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Review Article

# Guest-host Relationship of Cyclodextrin and its Pharmacological Benefits

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## Abstract

Many methods, including solid dispersion, micellization, and inclusion complexes, have been employed to increase the solubility of potent drugs. Beta-cyclodextrin (βCD) is a cyclic oligosaccharide consisting of seven glucopyranoside molecules, and is a widely used polymer for formulating soluble inclusion complexes of hydrophobic drugs. The enzymatic activity of Glycosyltransferase or α-amylase converts starch or its derivatives into a mixture of cyclodextrins. The βCD units are characterized by α -(1-4) glucopyranose bonds. Cyclodextrins possess certain properties that make them very distinctive because of their toroidal or truncated cage-like supramolecular configurations with multiple hydroxyl groups at each end. This allowed them to encapsulate hydrophobic compounds by forming inclusion complexes without losing their solubility in water. Chemical modifications and newer derivatives, such as methylated βCD, more soluble hydroxyl propyl methyl βCD, and sodium salts of sulfobutylether-βCD, known as dexolve® or captisol®, have envisaged the use of CDs in various pharmaceutical, medical, and cosmetic industries. The successful inclusion of drug complexes has demonstrated improved solubility, bioavailability, drug resistance reduction, targeting, and penetration across skin and brain tissues. This review encompasses the current applications of β-CDs in improving the disease outcomes of antimicrobials and antifungals as well as anticancer and anti-tubercular drugs.

**Keywords:** Beta-cyclodextrin, anticancer drugs, PFASs, anti-tubercular drugs, solid dispersion, drug delivery.