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Development of spray-dried meloxicam-containing microcomposites using biocompatible matrix

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Meloxicam (MEL) could relieve acute pain by absorbing through a highly vascularized alternative route: the nasal mucosa. However, there is an issue that requires a solution: the poor water-solubility of MEL. Chitosan can help to overcome this problem and because it is mucoadhesive, capable of opening the epithelial tight junctions and can achieve controlled drug delivery, there is a growing interest in it as a biocompatible matrix for nasal drug delivery in pharmaceutical developments [1]. The aims of this work were to prepare non-cross-linked and cross-linked drug-free and MEL-containing chitosan-based microparticles by spray drying while optimizing the process parameters and the composition of the formulation. The effect of inlet air temperature and pump rate on the particle size distribution and morphology of drug-free chitosan particles was investigated to determine the optimal parameters. After that, the micrometric properties, structural characterization and *in vitro* drug release of MEL-containing samples were studied. Sodium tripolyphosphate (TPP) was used in different amounts as the cross-linking agent. Micronized chitosan particles were successfully prepared regardless of the process parameters and the concentration of TPP. Nearly spherical habit could be observed in the case of drug-containing samples. The highest amount of molecularly dispersed MEL dissolved from the non-cross-linked formulation, controlled drug release was observed. Based on the mentioned results, spray-dried chitosan microparticles containing MEL may offer an opportunity to reduce acute pain or enhance analgesia through the nasal route.

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References

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