Application of Cyclodextrins in Cosmetics
What are cyclodextrins (CDs)?

- Composed of sugar units
- Cyclic molecules
- Naturally occurring compounds
- Used in food, pharmaceuticals, chemical industries, agriculture, etc.

Reversible inclusion complex
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**

The 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.
Who we are and what can we offer?

CycloLab is the world's only all-around Cyclodextrin Service Provider

Our services include:

• Supplying cyclodextrins for commercial products and product development

• Screening cyclodextrin derivatives to find the right candidate for the request of customers

• Providing formulation development services, composition optimization, stability assessment

• Offering analytical services to characterize complexes and products

For more information please click here
CDs in cosmetics
Skin anti-aging products:
**CoQ10-gammaCD in eye wrinkle creams**

Effect of CoQ10-γCD complex supplemented eye wrinkle cream on human skin
(Terao, et al. 2006 CycloChem Bio)

**Before intake**

**After 6 weeks**

- **Wrinkle**
  - Male, 33 years old / Outer corner of the left eye
  - Number of wrinkles decreases
  - Skin elasticity increases

- **Skin texture (digital microscope)**
  - Female, 32 years old / Cheek near the right eye
  - Skin elasticity increases

**Special characteristics**
- Chemical Name: CoQ10 ɣ-CD inclusion complex
- CAS-Number: ɣ-cyclodextrin: 17465-86-0
- Coenzyme Q10: 303-98-0
- Appearance: Free-flowing slightly yellow/orange colored powder
- Bulk density: 0.1-0.3 g/cm³
- Particle size: 100 micron max
- Dispersibility: Disperses easily in water (Picture→)
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
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

Title: USE OF CYCLODEXTRINE AS A PEARL-LUSTRING AGENT AND PEARL LUSTRED COMPOSITIONS IN TANGENT AGENT NACRANT ET COMPOSITIONS NACRYES

Abstract: The invention relates to the use of at least one cycloextrin as a pearl-lustring agent in a cosmetic composition in an aqueous physiologically acceptable medium. The invention also relates to pearl-lusted compositions comprising at least one cycloextrin and at least one surfactant in an aqueous physiologically acceptable medium. The invention further relates to pearl-lusted compositions comprising at least one cycloextrin, 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 cycloextrin 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.
P&G has been awarded over 200 patents on the application of CDs in fabric, homecare and health, beauty care.
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% Methyl-βCD 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% Methyl-βCD-injected and control groups ($n=3$ for both groups). Bar = 20 μm.

Company contacts:
CycloLab Cyclodextrin Research & Development Laboratory Ltd.
Budapest, P.O. Box 435, H-1525 Hungary
Location: Illatos út 7., Budapest, H-1097 Hungary
TEL: (+36) 1-347-60-70; FAX: (+36) 1-347-60-68
E-mail: info@cyclolab.hu; Homepage: http://cyclolab.hu/

Contact person:
Tamas Sohajda
R&D Director
info@cyclolab.hu
Tel: (+36) 1-347-60-72