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Preformulation studies of ciprofloxacin loaded PVP nanofibers

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Ciprofloxacin is a worldwide-used, broad-spectrum antibiotic with low water-solubility [1]. To earn higher solubility, and better bioavailability, nanofibers were fabricated as an amorphous solid dispersion with the polymer, polyvinylpyrrolidone (PVP). For the production, needle and needleless electrospinning methods were used [2]. The fiber size and morphology were observed by scanning electron microscopy (SEM). Physicochemical properties were characterized by X-ray powder diffraction (XRPD), differential scanning calorimeter (DSC), and Fourier-transform infrared spectroscopy (FTIR). The results proved the amorphous state of the CIP inside the nanofibrous mats. The solubility, *in vitro* dissolution rate, and *in vitro* diffusion were remarkably higher in the case of the nanofibers compared with the CIP powder or the physical mixture of the two components. The solubility of the CIP demonstrated a significant increase both in water (pH 6.3) and phosphate buffer solution (pH 7.4). In addition, fast-dissolving formulations were developed, while 94±6% of the CIP was released in the first 5 min. Moreover, *in vitro* diffusion from pH 6.8 to pH 7.4 also showed a notable increase. The stability of the nanofibrous samples was studied by SEM and *in vitro* dissolution. In conclusion, fast-dissolving formulations were built up which can be further investigated to develop appropriate pharmaceutical forms.

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