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The evaluation of a single-step, organic solvent-free supercritical fluid process for the preparation of Olanzapine and Methyl- β -cyclodextrin complexes: A legendary approach to enhance the solubility and dissolution properties

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The purpose of this study was to evaluate a single-step, organic solvent-free supercritical fluid process for the preparation of olanzapine-methyl- β -cyclodextrin complexes with an express goal to enhance the dissolution properties of olanzapine. The complexes were prepared by supercritical carbon dioxide processing, co-evaporation, freeze drying and physical mixing. The prepared complexes were then analyzed by differential scanning calorimetry, X-ray powder diffraction, scanning electron microscopy, solubility and dissolution studies. Computational molecular docking studies were performed to study the formation of molecular inclusion complexation of olanzapine with methyl- β -cyclodextrin. All the binary mixtures of olanzapine with methyl- β -cyclodextrin, except physical mixture, exhibited a faster and greater extent of drug dissolution than the drug alone. Products obtained by the supercritical carbon dioxide processing method exhibited the highest apparent drug dissolution. The characterization by different analytical techniques suggests complete complexation or amorphisation of olanzapine and methyl- β -cyclodextrin complexes prepared by supercritical carbon dioxide processing method. Therefore, organic solvent-free supercritical carbon dioxide processing method proved to be novel and efficient for the preparation of solid inclusion complexes of olanzapine with methyl- β -cyclodextrin. The preliminary data also suggests that the complexes of olanzapine with methyl- β -cyclodextrin will lead to better therapeutic efficacy due to better solubility and dissolution properties.

Biography

Shashi Ravi Suman Rudrangi is a Formulation Research and Development Scientist at Bristol Laboratories, United Kingdom. He has previously worked as a Research Associate at the Medway Centre for Pharmaceutical Sciences, University of Greenwich, UK. He has pursued his Bachelor's degree in Pharmacy from Kakatiya University, India in 2008, Masters and PhD degrees in Pharmaceutical Science at the University of Greenwich in 2010 and 2015, respectively. He works on the Inclusion complexation of poorly soluble drugs with cyclodextrins using organic solvent-free supercritical carbon dioxide processing method. He is a Member of the Royal Society of Chemistry, UK; Member of the Academy of Pharmaceutical Sciences Great Britain, UK and a Life Member of Chemical Research Society of India. He is the current Chair of the Student Association of the Academy of Pharmaceutical Sciences, Great Britain.

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