

# Improving the Dissolution Performance of Naproxen from Nanoparticles †

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**Abstract:** Naproxen, a non-steroidal anti-inflammatory, belongs to Class II of the Biopharmaceutical Classification System. It shows a low aqueous solubility (0.0159 mg/mL) which limits its dissolution rate and, therefore, its absorption and oral bioavailability. Thus, this work aimed to reduce the drug particle size to the nanoscale to overcome such drawbacks. Nanoparticles were obtained by nanoprecipitation using Soluplus<sup>®</sup> as a polymeric matrix and Pluronic<sup>®</sup> F68 as a surfactant. The resulting suspension was filtered, frozen, and freeze-dried. The powder obtained was characterized in terms of size, Z-pot, yield, encapsulation efficiency (%EE), drug loading (%DL), and drug/polymer interaction. Drug release was evaluated using the dialysis membrane method and 0.1 N HCl with 0.5% Tween<sup>®</sup> 80 at 37 °C. The particle size before and after freeze-drying was 97 and 105 nm, respectively, and the Z-pot was between -5.1 and -1.2 mV. The process yield was 85.66%, with %EE and %DL values of 98.32% and 18.29%, respectively. FT-IR/ATR studies showed the characteristic bands of naproxen in the nanoparticles. The dissolution efficiency of the nanoparticles was up to 2-fold greater than that of the raw drug. In conclusion, this approach may constitute a valuable alternative for obtaining nanoparticles of hydrophobic drugs with improved dissolution.

**Keywords:** naproxen; Soluplus<sup>®</sup>; nanoparticles; dissolution.

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## **Conflicts of Interest**

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.