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Formulation and investigation of nanosized piroxicam containing orodispersible lyophilisate

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The non-steroidal anti-inflammatory piroxicam (PRX), is poorly water-soluble active substance, which provides relief in different arthritides. Reducing the particle size of PRX increases its bioavailability [1]. For paediatric, geriatric, and dysphagic patients, oral dispersible systems ease the administration. Overall, fast disintegration followed by drug release and absorption through the oral mucosa can induce rapid systemic effects [2].
We aimed to produce orodispersible lyophilisate consisting of nanosized PRX. After a spray ultrasound-associated solvent diffusion-based nanoprecipitation, the solid form was formulated via freeze-drying. We were expecting fast disintegration and drug dissolution from the an orodispersible formulation; which could be useful in pain therapy.
PRX was solved in ethyl-acetate and then sonicated into an aqueous poloxamer-188 solution. Then, the PRX nanosuspension were freeze-dried into blister sockets. Mannitol and sodium-alginate were applied as excipients. Dynamic light scattering (DLS) and nanoparticle tracking analyses were used to determine the particle size. Scanning electron microscopy (SEM) was applied to characterize the morphology. To establish the crystallinity, X-ray powder diffraction (XRPD) and differential scanning calorimetry (DSC) were used. The disintegration of the lyophilisate was determined. The in vitro dissolution test was executed in artificial saliva.
The particle size investigations presented the nanosized diameter of the drug. The SEM pictures showed the nanosized PRX and the porous structure. PRX became amorphous according to the XRPD and DSC curves. The disintegration time was under 1 minute. The dissolution properties of the PRX improved. The final result was an innovative anti-inflammatory drug delivery system.

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