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Enhancement of dissolution and stability of candesartan cilexetil-loaded silica polymers

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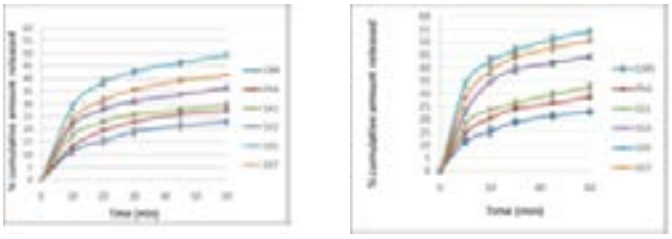
Objective: To prepare stable amorphous solid dispersions of candesartan cilexetil (CAN) with different types of silica, including non-porous (aerosil 200) and porous silica (sylysia 350) using the spray-drying method.

Methods: various ratios of candesartan cilexetil (CAN) were spray dried with aerosil and sylysia. Powder x-ray diffraction (x-ray) differential scanning calorimetry (DSC), SEM were used to characterize the spray dried powders in addition to dissolution and stability studies.

Results: X-ray results showed that the spray–dried (CAN) in the prepared solid dispersion were in amorphous form irrespective of the used silica. In (DSC) analysis, the melting peak of spray-dried (CAN-silica) solid dispersion disappeared. Dissolution property of (CAN) was remarkably improved by formulating with silica particles. In comparing the effect of the type of the silica particles, the dissolution rate of (CAN) from the spray-dried (CAN-sylysia) was faster than that (CAN-aerosil 200) irrespective of the drug content. It was also shown that the spray-dried formulation with silica did not recrystallize when storing at severe storage conditions (40 °C, 75% RH) for three months, while spray-dried (CAN) without silica easily re-crystallized under the same conditions.

Conclusion: Spray drying of (CAN) with sylysia 350 is an efficient method to enhance the dissolution and stability of the drug.



Release profile of CAN, the solid dispersions containing aerosil®200 and Sylysia 350, SA1 (1:1), SA3 (1:3), SA5 (1:5), SA7 (1:7) and the corresponding physical mixture with (1:5) ratio

Recent Publications

1. Khanfar, M etal (2019) enhancement of dissolution and stability of Candesartan cilexetil–loaded silica polymers(2019) IJAP,
2. Khanfar,M,etal (2018) Enhancement of the dissolution and bioavailability from freeze-dried powder of a hypocholesterolemic drug in the presence of Soluplus., Powder Technology 329:25-32
3. Khanfar, M and Suhair ALnimry (2017),Stabilization and Amorphization of Lovastatin Using Different Types of Silica,AAPSPharmSciTech 18(6)
4. al Nimry, Suhairand Khanfar M.2015,Preparation and characterization of lovastatin polymeric microparticles by coacervation-phase separation method for dissolution enhancement, Journal of Applied Polymer Science 133(14)

5. Khanfar M., Fares M, Salem M, Qandil A., 2013, Mesoporous silica based macromolecules for dissolution enhancement of Irbesartan drug using pre-adjusted pH method, Microporous and Mesoporous Materials 173:22-28.

Biography

Mai Khanfar, is a professor of pharmaceuticalTechnology in Jordan University of Science and Technology- Irbid – Jordan. She is now the head of pharmaceutical technology department in this university. Khanfar has many research interests like studying the physical properties of drugs using adsorption isotherm techniques (Surface Phenomena), formulation of long acting preparations using retarding polymers, the use of FTIR technology quantitatively for characterizing different drugs and analyzing their release, solid state manipulation (crystallization), enhancing the solubility of poorly soluble drugs using liquisolid technique and the use of silica polymers to enhance solubility of poorly soluble drugs. Hence Mai had many publications related to these topics in highly ranked journals. Mai is also a supervisor and co supervisor for many master students. She takes part of teaching different levels of pharmacy students viz. physical pharmacy, pharmaceutics , pharmaceutical technology and cosmetic formulations for undergraduate students, in addition to master course like advanced pharmaceutical technology, and a PHD course like pharmaceutical polymers and excipients for graduate students. She was a member of re-registration committee for drugs in Jordan food and drug administration (JFDA) in the years from 2013-2015. Now in addition to her administrative work as a head of pharmaceutical department ,she have two current projects related to the enhancing of the release of poorly soluble drugs using nanotechnology and other one using polymers and some silica polymers to enhance the release in addition to supervision of four master students

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