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A New Technology for Metformin Hydrochloride Mucoadhesive Microparticles Preparation Utilizing BÜCHI Nano-Spray Dryer B-90

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Abstract : Objective: Currently, mucoadhesive microparticles acquired a high interest in both research and pharmaceutical technology fields. Recently, BÜCHI lunched its latest fourth generation nano spray dryer B-90 used for nanoparticle production. B-90 offers an elegant technology combined particle engineering and drying in one step. In our laboratory, we successfully developed a new formulation for metformin hydrochloride, mucoadhesive microparticles utilizing B-90 technology for treatment of type 2-diabetis. Method: Gelatin or sodium alginate, natural occurring polymers with mucoadhesive properties, solely or in combination was used in our formulation trials. Preformulation studies (atomization head mesh size, flow rate, head temperature, polymer solution viscosity and surface tension) and postformulation characters (particle size, flowability, surface scan and dissolution profile) were evaluated. Finally, hypoglycemic effect of the selected formula was evaluated in streptozotocin-induced diabetic rats. Spray head with 7 µm hole, flow rate of 3.5 mL/min and head temperature 120 ºC were selected. Polymer viscosity was less than 11.5 cP with surface tension less than 70.1 dyne/cm. Result: Discrete, non aggregated particles and free flowing powders with particle size was less than 2000 nm were obtained. Gelatin and sodium alginate combination in ratio 1:3 were successfully sustained the in vitro release profile of the drug. Hypoglycemic evaluation of the previous formula, showed a significant reduction of blood glucose level over 24 h. Conclusion: B-90 technology can open a new era of , mucoadhesive microparticles preparation offering convenient dosage form that can enhance compliance of type 2 diabetic patients.

Keywords : mucoadhesive, microparticles, technology, diabetis
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