

Abstract

# Redefining Ketoprofen: Nanoemulsion for Future Melanoma Therapeutics <sup>†</sup>

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**Abstract:** Drug repurposing is a great strategy to find new uses for known active principles: ketoprofen, a non-steroidal anti-inflammatory drug, has shown anti-proliferative activity in melanoma cell lines. Since its solubility is low (0.0213 mg/mL), our objective is to incorporate it in an oil-in-water (O/W) nanoemulsion, increasing formulation dosage, and study the prepared nanosystem. Spontaneous emulsification was used to prepare seventeen O/W nanoemulsions with the oil phase being Lauroglycol™ 90, Transcutol® HP and Tween® 80, while the aqueous phase was water. Dynamic light scattering was used to determine droplet size and the polydispersity index (PDI), discriminating the most homogeneous formulations. These were further studied in terms of solubility, pH, zeta potential, osmolality, long-term and accelerated stability, and drug release. It was possible to obtain up to 20 mg/mL of ketoprofen during solubility assays (930 times more than in water), with droplet sizes between 100 and 200 nm. Nanosystem characterization suggests that formulations are compatible with topical application and that stability is not compromised neither with increased drug loaded concentration nor with time. Drug release assays showed up to 30% release at the 24-hour mark.

Having successfully developed high ketoprofen strength nanoemulsions, high bioavailability may be obtained upon administration. Retrieved data demonstrates that the formulations are stable and might be compatible with skin. Although drug incorporation into the vehicles destabilizes the nanoemulsions, this effect is not concentration-dependent up to the maximum allowed drug concentration. However, viscosity, ex vivo drug permeation, and in vitro cytotoxicity still need to be assessed.

**Keywords:** Nanoemulsion; Ketoprofen; Melanoma; Drug repurposing;

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## Supplementary Materials:

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