to the controls by using AutoCAD software. The percentage of healing effect of the cream prepared from callus mucilage was (99.79%) compared to that of Madecassol® (99.76%). For the treatment time, the significant healing activity was observed after 17 days compared to that of the reference pharmaceutical products without any wound infection. The healing effect of Madecassol® is more effective because it stimulates and regulates the production of collagen, a fibrous matrix essential for wound healing. Mucilage extracts also showed a high capacity to heal the skin without any infection. According to this pharmacological activity, we suggest to use calluses produced by in vitro culture to producing new compounds for the skin care and treatment.

Keywords : calluses, Pulicaria incisa, mucilage, Wounds
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