Development of *in situ* Gels of Nano Calcium for Wound Healing and Burns

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Abstract:

The present study assessed the effectiveness of *in-situ* gels of nano calcium oxide (NCO) in delivering ionized calcium to the site of burns to aid in wound/burn healing in comparison to a marketed formulation (calcium alginate dressing). *In-situ* gels were prepared by blending different concentrations of NCO (12.5, 25 and 50 ppm) with xanthan gum and menthol (2.5, 5 and 7.5%). *In-vivo* studies were performed using burn wound model in rats, followed by statistical analysis and histopathological studies. *In-vitro* wound healing studies were carried out by scratch assay using L929 mouse fibroblast cell lines.

The percentage wound contraction for all formulation treated groups was in the range 77.206±3.055 to 99.1.76±0.216 at the end of 14 days of study in comparison to 78.7±2.352 for marketed formulation and 71.95±1.055 for control group (untreated). Formulations containing 50ppm of NCO showed the highest percentage of wound contraction. The histological studies of day 14 for groups treated with 50ppm NCO completely showed healed skin structures with normal epithelisation, normal architecture of collagen fibres and appearance of new blood vessels and absence of inflammatory cells. Scratch assay results revealed that at the end of 48h. of the study, there was increased wound closure rate and faster migration with 50ppm NCO when compared to the control (untreated) group.

Conclusion: The study proved *in-situ* gels of nano calcium oxide and a wound care system that is dermatologically acceptable for effective treatment of burns has been developed successfully.