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Utilization of LC for the physicochemical and thermodynamic characterization of forming cilostazol inclusion complexes with β-CD and DM-β-CD

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In this presentation, the interaction between cilostazol and two different cyclodextrins (β-CD and DM-β-CD) is studied by using LC. The capacity factors (k) of cilostazol were monitored in the presence of increasing concentrations of β-CD or DM-β-CD from the reduction of the retention time (tR). It was observed that cilostazol forms a 1:1 inclusion complex with β-cyclodextrin (β-CD) and dimethyl-β-cyclodextrin (DM-β-CD) at 25^{0}C, 37^{0}C and 45^{0}C. The interaction of cilostazol with DM-β-CD was more efficient and the highest the formation constant (K) was found for DM-β-CD (23.82M-1) at 25^{0}C. Moreover, the values of K decreased as the system temperature increased. To obtain the information on the mechanism of cilostazol affinity for β-CD and DM-β-CD, the thermodynamic parameters of the complexation (ΔG, ΔH, and ΔS) were studied. Finally, a comparison of the K values obtained for the two different cyclodextrins revealed that the K values of the complexation are dependent upon the structure of the host molecule. The change in the thermodynamic parameters suggested that the complexation could proceed spontaneously (ΔG<0) along with the releasing of heat (ΔH<0) and the decrease of entropy (ΔS<0).

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