OP-22

DOI: 10.14232/syrptbrs.2025.48

Solid-state characterization methods for inclusion complexes of dimenhydrinate and hydrophilic derivatives of β-cyclodextrin

Lamija Hindija, Jasmina Hadžiadbić, Ognjenka Rahić, Edina Vranić

University of Sarajevo, Department of Pharmaceutical Technology, Sarajevo, Bosnia and Herzegovina

Hydrophillic derivates of β-cyclodextrin (β-CD) might be used to mask bitter taste and enhance solubility of a slightly soluble antiemetic drug, dimenhydrinate, used to alleviate motion caused nausea, vomiting and vertigo. Thorough characterisation of the newly formed inclusion complexes is necessary to choose the optimal derivate which will provide the most efficient complexation and to determine the most suitable method for forming stable complexes. Commonly employed methods for solid state characterisation of complexes are differential scanning calorimetry (DSC), thermal gravimetric analysis (TGA), X ray difraction (XRD), Fourier transform infra-red spectroscopy (FTIR) and Raman spectroscopy. DSC detects heat flow changes during crystallization, melting or vaporization, with the absence of the drug's melting point indicating inclusion complex formation, while TGA monitors weight loss from dehydration or volatilization, proving drug incorporation into the CD cavity. XRD confirms the formation of a new crystalline species by detecting new peaks or intensity changes, indicating the loss of the pure compound's crystalline structure and its transformation into an amorphous form. SEM determines particle size, shape, and homogeneity, aiding in identifying micro-morphologic changes during complex formation. Changes in peak intensity in the FTIR spectrum of the inclusion complex, compared to the pure drug, provide insight into the bonds and functional groups involved in the interactions with CD. Raman spectroscopy is useful for studying drug-CD inclusion complexes, as the inclusion of the guest molecule alters polarizability, ring size, and vibrational relaxation time, leading to changes in the Raman peaks of the drug and CD.