

# Ketoprofen-loaded Eudragit electrospun nanofibers for the treatment of oral mucositis

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## Abstract:

**Purpose:** The purpose of this study was to formulate ketoprofen (KET)-loaded Eudragit L and Eudragit S nanofibers (NFs) by the electrospinning technique for buccal administration to treat oral mucositis as a safe alternative to orally administered KET, which causes gastrointestinal tract (GIT) side effects. **Materials and methods:** NFs were prepared by electrospinning using Eudragit L and Eudragit S. Several variables were evaluated to optimize NF formulation, such as polymer types and concentrations, applied voltage, flow rate and drug concentrations. Differential scanning calorimetry (DSC), Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM) and analyses of drug contents, hydration capacity, surface pH, drug release and ex vivo permeation were performed to evaluate the NFs. The selected formulation (F1) was evaluated in vivo on induced oral mucositis in rabbits. **Results:** SEM revealed that 20% polymer formed smooth and bead-free NFs. DSC results confirmed the amorphous nature of KET in the NFs. FTIR confirmed hydrogen bond formation between the drug and polymer, which stabilized the NFs. Both formulations (F1 and F2) had an acceptable surface pH. The drug loading was >90%. The amount of KET released from NF formulations was statistically significantly higher ( $P \leq 0.001$ ) than that released from the corresponding solvent-casted films. The complete release of KET from F1 occurred within 2 hours. Ex vivo permeation study revealed that only a small fraction of drug permeated from F1, which was a better candidate than F2 for local buccal delivery. In vivo evaluation of F1 on oral mucositis induced in rabbits demonstrated that F1 reduced the clinical severity of mucositis in rabbits under the current experimental conditions. The attenuated clinical severity was accompanied by a marked reduction in inflammatory infiltrate and re-epithelization of the epithelial layer. **Conclusion:** Eudragit L100 nanofibers (EL-NF) loaded with KET (F1) suppressed the inflammatory response associated with mucositis, which confirmed the efficacy of local buccal delivery of KET-loaded EL-NF in treating oral mucositis. © 2017 Reda et al.

## Reference:

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