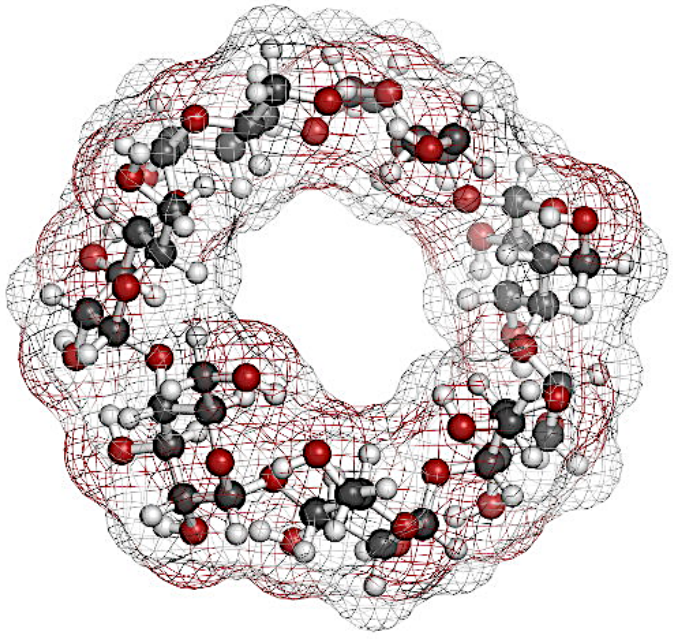
ND Pharma

CYCLODEXTRINS

The New Frontiers in Carbohydrates



CYCLOSOL® Series

by ND Pharma & Biotech

ND Pharma

CYCLODEXTRINS

Cyclodextrins are oligosaccharides obtained by enzymatic extraction from starch and starch-containing raw materials such as corn or potatoes.

Cyclodextrins are vegetarian-grade and non-allergenic, and do not have an E number. The characteristic feature of cyclodextrin molecules is their ring-shaped, three-dimensional structure, with a hydrophobic cavity in the center, which is capable of receiving a lipophilic "guest" molecule – provided its size and shape are compatible.

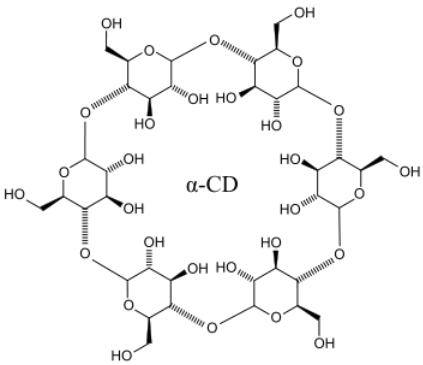
Cyclodextrins hydrophilic outer surface ensures compatibility with aqueous systems. These specific properties of cyclodextrin complexes open-up a wide range of new application fields in a wide variety of industries and sectors.

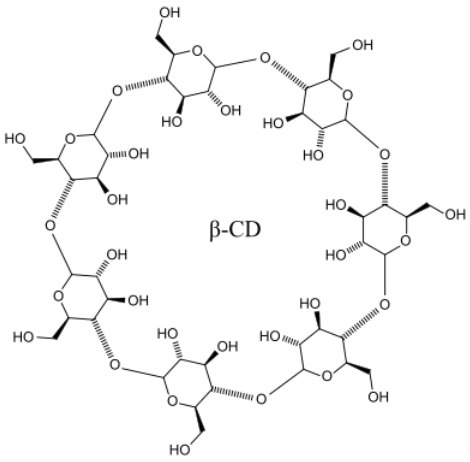
ND Pharma & Biotech

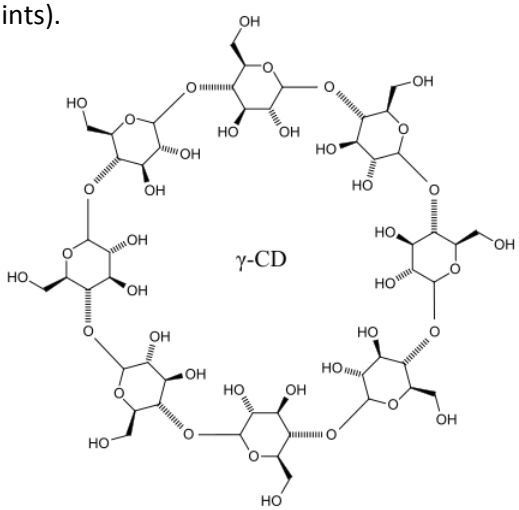
ND Pharma & Biotech manufactures and supply all three natural cyclodextrins – α, β and γ.

Cyclodextrins from ND Pharma, are in the market under the product name **CYCLOSOL®**: We offer **CYCLOSOL®** cyclodextrins in pharmaceutical grade (**CYCLOSOL® Pharma**), food grade (**CYCLOSOL® Food**), as well as standard technical grade.

In addition, we have various other **CYCLOSOL®** complexes in our portfolio. **CYCLOSOL®** cyclodextrins from ND Pharma are used in different applications in the food and food supplement industries, as well as in consumer care, pharmaceuticals and construction (paints).







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CYCLODEXTRINS

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Cyclodextrins are non-reducing chiral sugars, whose molecules are made of several glucose building blocks linked into a ring.

In dependence to the number of glucose units, a distinction is made between α-, β- and γ-cyclodextrin.

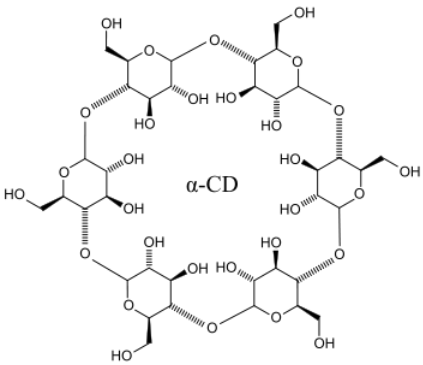
α-cyclodextrin consists of six,
β-cyclodextrin consist of seven and,
γ-cyclodextrin consist of eight glucose units.

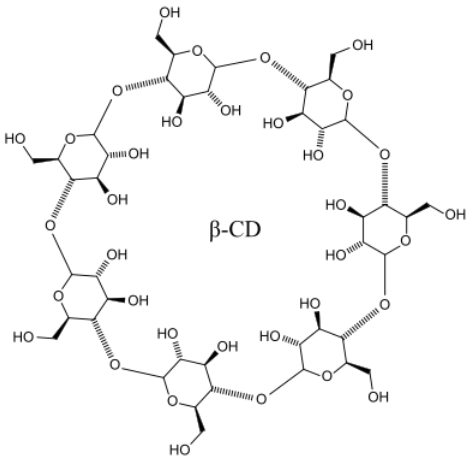
Cyclodextrins are natural degradation products of starch, mainly from Maize and/or Potato.

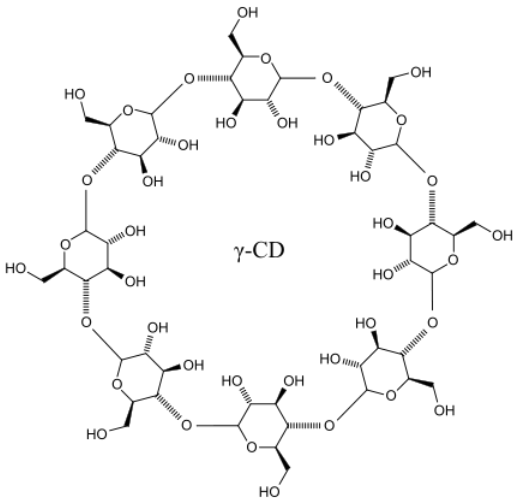
The **cyclodextrin** molecules are structured so that the hydrophilic (water-likers) glucose building blocks face outwards and there is a lipophilic cavity (i.e. one with an affinity for fats) on the inside.

This cavity can receive another lipophilic molecule as a “guest,” provided it is of the “appropriate” size and shape. The cohesion between the two molecules is produced by relatively weak forces (van der Waals), enabling the guest molecule to be liberated again under suitable conditions.

The weak van der Waals interactions within an inclusion compound do not chemically alter the “guest” or “host” molecules.







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CYCLODEXTRINS

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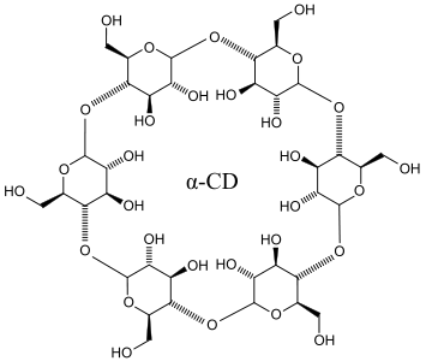
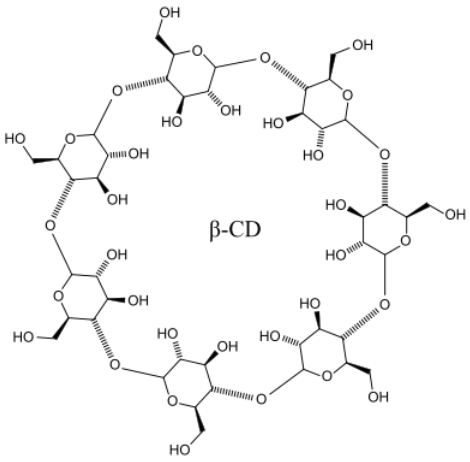
In the food industry, alpha-cyclodextrin offers a new vegetarian-grade alternative to stabilization of oil-in-water emulsions. It can also be used as a whipping aid for liquid and dry proteins. As a whipping agent, it makes it possible to produce new mousse products ***without the need for fat or dairy protein***. **alpha-Cyclodextrin** is used in Europe, USA and many other countries as a soluble dietary fiber. Moreover, the ***European Commission has certified that alpha-cyclodextrin has a scientifically proven health benefit (health claim)***. The EU expert opinion confirmed that ***alpha-cyclodextrins can reduce the increase in blood sugar after a starchy meal.*** Other applications of cyclodextrins in the food industry include masking bitter tasting substances, stabilizing aromas and increasing the bioavailability of active ingredients.

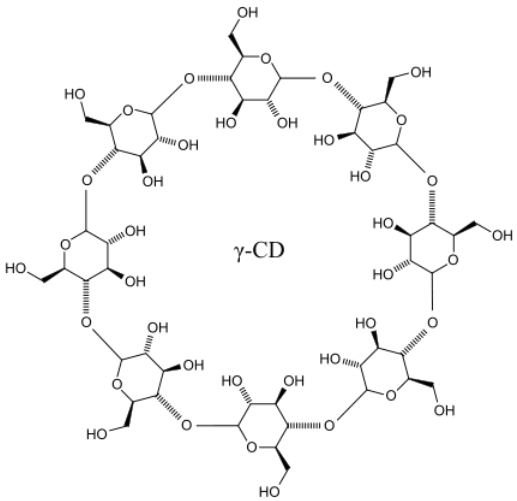
Because the capability of reversible inclusion of other substances, cyclodextrins can also be used ***in pharmaceutical and chemical fields*** of application, for ***modifying the properties of compounds***: ***improving the stability and solubility in aqueous media*** or ***to reduce the volatility***; likewise, they can ***mask the taste or odor of drugs***.

Cyclodextrins are used in fermentation to extract the desired fermentation products. They are particularly suitable for lipophilic products.

Cyclodextrins can also be used to selectively ***improve the properties of polymer systems***: as processing auxiliaries in polymerization processes or as additives for rheology control – in a range of different industries, both in ***construction*** as well as in ***life-sciences applications***.







ND Pharma

CYCLODEXTRINS

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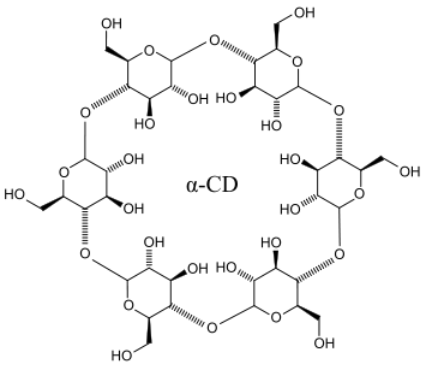
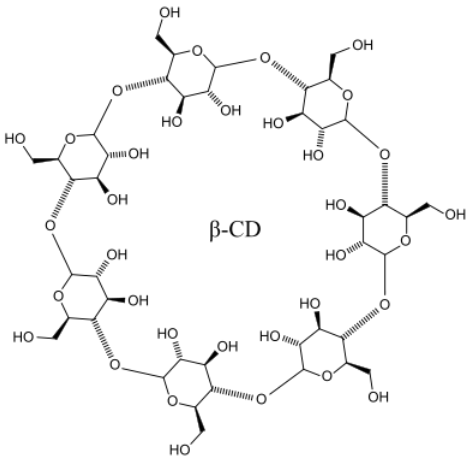
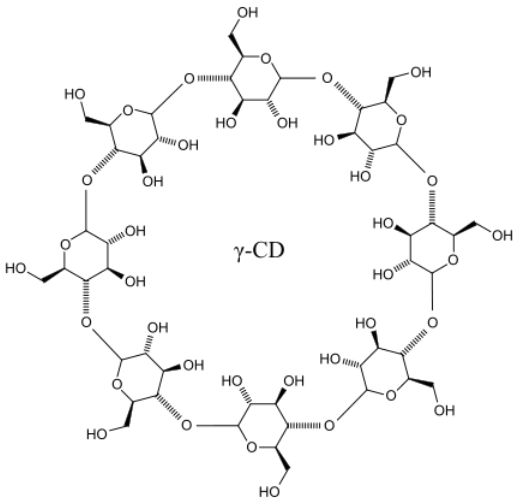
Our Cyclodextrins Offer:

- **CYCLOSOL A®**
- **ALPHA-CYCLODEXTRIN**
- **CYCLOSOL AH®**
- **ALPHA-CYCLODEXTRIN HYDRATE**
- **CYCLOSOL A GLUCOSYL®**
- **6-O-ALPHA-D-GLUCOSYL-ALPHA-CYCLODEXTRIN**
- **CYCLOSOL ANASH®**
- **ALPHA-CYCLODEXTRIN SULFATE SODIUM HYDRATE**
- **CYCLOSOL A (FG)®**
- **ALPHA-CYCLODEXTRIN (FOOD GRADE)**
- **CYCLOSOL B®**
- **BETA-CYCLODEXTRIN**
- **CYCLOSOL B-MET®**
- **2,6-DI-O-METHYL-BETA-CYCLODEXTRIN**
- **CYCLOSOL B-TRIAC®**
- **TRIACETYL-BETA-CYCLODEXTRIN**
- **CYCLOSOL B-H_2O®**
- **BETA-CYCLODEXTRIN HYDRATE**
- **CYCLOSOL B-2HPL®**
- **2-HYDROXYPROPYL-BETA-CYCLODEXTRIN**
- **CYCLOSOL B-HPL®**
- **HYDROXYPROPYL-BETA-CYCLODEXTRIN**
- **CYCLOSOL G-PURE®**

GAMMA-CYCLODEXTRIN 98% MIN







CYCLOSOL® by ND Pharma

For further information about us, our catalogue of products and services and the fields we operate offering solutions, please write us to:

info@ndpharmabiotech.com

ND Pharma & Biotech

We have been an independent, family-owned and financially stable private company serving as provider for the Pharmaceutical, Research, Biotechnological, Agricultural and Chemical Industry since our incorporation.

We have established a series of strong partnerships and alliances worldwide to serve more efficiently to our clients and customers worldwide.

Our exclusive business model is part of our uniqueness in the creation of added value and strategic advanced solutions for you.

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