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Evaluation the effect of cyclodextrin complexation on aqueous solubility of fluorometholone to achieve ophthalmic solution

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View references (٣١)

Abstract

In this study, the effect of different CDs including α-CD, β-CD, γ-CD, hydroxypropyl β-CD (HP β-CD), sulphobutylether β-CD (SBE β-CD) and HP γ-CD on aqueous solubility of fluorometholone (Flu) was investigated. Also the phase solubility studies were performed in the presence of eye drop excipients such as benzalkonium chloride, hydroxypropyl methylcellulose (HPMC) and buffers. The aqueous solubility of Flu was increased by ٨, ١٥, ٥, ١٠٠, ٦٥ and ١٣٥ folds in the presence of ٢٠٪ w/v α-CD, β-CD, γ-CD, HP β-CD, HP γ-CD and SBE β-CD, respectively. Aqueous solubility of Flu was ٠,٤٣ ± ٠,٠٨ and ١,١٦ ± ٠,٠٤ mg/mL in systems containing ٥٪ w/v HP γ-CD and SBE β-CD, respectively. The aqueous solubility of Flu in the presence of HP γ-CD was not influenced by buffer type while the phosphate buffer caused a reduction in the aqueous solubility in the presence of SBE-β-CD. Also, investigations on the solubility of Flu in water in the presence of ٥٪ HP γ-CD and SBE-β-CD and the additives such as benzalkonium chloride and HPMC indicated that these components had no remarkable effect on the aqueous solubility of Flu. In conclusion, CD complexation is able to improve the aqueous solubility of Flu and it would be possible to prepare ophthalmic solution of Flu by this method. © Springer Science+Business Media B.V. ٢٠٠٩.

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