

# Formulation and Evaluation of Ocimum Sanctum based Emulgel for Wound Healing Potential

Tikone Dattatray B<sup>1</sup> and Prof. Gaikwad Shital D<sup>2</sup>

Samarth Institute of Pharmacy Belhe Pune, Maharashtra, India<sup>1</sup>

Department of Pharmaceutical Chemistry, Samarth Institute of Pharmacy Belhe, Pune, Maharashtra, India<sup>2</sup>

**Abstract:** The purpose of this study was to evaluate the anti-inflammatory effect of leaves of *Ocimum sanctum* in the formulation of hydrogels using different types of animal models. **Materials and Methods:** *O. sanctum* leaf ethanol extract was fractionated with methanol to give a methanol fraction. The methanol fraction (1% v/v) was used in hydrogel formulations in various combinations of Carbopol 940 and sodium CMC. The hydrogels produced were characterized for optimal physical properties, pH, ductility, uniformity, viscosity, release profile, and irritation. Optimized hydrogels were evaluated for anti-inflammatory activity in animals using xylene-induced, croton oil-induced ear edema, and cotton pellet-induced granuloma models. The effect was monitored by , which measures the suppression rate of ears , nitric oxide (NO) and myeloperoxidase (MPO) levels in mice after acute inflammation induced by croton oil. **Results and discussion:** Physical evaluation confirmed that the resulting hydrogel was brownish in color and had a uniform and smooth appearance when applied. The combination of F3-hydrogel formulations was found to be appropriate for all other evaluation parameters such as pH, viscosity, spreadability and consistency. Therefore, it was observed that the optimal composition of F3 preparation is 1.5 g of Carbopol 940 and 1% sodium CMC. The suppression rate of edema in xylene-induced ear edema in mice was found to be comparable to that of the standard treatment group (65.59%). In this study, the results show that the prepared hydrogel-OSMFH has an inhibitory effect on acute inflammation. The results show the ability of croton oil to induce the influx of neutrophils into the ear tissue of mice.

**Keywords:** Ocimum sanctum, Anti-inflammatory, Hydrogel, Voltaren Emulgel, Carbopol.

## REFERENCES

- [1]. Chen L, Deng H, Cui H, Fang J, Zuo Z, Deng J, et al. Inflammatory responses and inflammation-associated diseases in organs. *Oncotarget* 2017;9:7204-18.
- [2]. Kelm MA, Nair MG, Strasburg GM, DeWitt DL. Antioxidant and cyclooxygenase inhibitory phenolic compounds from *Ocimum sanctum* Linn. *Phytomedicine* 2000;7:7-13.
- [3]. Shishodia S, Majumdar S, Banerjee S, Aggarwal BB. Ursolic acid inhibits nuclear factor-kappaB activation of IkappaBalpha kinase and p65 phosphorylation: Correlation with down-regulation of cyclooxygenase 2, matrix metalloproteinase 9, and cyclin D1. *Cancer Res* 2003;63:4375-83.
- [4]. Paech K, Tracey MV. *Modern Methods of plant Analysis*. Vol. 4. Berlin: Springer; 1955. p.367- 74.
- [5]. Sim SK. *Medicinal Plant Glycosides*. 2nd ed. Toronto, Canada: University of Toronto Press; p. 25-7.
- [6]. Kokate CK, Purohit AP, Gohkale SB. *Pharmacognosy*. In: Terpenoids. 21st ed. Pune: Nirali Prakashan; 2002.
- [7]. Chirayath RB, Jayakumar R, Biswas R, Vijayachandran LS. Development of *Mangifera indica* leaf extract incorporated carbopol hydrogel and its antibacterial efficacy against *Staphylococcus aureus*. *Colloids Surf B Biointerfaces* 2019;178:377-84.
- [8]. Phad AR, Dilip TN, Ganapathy RR. Emulgel: A comprehensive review for topical delivery of hydrophobic drugs. *Asian J Pharm* 2018;12:S382.
- [9]. Gupta P, Yadav DK, Siripurapu KB, Palit G, Maurya R. Constituents of *Ocimum sanctum* with antistress activity. *J Nat Prod* 207;70:1410-6.
- [10]. Dutta D, Devi SS, Krishnamurthi K, Kumar K, Vyas P, Muthal PL, et al. Modulatory effect of distillate Of *Ocimum sanctum* leaf extract (Tulsi) on human lymphocytes against genotoxicants. *Biomed Environ Sci* 2007;20:226-34.

- [11]. Draize JH, Woodard G, Calvery HO. Methods for the study of irritation and toxicity of substances applied topically to the skin and mucous membranes. *J Pharmacol Exp Ther* 1944;82:377-90.
- [12]. Yousif MF, Haider M, Sleem AA. Formulation and evaluation of two anti-inflammatory herbal gels. *J Biol Act Prod Nat* 2011;1:200-9.
- [13]. Maxia A, Frau MA, Falconieri D, Karchuli MS, Kasture S. Essential oil of *myrtuscommunis* inhibits inflammation in rats by reducing serum IL-6 and TNF-  $\alpha$ . *Nat Prod Commun* 2011;6:1545-8
- [14]. Redza-Dutordoir M, Averill-Bates DA. Activation of apoptosis signalling pathways by reactive oxygen species. *Biochim Biophys Acta* 2016;1863:2977-92.
- [15]. Bryan NS, Grisham MB. Methods to detect nitric oxide and its metabolites in biological samples. *Free Radic Biol Med* 2007;43:645-57.
- [16]. Krawisz JE, Sharon P, Stenson WF. Qualitative assay for acute intestinal inflammation based on myeloperoxidase activity. *Gastroenterology* 1984;87:1344-50.
- [17]. Bancroft JD, Gamble M. *Theory and Practice of Histological Techniques*. 6th ed. London, United Kingdom: Churchill Livingstone, Elsevier; 2008. p. 93-133.
- [18]. Winter CA, Risley E, Nuss G. Carrageenan-induced edema in hind paw of the rat as an assay for antiinflammatory drugs. *Proc Soc Exp Biol Med* 1962;111:544.
- [19]. Crunkhon P, Meacock S. Mediators of the inflammation induced in the rat paw by carrageenan. *Br J Pharmacol* 1971;42:392-402.
- [20]. Deuschle VC, Deuschle RA, Bortoluzzi MR, Athayde ML. Physical chemistry evaluation of stability, spreadability, in vitro antioxidant, and photo-protective capacities of topical formulations containing *Calendula officinalis* L. leaf extract. *Braz J Pharm Sci* 2015;51:63-75.
- [21]. Atta AH, Alkofahi A. Anti-nociceptive and antiinflammatory effects of some Jordanian medicinal plant extracts. *J Ethnopharmacol* 1998;60:117-24.
- [22]. Vogel HG, Vogel WH. *Drug Discovery and Evaluation, Pharmacological Assay*. Berlin: Springer; 1997. p. 370, 382, 402-3.
- [23]. Medeiros R, Figueiredo CP, Passos GF, Calixto JB. Reduced skin inflammatory response in mice lacking inducible nitric oxide synthase. *Biochem Pharmacol* 2009;78:390-5.
- [24]. Xavier-Santos JB, Félix-Silva J, Passos JG, Gomes A, Fernandes JM, Garcia VB. Development
- [25]. of an effective and safe topical anti-inflammatory gel containing *Jatropha gossypifolia* leaf extract: Results from a pre-clinical trial in mice. *J Ethnopharmacol* 2018;227:268-78.
- [26]. Badgujar VB, Jain PS, Patil RR, Haswani NG, Chaudhari SG. Anti-inflammatory activity of *Helicteres isora* L. stem bark extracts in rats. *Asian J Pharm Clin Res* 2009;2:63