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Enhancement of dissolution of Atorvastatin through preparation of solid dispersions using supercritical fluid technology

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Supercritical fluid technology (SFT) method offered many advantages in the pharmaceutical area for heat sensitive materials, drying process and preparation of carriers and recently for solid dispersions. The aim of this study was to enhance the dissolution of Atorvastatin as class II model drug. SFT was employed in sample preparation. Selected polymers were polyvinylpyrrolidone (PVP K30), polyethylene glycol (PEG 6000), Soluplus®, and chitosan. Full physicochemical characterizations including *in-vitro* release were performed. The drug was mixed physically with one of the polymers (PVP K30, PEG 6000, Soluplus or chitosan carrier) to produce mixture of drug to polymer in ratio of 1:9. Then, it was processed by SFT apparatus. The overall loading efficiency for all prepared SDs was very good with values higher than 59%. Enhancement of rate of dissolution was achieved in the prepared dispersions. The drug was precipitated as crystalline form in all prepared dispersion. Drug peaks appeared in FTIR for all PMs and SDs indicating absence of chemical interaction between the drug and the polymers though weakening of N-H stretching bond indicated possibility of interaction between Atorvastatin with Soluplus®. SEM analysis for PVPK30, and PEG 6000 dispersions suggested deposition of the drug particles on the surface of the polymer. On the other hand, SD prepared using Soluplus® shows that the surface of the polymer has been foamed and bubbles have been formed. While the particles of the drug were observed clearly in porous structure of chitosan carrier with powder X-ray diffraction indicating the crystalline nature of the drug. All prepared dispersions showed chemical stability except for PVP dispersions which formed stick paste. In conclusions, enhancement of dissolution was achieved through preparation of solid dispersions using SFT solvent free method.

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Evaluation of co-processed excipients for Ezetimibe liquisolid formulation

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Introduction: Liquisolid technique is a powdered solution technology used to convert a liquid medicament into an acceptably flowing & compressible powder by physical blending with selected excipients.

Materials & Methods: In this study, the Ezetimibe will be used with new co-processed excipients (compacted chitin magnesium silicate and/or mannitol & their physical mixtures) & compared to Avicel® PH101 & Aerosil®200 that were used in the original mathematical method of Spireas et al (1998) with the aim of having a novel multifunctional excipient that act as carrier, coating, disintegrant at the same time, thus reducing cost & drug excipient interactions.

Results & Discussion: Compacted powder blends containing different ratios of chitin, magnesium silicate &/or mannitol were prepared using roller compacter and tested for their surface area, particle size & flow ability to be compared with avicel and then liquisolid compacts were prepared according to Spireas. For all prepared liquisolid formulation, interactions between the drug & selected excipients had been detected by a lot of techniques. Co-processing of excipients using roll compactor has a remarkable improvement in the flow ability, and compressibility of the powder.

Conclusion: The best dissolution profile was achieved by using the compacted chitin: mannitol (20:80).

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