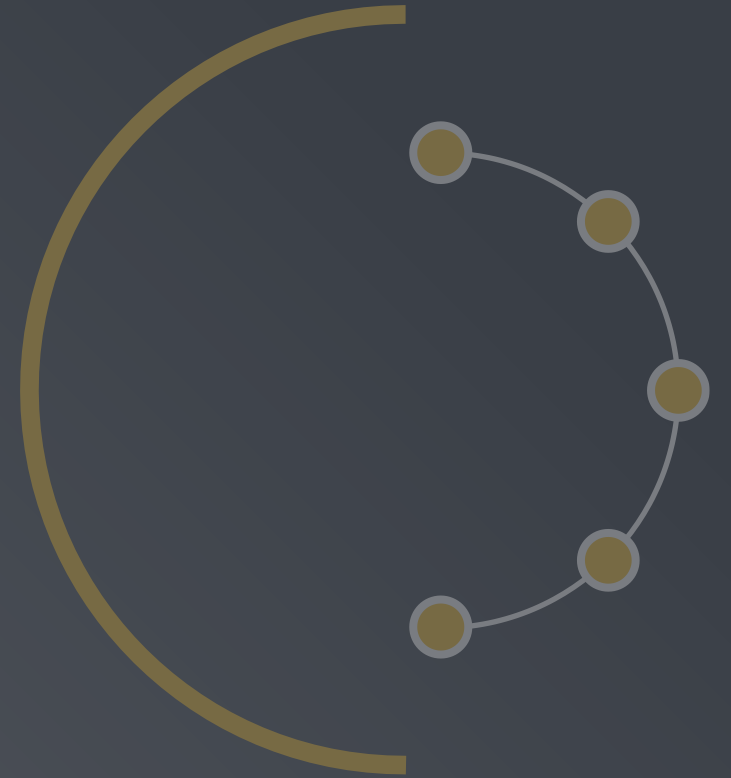




CARBOHYDE
SUGAR IS LIFE



Cyclodextrins

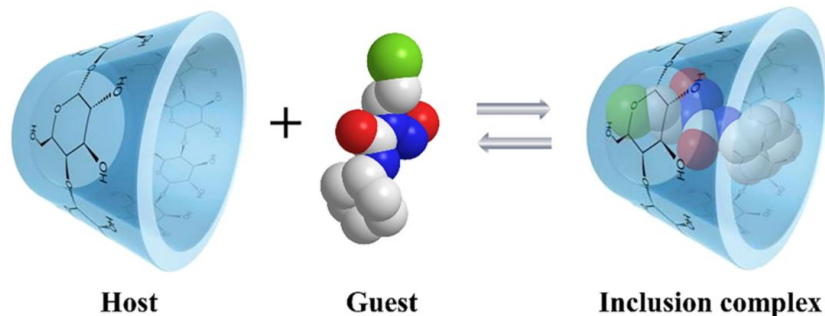
In Nutraceuticals



What are Cyclodextrins (CDs)?

Properties

- Vegan, natural, cyclic molecules, composed of sugars.
- Toroid structure with **interior hydrophobic** cavities and **exterior hydrophilic** rims.
- Hydrophobic molecules can be incorporated.
- Often, the **aim** is to increase the solubility, dissolution rate, and stability.



Dynamic host-guest interaction



Medicine



Household



Food & Drinks



CD

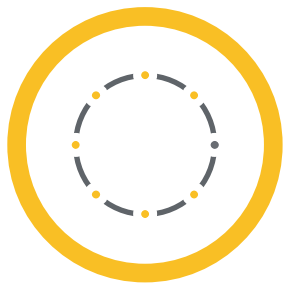


Agriculture



Cosmetics

The structure and application areas of CDs



A Powerful Tool in Traditional Application

CDs as multifunctional excipients

Cyclodextrins can be used to improve the stability and bioavailability of vitamins, minerals, and other active ingredients in nutraceuticals and dietary supplements.

With cyclodextrins we can **increase** your bioactive compound's



- Solubility, dissolution rate
- Stability
- Wetting
- Absorbed quantity, bioavailability

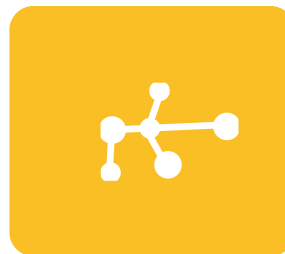
With cyclodextrins we can **decrease** your bioactive compound's



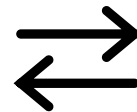
- Dose for the same efficacy
- Taste and smell
- Interactions
- Toxicity, side effects



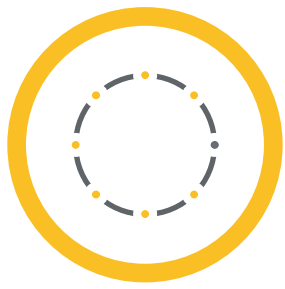
cyclodextrin



bioactive
compound



inclusion complex



Cyclodextrins in Nutraceuticals

Safety of CDs

Cyclodextrins have been extensively studied in food and nutraceuticals, with regulatory agencies approving their inclusion due to their low toxicity and minimal risk to human health.

	α -CD	β -CD	γ -CD
GRAS ¹	✓	✓	✓
Novel food ²	✓		✓
Total daily oral dose (mg/day)	6 000	500	10 000

¹Generally recognized as safe (GRAS)

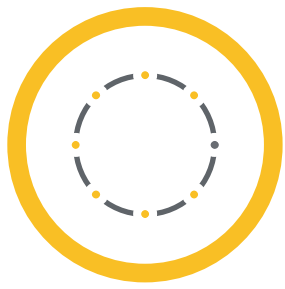
²https://food.ec.europa.eu/safety/novel-food/authorisations/list-authorisations-under-former-novel-food-regulation_en

Area of application

By forming inclusion complexes with a range of guest molecules, cyclodextrins can **protect volatile compounds** from degradation, **mask unwanted tastes and odors**, and even improve the overall taste profile of the food/nutraceutical.

Many bioactive compounds have poor water solubility, which can limit their absorption in the body. Cyclodextrins can **improve the solubility** of these compounds, aiding in their absorption and bioavailability.

Cyclodextrins have a **prebiotic** effect in lower guts.



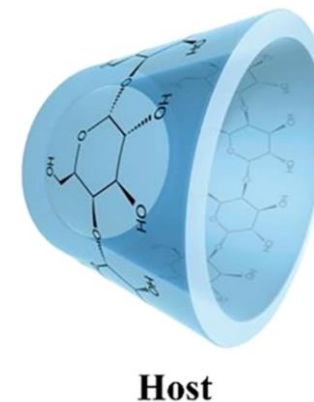
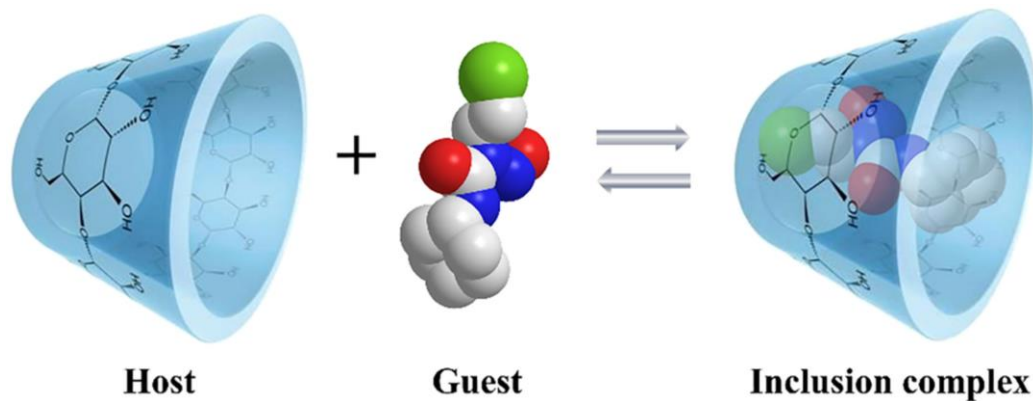
Utility of Cyclodextrins in Food

Encapsulation agents/additive

- **stabilization** of flavours, colorants, etc.
- **solubilization** purposes (beverages)
- **controlled-release** of food additives
- **improving food properties** (against hygroscopicity, improving powder properties, etc.)

„Empty” non-complexed CDs

- **tastes and odor masking** agents
- **dietary fibers**, affecting human microflora
- human **lipid status-altering** agents
- **glycemic response** affecting agents



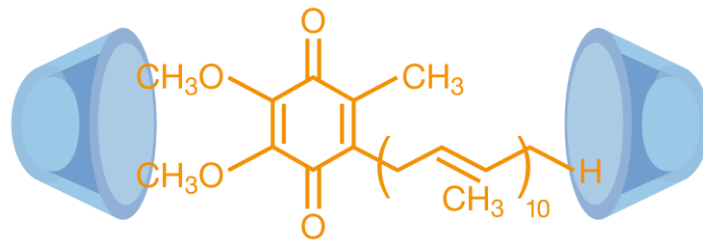


CD-Containing Dietary Supplement

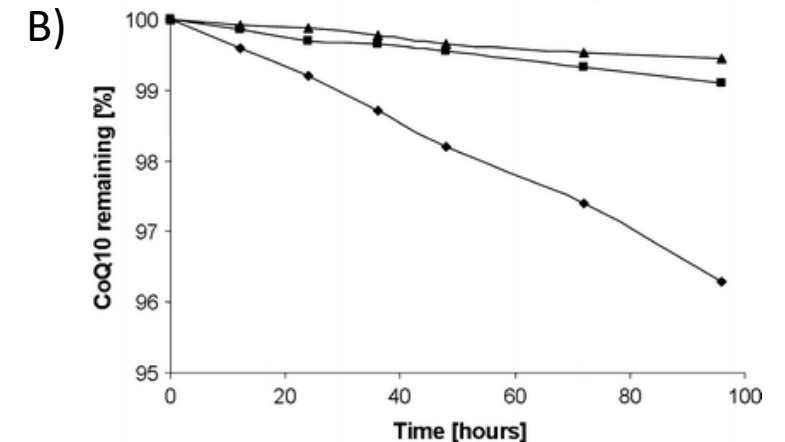
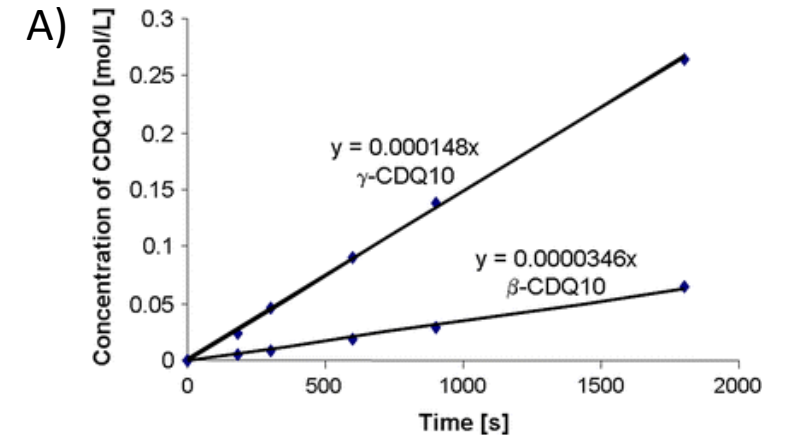
CoQ10 containing products

Cyclodextrins can encapsulate CoQ10 molecules, enhancing their solubility in water-based solutions and potentially improving absorption.

Cyclodextrins can protect CoQ10 from degradation, thereby increasing its stability and shelf life.

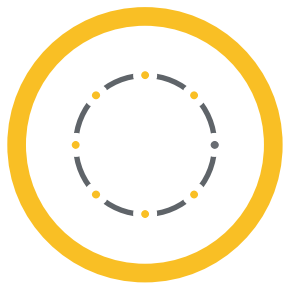


CoQ10 encapsulated by GCD



Increased solubility (A) and stability (B) of CoQ10 by CDs¹

¹Fir, M.M. et al. Studies of CoQ10 and cyclodextrin complexes: solubility, thermo- and photo-stability. J Incl Phenom Macrocycl Chem 64, 225–232 (2009). <https://doi.org/10.1007/s10847-009-9555-4>



CD-Containing Dietary Supplement

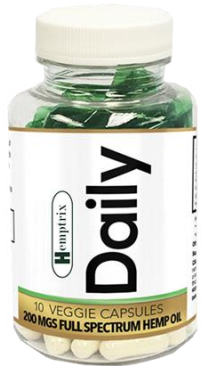
Solubilized cannabinoids - cannabidiol (CBD)

Improved solubility and bioavailability of CBD.

α-CD is also listed for its benefits as a dietary supplement, as being able to lower cholesterol and blood-fat levels, while also feeding the gut microbiome.

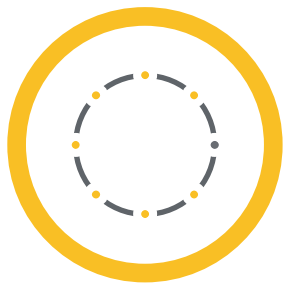


Capsules containing a micelle preparation of water-soluble full-spectrum hemp oil powder.



Spectrum of products containing CD solubilized CBD

SUPPLEMENT FACTS		
SERVING SIZE: 1 CAPSULE		
SERVINGS PER CONTAINER: 10		
AMOUNT PER SERVING		% DAILY VALUE
Cyclodextrin Prebiotics	475 mgs	**
Cannabidiol (CBD) *	25 mg	**
(Derived from 200mgs full spectrum, whole plant hemp oil including all natural Cannabinoids and Terpenes.)		



CD-Containing Dietary Supplement

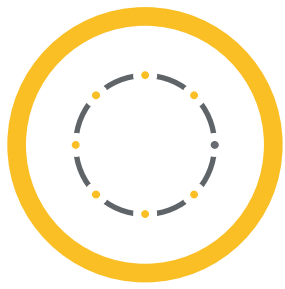
Manuka Honey - Cyclopower

Manuka honey is renowned for its potential health benefits, particularly its **antibacterial and wound-healing properties**.

When combined with cyclodextrins in the form of Manuka honey CycloPower, it is claimed that the **encapsulation enhances the bioavailability and efficacy** of the active compounds present in the honey.



Manuka Honey - Cyclopower



CD-Containing Dietary Supplement

SCHALI®-D encapsulated bio-complexes

SCHALI®-D dietary supplements are intended to support endocrine function and prevent diabetes conditions.



SCHALI®-D products



QD SCHALI®

Natural bio compatible hetero-crystals of QD SCHALI® series



SCHALI® Care

SCHALI® Care is a line of antiseptic products for wide range of applications



SMC SCHALI®

SMC SCHALI® Silicone Mineral Complex is intended to promote vital reserves and protect humans from everyday stress



SCHALI®-D

SCHALI®-D bio-complexes are functional dietary supplements supporting endocrine system function



HMP SCHALI®

HMP SCHALI® medical sterile Hydrocolloid Mineral Plaster is intended to normalize human serotonin balance



SCHALI® Dental

Complex Oral Hygiene and Protection

SCHALI® product portfolio



CARBOHYDE
SUGAR IS LIFE

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