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Applications of Cyclodextrins in Medical Textiles – Review

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Abstract

This paper presents data on the general properties and complexing ability of cyclodextrins and assessment methods (phase solubility, DSC tests and X-ray diffraction, FTIR spectra, analytical method). It focuses on the formation of drug deposits on the surface of a textile underlayer, using a cyclodextrin compound favoring the inclusion of a drug/active principle and its release onto the dermis of patients suffering from skin disorders, or for protection against insects. Moreover, it presents the kinetics, duration, diffusion flow and release media of the cyclodextrin drug for *in vitro* studies, as well as the release modeling of the active principle. The information focuses on therapies: antibacterial, anti-allergic, antifungal, chronic venous insufficiency, psoriasis and protection against insects. The pharmacodynamic agents/active ingredients used on cotton, woolen and synthetic textile fabrics are presented.

Keywords: cyclodextrin, textile fabric, drug release, skin disorders

Abbreviations: Alpha CD = alpha cyclodextrin; Beta CD = beta cyclodextrin; Beta CD-g-PAA = beta cyclodextrin grafted with polyacrylic acid; BTCA = butane tetracarboxylic acid; CD = cyclodextrin; CTR = citric acid; DMF = N,N-dimethyl formamide; EPCL=epichlorohydrin; Gamma CD = gamma cyclodextrin; HP beta CD = hydroxypropyl beta cyclodextrin; HP gamma CD = hydroxypropyl gamma CD; Iac = itaconic acid; Ianh = itaconic anhydride; Me CD = methyl cyclodextrin; Me beta CD = methyl beta cyclodextrin; MCT beta CD= mono chlorotriazynil beta cyclodextrin; MCT beta CD-g-PAA = mono chlorotriazynil beta cyclodextrin grafted with polyacrylic acid; NPs = nano particles; PAA = polyacrylic acid; PES = polyester; PHMB = polyhexamethylene biguanide; TEA = triethylamine; TEM = transmission electron microscopy.

Chemical compounds

Beta-Cyclodextrin (PubChem CID: 71306822); Methyl-Beta-cyclodextrin (PubChem CID: 51051622); Epichlorohydrin (PubChem CID: 7835); Acryloyl chloride (PubChem CID: 13140); Itaconic acid (PubChem CID: 811); Polyhexamethylene biguanide (PubChem CID: 20977); Triclosan (PubChem CID: 5564); Ag (PubChem CID: 23954); Permethrin (PubChem CID: 40326);

1. Introduction

After enzymatic degradation, the starch from potatoes, corn, rice, etc. forms a mixture of linear, branched or cyclic dextrans, called cyclodextrins [1]. CDs were discovered by routine procedures

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