CYCLOLAB

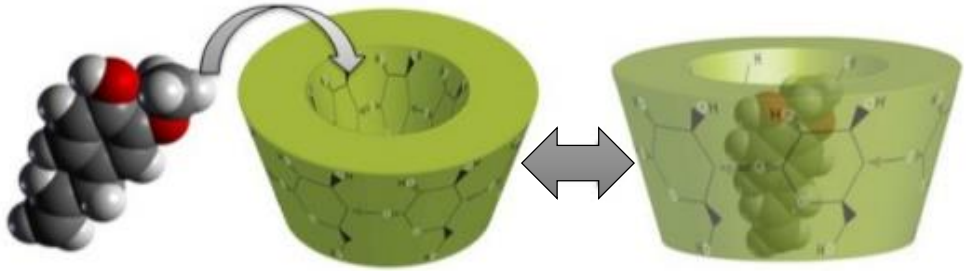
PIONEERS IN CYCLODEXTRIN-BASED INNOVATION

GETTING THE BEST OUT OF CYCLODEXTRINS

Cyclodextrins in cosmetics

What are cyclodextrins?

- Composed of sugars
- Cyclic molecules
- Naturally occurring compounds
- Used in food, pharmaceuticals, drug delivery, chemical industries, agriculture, etc.
- **Sub-nanometer** sized molecular containers with hydrophilic outer phase and hydrophobic interior properties
- Reversible inclusion complex formation



CYCLO AB

DEXOLVE™

Why use cyclodextrins in cosmetics?

CDs as solubilizing agents

- Stable aqueous solutions of insoluble compounds can be prepared without the use of organic co-solvents or surfactants and the rate of dissolution can be enhanced.

Flavor and odor coverage by encapsulation

- CDs may be useful in covering the unfavorable organoleptic characteristics of some cosmetic products due to the presence of a particular active.

Liquid or oily materials can be transformed into powder forms

- Some active ingredients in cosmetic preparations, such as α-tocopherol and vitamin A, occur in oily form and thus are difficult to handle. This problem can be easily solved by preparing a CD inclusion complex in solid state.

Why use cyclodextrins in cosmetics?

Controlled/extended release of fragrances

- CDs can be used to complex different fragrances, included in personal care products such as shampoos, deodorants, detergents and absorbent powders such as bath- and baby-powder products.

Protecting agents against light, heat, and oxidation:

- CDs can increase the physical and chemical stability of guest molecules by protecting them against oxidation, decomposition, hydrolysis or loss by evaporation.

Preventing skin irritation

- CDs alleviate local irritation and reduce side effects. CDs have advantages over other conventional penetration enhancers, such as fatty acids and surfactants.

Stabilization of emulsions and suspensions

- Incompatible compounds can be mixed and used together in complexed form.

CDs in cosmetics

Water / Aqua, Butylene Glycol, Biosaccharide Gum-1, Cyclodextrin, Salicylic Acid, Panicum Miliaceum Glycoprotein Extract, Aloe Barbadensis (Aloe Vera) Extract, Arginine, PEG-10 Soya Sterol, Ceteth-20, Dimethicone, Ceteth-2, Dimethicone Copolyol, Hexadecanol, Methylparaben, Green 5 / CI 61570, Yellow 10 / CI 47005

Olive Fruit Oil, Vaseline, Mineral Oil, Diisostearyl Malic Acid, Ceresin, Hydrogenated Kokoguriseriru, Hexa-hydroxy Stearic Acid Dipentaerythrityl, Tri(Caprylic/Capric Acid) Glyceryl, Ethylhexyl Methoxycinnamate, Cyclodextrin, Polyethylene, Dimethicone, Squalane, Tocopherol Acetate, Isotridecyl Isononanoate, Microcrystalline Wax, Fragrance, Silica, t-Butylmethoxydibenzoylmethane, BHT, (+/-) 4 Yellow, Blue 1, Red 201

CDs in cosmetics

Peg-115M, PVP, Peg-100, Cyclodextrin, Tocopherol, Aloe Barbadensis (Aloe Vera), Maltodextrin

Alcohol Denat., Water / Aqua, Parfum / Fragrance, Methyl Cyclodextrin, BHT, Butylphenyl Methylpropional, Citral, Citronellol, Diethylamino Hydroxybenzoyl Hexyl Benzoate, Ethylhexyl Methoxycinnamate, Eugenol, Geraniol, Limonene, Linalool

CDs in cosmetics

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En ce qui concerne les codes à deux lettres et autres abréviations, se référer aux "Notes explicatives relatives aux codes et abréviations" figurant au début de chaque numéro ordinaire de la Gazette du PCT.

(54) Title: USE OF CYCLODEXTRINE AS A PEARLY-LUSTRING AGENT AND PEARLY LUSTRED COMPOSITIONS

(54) Titre : UTILISATION D'UNE CYCLODEXTRINE EN TANT AGENT NACRANT ET COMPOSITIONS NACREES

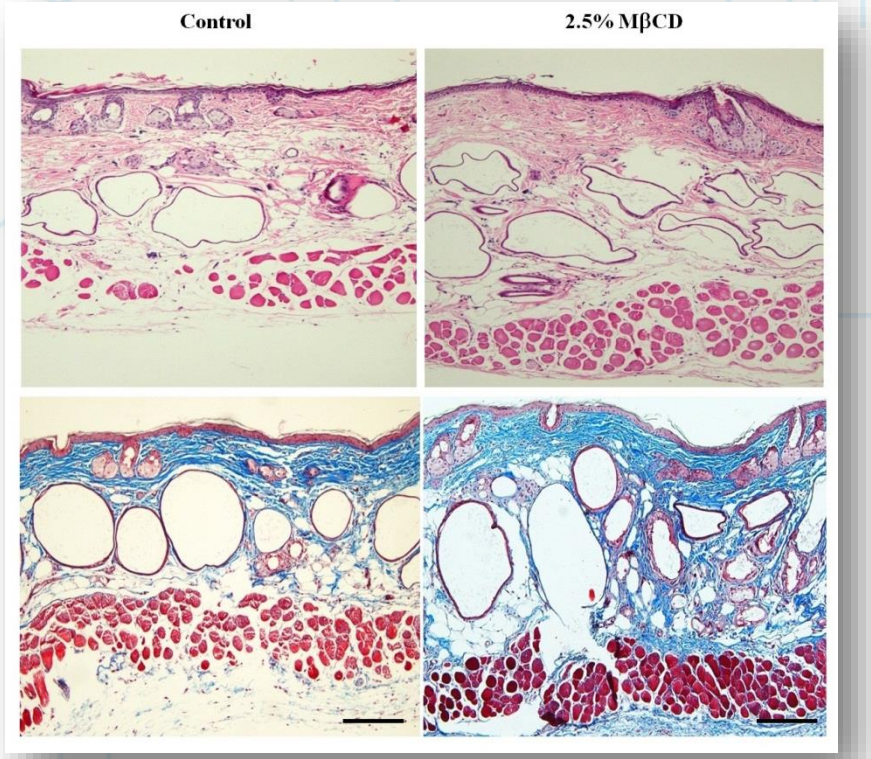
(57) Abstract: The invention relates to the use of at least one cyclodextrine as a pearly-lustring agent in a cosmetic composition in an aqueous physiologically acceptable medium. The invention also relates to pearly-lustred compositions comprising at least one cyclodextrine and at least one surfactant in an aqueous physiologically acceptable medium. The invention further relates to pearly-lustred compositions comprising at least one cyclodextrine, at least one surfactant and at least one conditioning agent in an aqueous physiologically acceptable medium. The invention also relates to the use of said cyclodextrine as a suspension agent for insoluble conditioning agents. The inventive compositions are used in particular as rinsed products for washing and/or conditioning keratin materials.

CDs in household toiletries

P&G has been awarded over 200 patents on the application of CDs in fabric, homecare and health, beauty care

Future prospects

- Caveolin-1 (Cav-1) is one of the key molecules to modulate collagen metabolism in the skin with a negative correlation between Cav-1 and collagen I (COL I).
- Methyl-βCD is a known chemical Cav-1 inhibitor.
- Methyl-βCD injection via the intra-dermal route revealed that 2.5% MβCD administered twice per week for two months showed a potent COL I up-regulating activity, leading to the increase of skin thickness ($P < 0.05$) without adverse reactions such as skin fibrosis.
- Collectively, Methyl-βCD has a COL I enhancing activity in chronologically-aged skin, where Cav-1 acts as a brake in COL I expression, suggesting its potential role for an anti-aging agent.



H & E (upper panel) and Masson's trichrome (lower panel) stains for skin samples were performed from 2.5% MβCD-injected and control groups (n=3 for both groups).
Bar = 20 μm

Lee, J-A.; Choi, D-I.; Choi, J-Y.; Kim, S-O.; Cho, K-A.; Lee, J-B.; Yun, S-J.; Lee, S-C. (2015) Methyl-β-cyclodextrin up-regulates collagen I expression in chronologically-aged skin via its anti-caveolin-1 activity. Oncotarget., 6(4), 1942-1953

Who are we at CycloLab?

The world's only all-round CYCLODEXTRIN company with over

40-year experience of CD-technology

in pharmaceutical-, cosmetics-, food-, environmental- and analytical applications

Experience

Over 490 technical/scientific papers
and 950 technical reports to customers

200 different cyclodextrin derivatives
130 patents/applications
40 products on the market

Drug Master Files (USA type IV) and eCTD

Over 20,000 citations to CYCLOLAB's papers

Expertise & Technology

Custom synthesis

Drug solubilization and stabilization

Further industrial applications

Cyclodextrin-related analytics

Stability testing

GMP-conform manufacturing

Feasibility studies

DEXOLVE™

CycloLab service portfolio
Related services – R&D

Early phase drug development

Customization of CD enabled formulations

Investigation of changes in physico-chemical properties

Life cycle management

Custom cyclodextrin synthesis

Exclusive manufacture, unique synthetic routes

Self-tailored products and characteristics

In vitro bioequivalence studies

Design and performance of in vitro studies to support bioequivalence of a CD enabled formulation

Analytical services

Method development, validation; cGMP release testing of pharma grade CDs

HPLC, GC, CE, UV, MS, NMR, IR, Micro and BET content methods

Stability studies

CD-guest interaction studies

CD-based chiral separations

Assay, impurity tests

Bioanalytical investigations

IP services and consultation

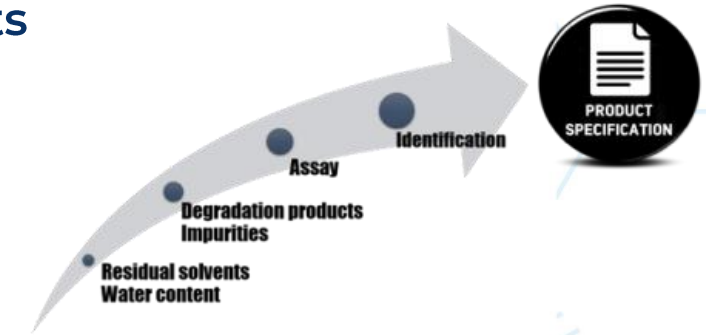
30 years of experience in compilation of CD related patents (synthesis, application, etc.), patent claim analysis, consultancy in CD related projects

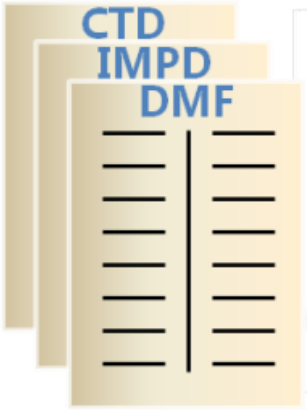
Over 62.000 CD related papers

DEXOLVE™

GMP SYNTHESIS

Regulatory license for manufacture of APIs and clinical investigational products





CycloLab service portfolio
Related services – R&D

Feasibility study

Running a short feasibility study with your molecule free of charge

Proof of concept to consider CD based formulations

CycloLab Grant

CycloLab offers a unique possibility to collaborate on creating novel and interesting cyclodextrins under the terms of the CycloLab Grant

The proposal after application is thoroughly evaluated by CycloLab

If the application is approved, the cyclodextrin is provided free of charge for the beneficiary

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