

Nanosuspension of Fenbendazole as Novel Strategy to Enhance its Dissolution Performance [†]

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Abstract: Fenbendazole is a highly hydrophobic benzimidazole with great potential to be repositioned as an anticancer drug. Therefore, this work aimed to develop fenbendazole nanocrystals (FNB-nc) with improved dissolution characteristics. A nanosuspension was prepared by adding dropwise fenbendazole dissolved in a hydrochloric-acid ethanolic solution over aqueous poloxamer P407. FNB-nc was recovered by freeze-drying, and a physicochemical characterization was performed. Release profiles were obtained in HCl pH 1.2 and phosphate buffer pH 7 by applying the dialysis membrane method at 37±0.5 °C. FNB-nc exhibited a hydrodynamic diameter of 185±16.96/458.8±17.37 nm before/after freeze-drying, respectively, with polydispersion index under 0.470, while zeta potential was -3.97±1.10 and 2.23±1.36 mV before and after drying, respectively. FNB-nc thermogram obtained by differential scanning calorimetry indicated that 64% of FNB exhibited an amorphous state, while FTIR-ATR spectra revealed characteristic peaks of the drug. Release profiles obtained for the nanosuspension and raw drug showed that statistically significant differences were obtained in HCl (p<0.02) and phosphate (p<0.04), releasing nearly 60% of fenbendazole from the nanocrystals in HCl after 24 hours against 13% obtained with the untreated drug. These results demonstrate that nanosuspension may be a promising procedure for improving the biopharmaceutical properties of fenbendazole.

Keywords: Fenbendazole; nanocrystals; dissolution improvement.

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Conflicts of Interest

The authors declare no conflict of interest.