

WACKER



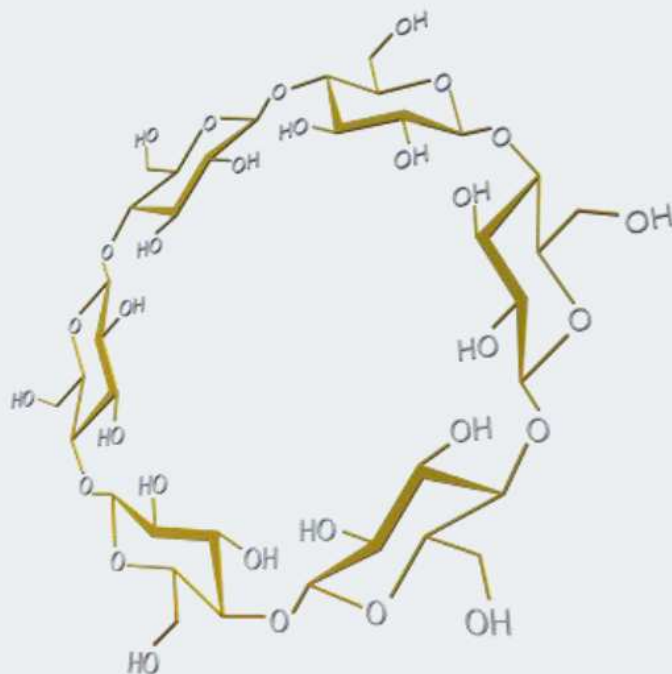
CAVAMAX[®] and ITS APPLICATIONS

Agenda

1. What is CAVAMAX®?

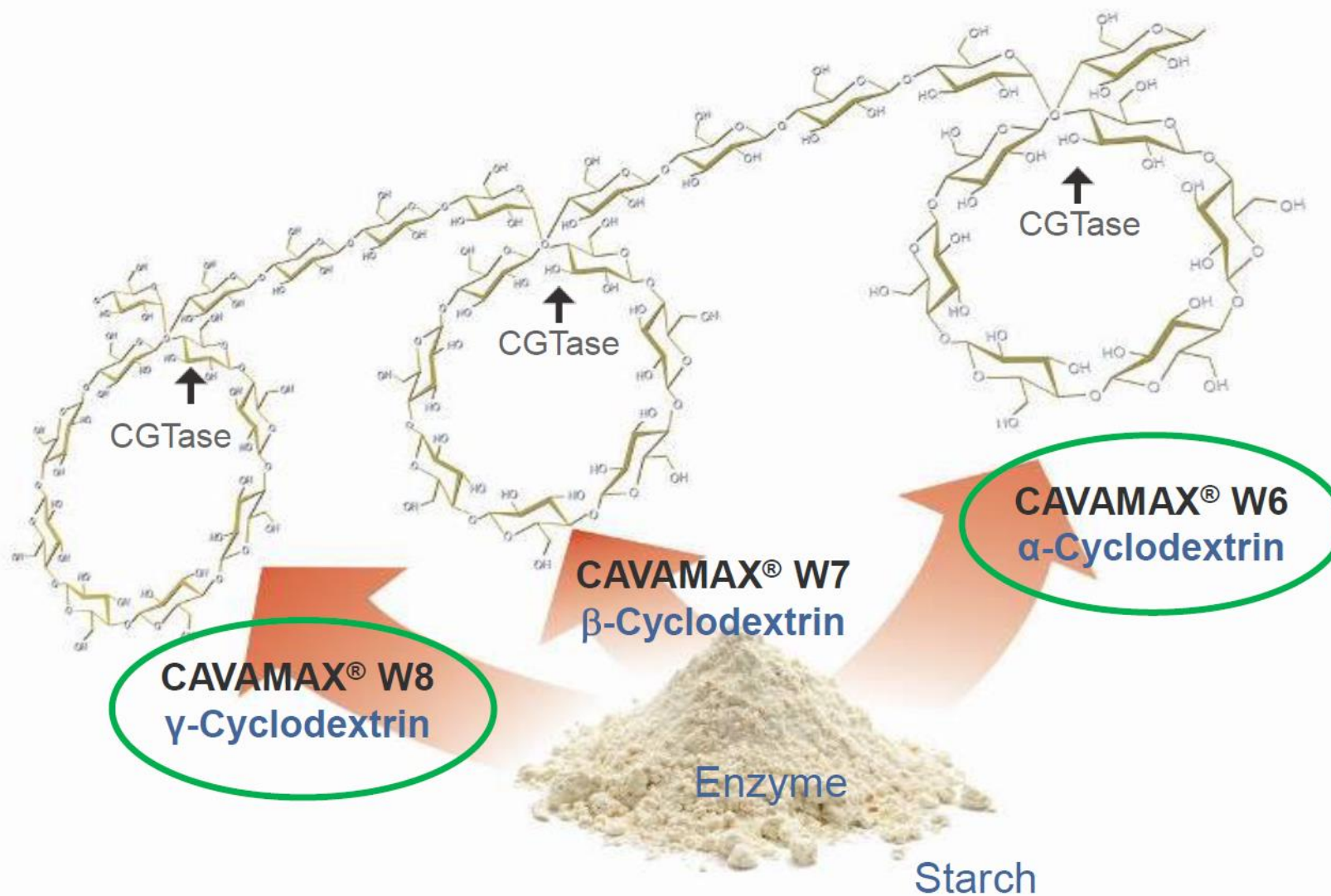
Cyclodextrins are Naturally Occurring, Non-reducing Oligosaccharides

Cyclodextrins



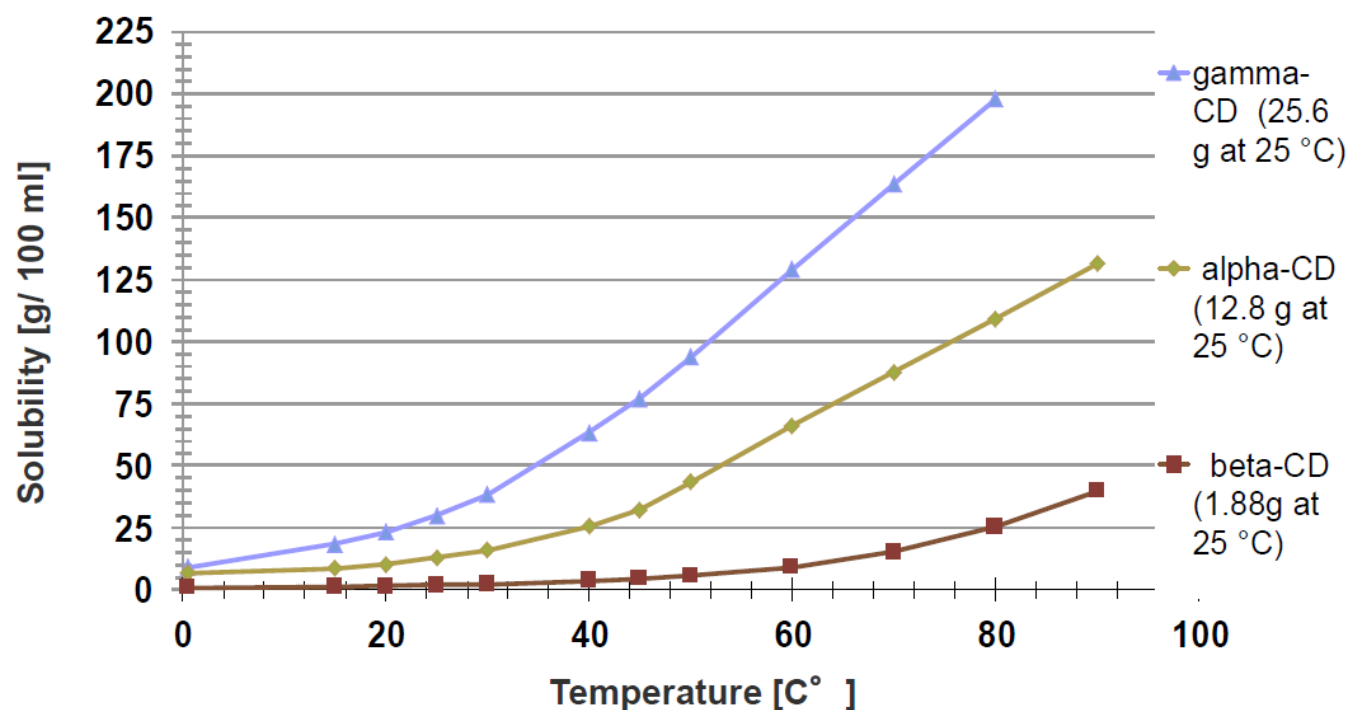
- ▶ Ring shape
- ▶ No free aldehyde or ketone groups
- ▶ Consisting of 6 or more monosaccharide
- ▶ Very stable in alkaline solutions (pH ~14)
- ▶ Hydrolysis in acidic media (pH < 3)
- ▶ Thermally stable ~ 200 °C

Wacker CAVAMAX® – Three Types for A Perfect Solution



Main Characteristics of Cyclodextrins

Type	No. of glucose unit	Molecular weight	Cavity diameter [Å]	Solubility in water (25°C) [g/ 100 ml]	Hydrolysis by α - amylase
α -Cyclodextrin	6	973	4.7 - 5.3	12.8	negligible
β -Cyclodextrin	7	1135	6.0 - 6.5	1.88	slow
γ -Cyclodextrin	8	1297	7.5 - 8.3	25.6	rapid



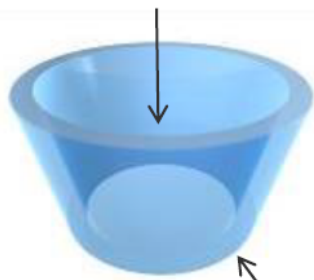
Agenda

1. What is CAVAMAX®?

2. What can CAVAMAX® do?

Thanks to their Three-dimensional Structure, Cyclodextrins Can Encapsulate Other Molecules

hydrophobic



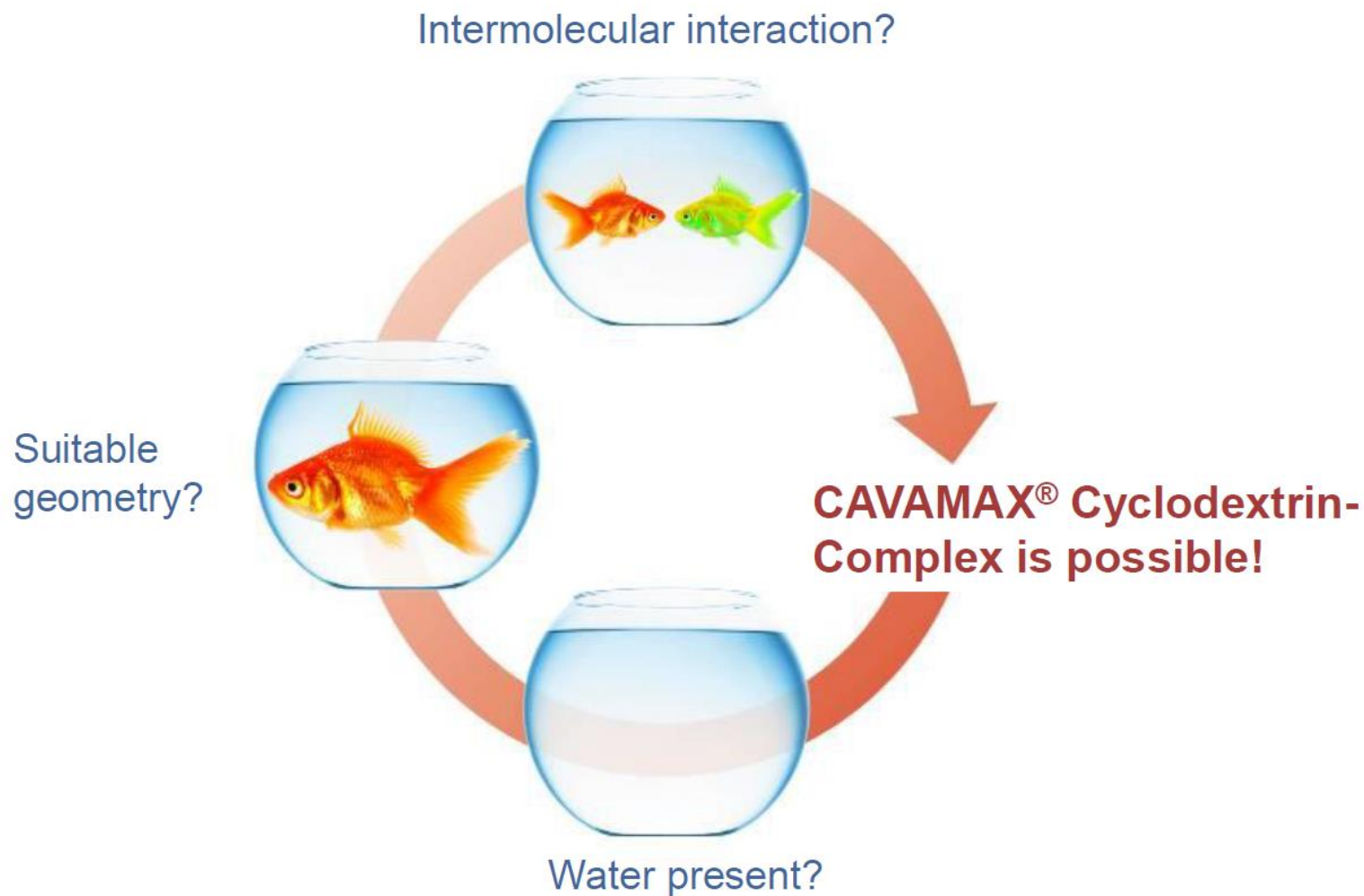
hydrophilic

- ▶ Bucket shaped form with a hydrophobic interior and a hydrophilic exterior



- ▶ Attracts and encapsulates selected molecules
- ▶ Forms a Host/Guest complex

To Achieve Molecular Encapsulation, A Few Requirements are Necessary



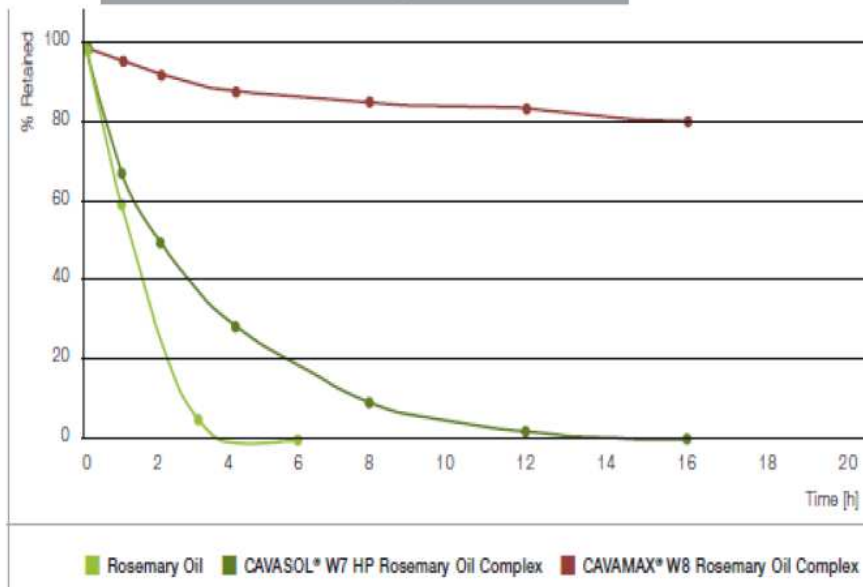
By Molecular Encapsulation, CAVAMAX® Cyclodextrins Generate A Variety of Effects

Controlled release

e. g. controlled release of an essential oil in water at 40 ° C



Controlled Release of Rosemary Oil in Water at 40 °C

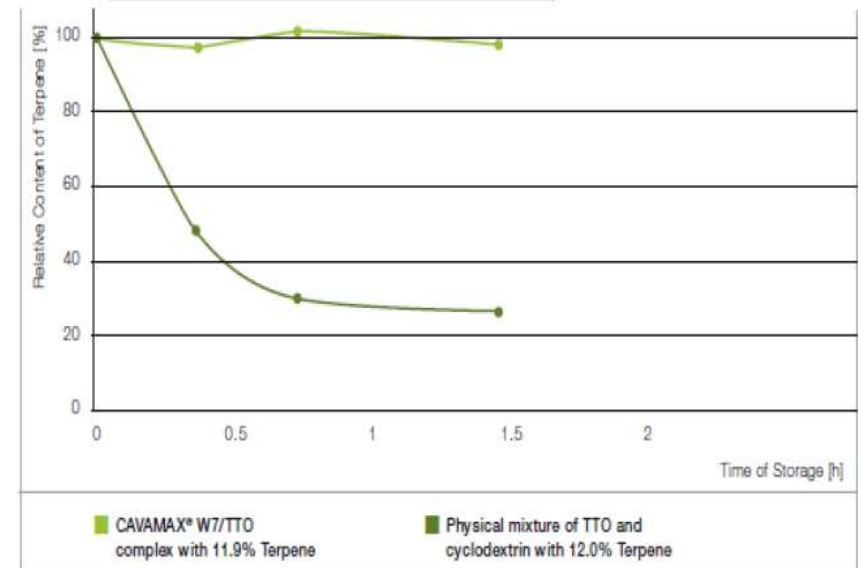


Stabilization

- ▶ Light, UV-radiation
- ▶ Temperature
- ▶ Oxidation
- ▶ Hydrolysis

e. g. Stabilizing Tea Tree Oil at 45 ° C

Stability of Tea Tree Oil at 45 °C (Sunlight Test)

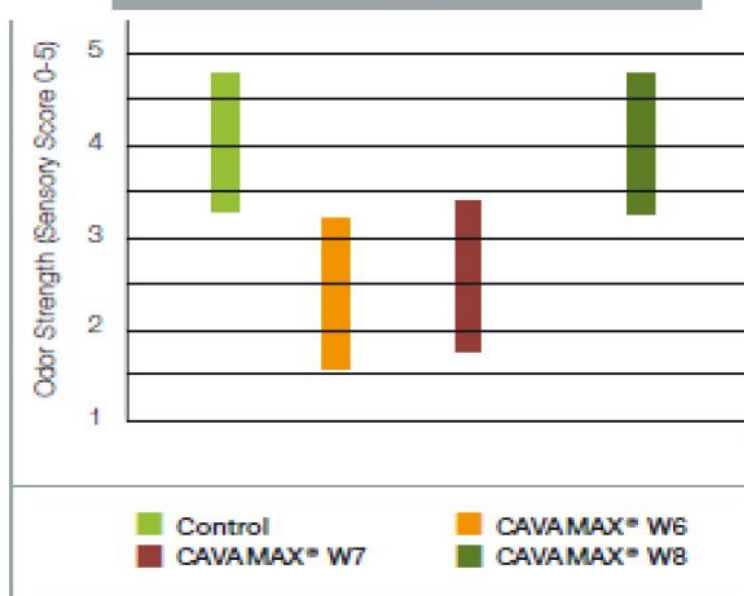


By Molecular Encapsulation, CAVAMAX® Cyclodextrins Generate A Variety of Effects

Masking

- ▶ Unpleasant odor
- ▶ Undesirable taste

Reduction in Odor Intensity of Garlic



Increase of bioavailability

- e. g. CAVACURMIN®
- e. g. CAVAQ10™
- e. g. Retinol complex

Solubilization

- ▶ Enhancement of water solubility
- ▶ Avoid organic solvents
- e. g. improved water solubility of hydrocortisone

Agenda

1. What is CAVAMAX®?
2. What can CAVAMAX® do?
3. CAVAMAX®'s Application:

MASKING

Functional Food Ingredients often Have Undesirable Aspects



Bitter taste



Undesired smell



Unpleasant taste

To Mask These Undesirable Things, Standard-solutions are Only Second Best

Reduction of active ingredient?



Less effect!

Adding sugar?



Less healthy!

Adding aroma?



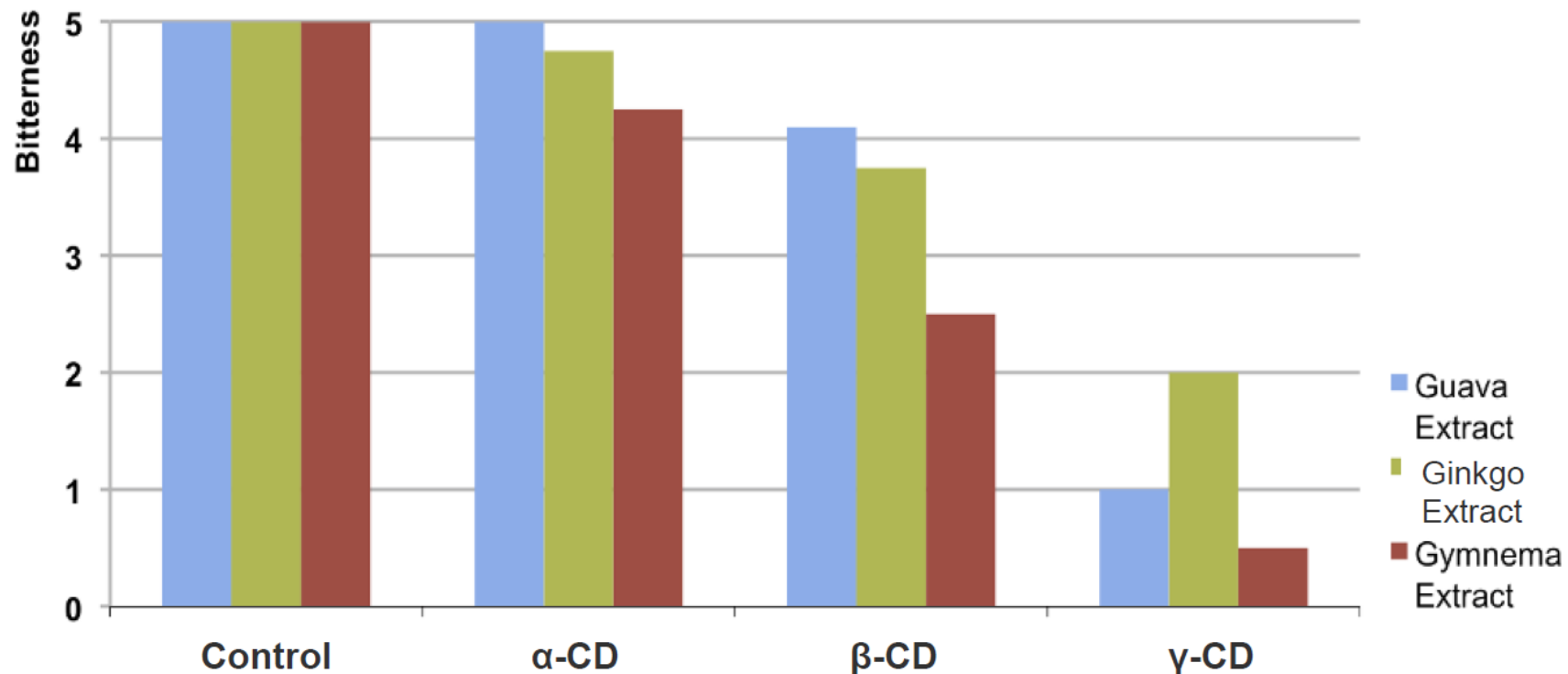
Unwanted taste!

Our Technology: CAVAMAX® Cyclodextrins – The solution in A Nutshell



CAVAMAX® Can Mask the Bitterness Efficiently

Bitter taste masking by the different types of CAVAMAX®



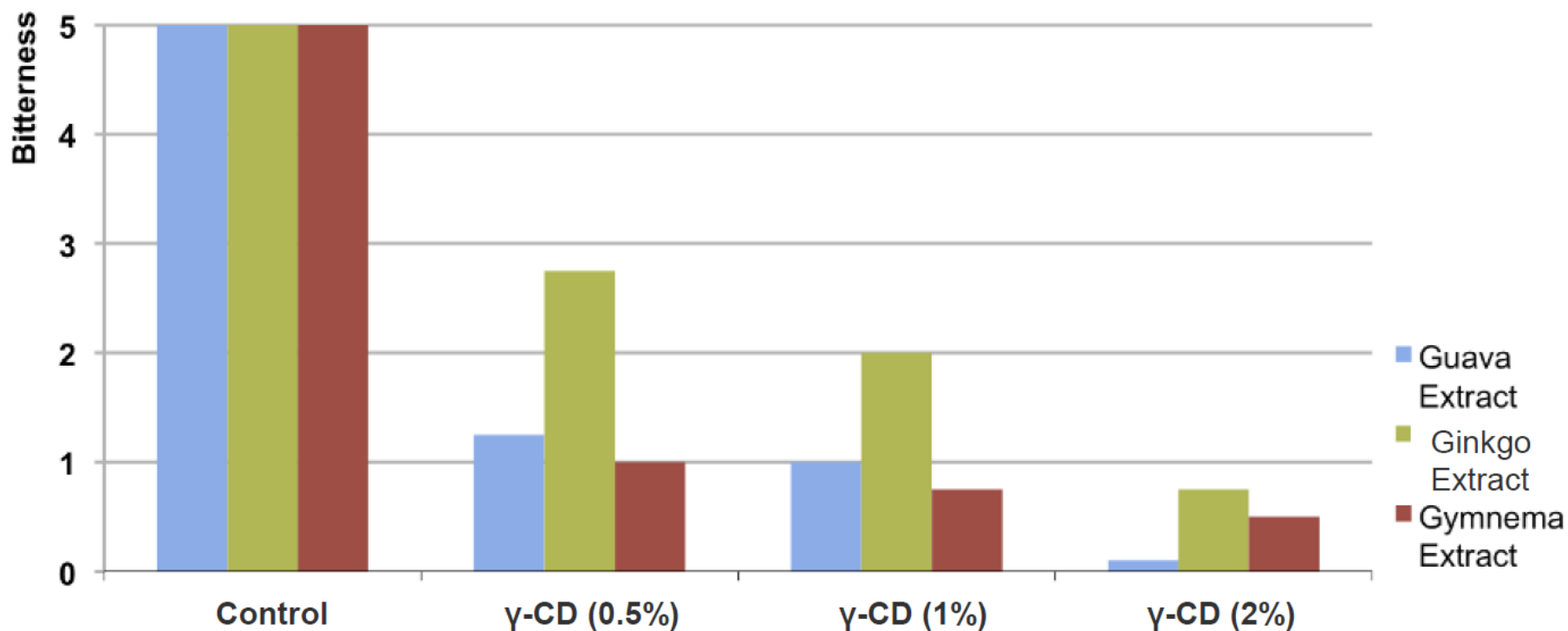
Scale:

01 = not detectable, 02 = faintly detectable, 03 = detectable, 04 = notably, 05 = unpleasant

- **All CAVAMAX®** are able to reduce the bitter taste of 3 extracts.
- **CAVAMAX® W8** is able to mask the bitter taste **most effectively**.

Bitter Taste Can Be Controlled by CAVAMAX® Content

Bitter taste masking by increasing amounts of CAVAMAX® W8 (γ -CD)



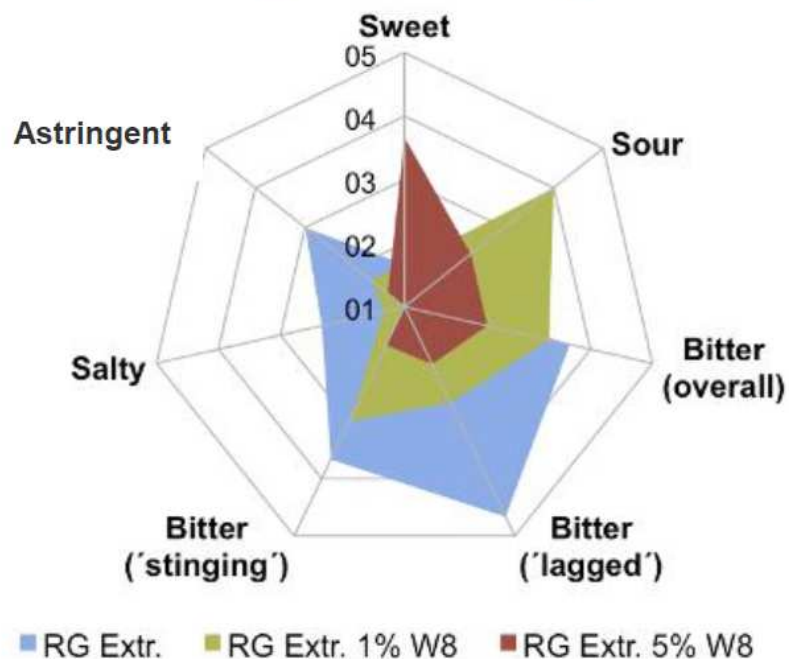
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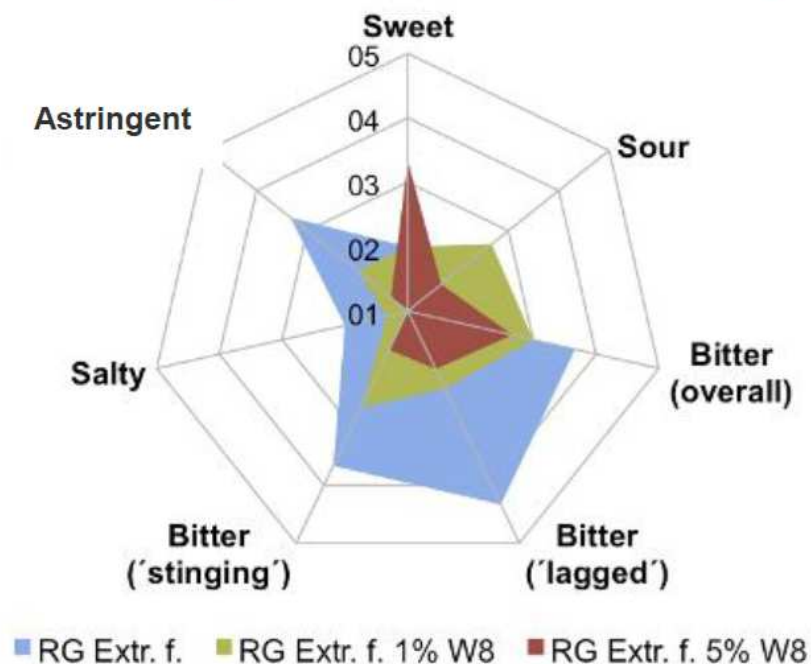
➤ **The more CAVAMAX® W8 is used, the more bitter taste is masked.**

CAVAMAX® W8 can Mask Unpleasant Taste of Red Ginseng Effectively

Taste masking Red Ginseng Extract



Taste masking fermented Red Ginseng Extract



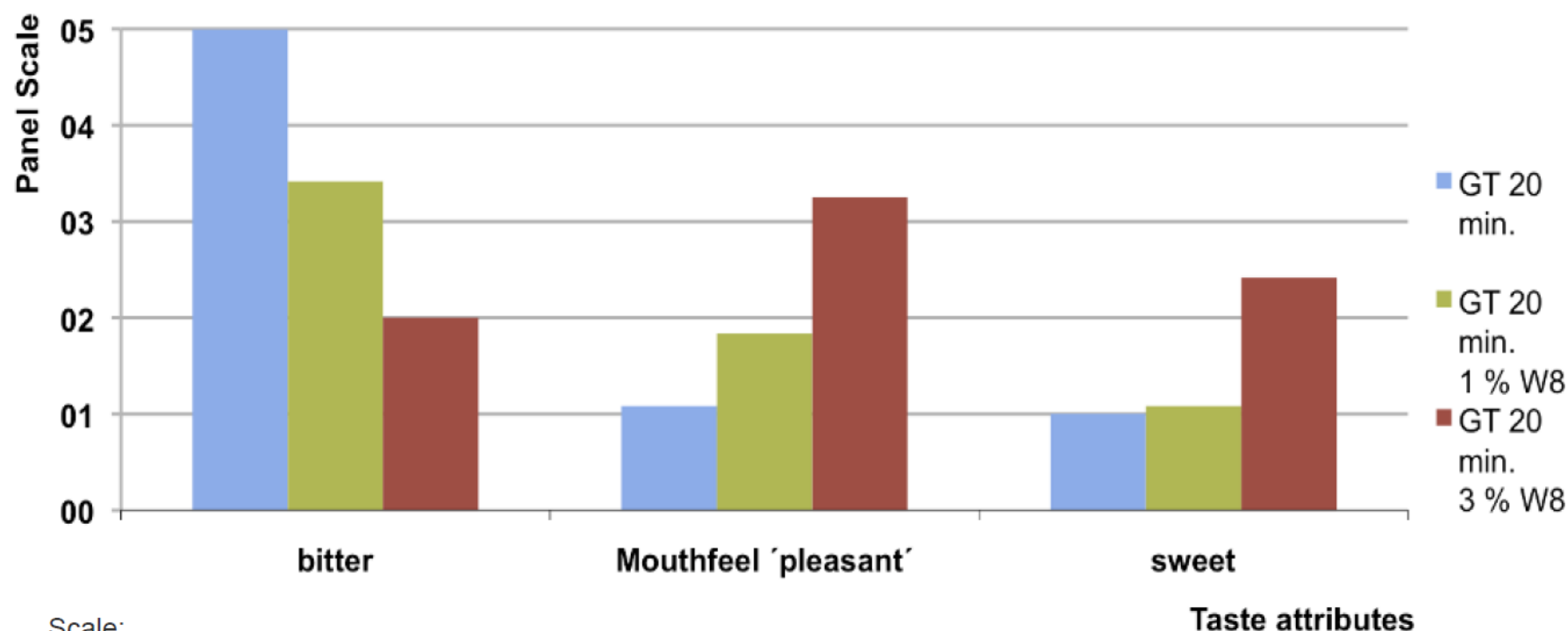
Scale:

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➤ **CAVAMAX® W8** is able to reduce bitterness and astringent taste of red Ginseng **effectively**.

CAVAMAX® W8 Turns Green Tea Drinking into A Pleasant Experience

Bitterness masking of **freshly brewed Green Tea** (20min) with CAVAMAX® W8 (γ -CD)



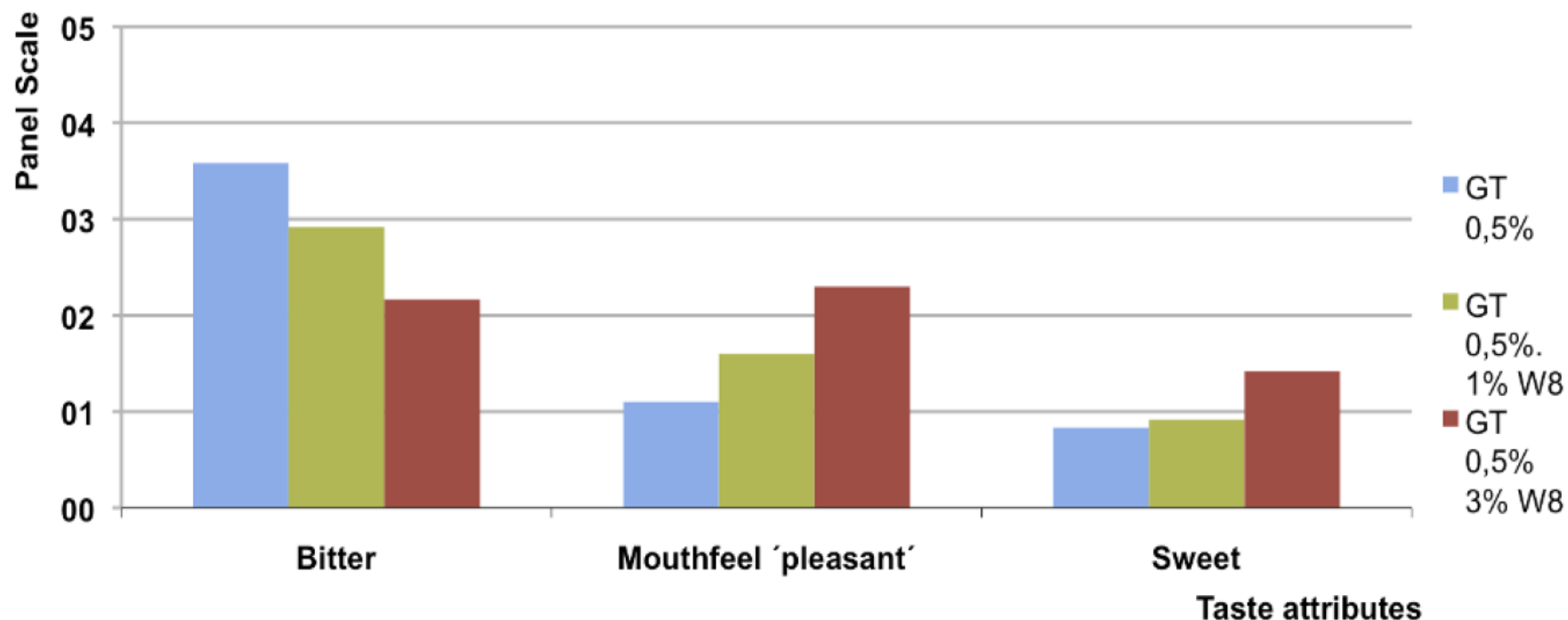
Scale:

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➤ **CAVAMAX® W8** was able to mask bitter taste and increase sweetness of freshly brewed green tea **effectively**.

CAVAMAX® W8 Turns Green Tea Drinking into A Pleasant Experience

Bitterness masking of 0.5% **Green Tea extract** with CAVAMAX® W8 (γ -CD)



Scale:

01 = not detectable, 02 = faintly detectable, 03 = detectable, 04 = notably, 05 = unpleasant

➤ **CAVAMAX® W8** was able to mask bitter taste and increase sweetness of green tea extract **effectively**.



THANK YOU