

# CAVAMAX® – TASTE-MASKING GUMMIES: THE TASTE OF HEALTHINESS

Ready to be part of the sweetest trend in the nutraceutical industry?

- The global gummy market is predicted to reach \$42.06 billion by 2028\*.
- About 37% of U.S. consumers prefer taking vitamins, minerals, or supplements in a gummy format.
- Younger consumers in particular find the idea of combining a healthier lifestyle with indulgence appealing.

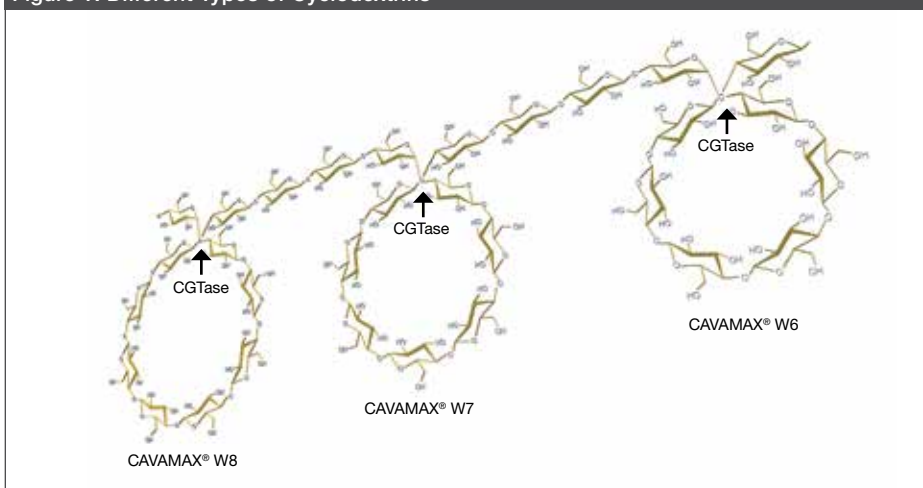
The problem: Many bio-actives have an unpleasant taste or smell, which is undesirable in gummies. Our taste-masking technology based on CAVAMAX® can easily solve this problem.

## The Perfect Solution for Your Desired Product Properties

The ring-shaped CAVAMAX® cyclodextrins (WACKER is the only producer of all the three types of cyclodextrins, see Figure 1) can mask the bad taste and bitterness of those bio-actives via a process called molecular encapsulation. Cyclodextrins have a donut-shaped three-dimensional structure (see Figure 2). The inside of this cavity is hydrophobic and tends to bind to/attract lipophilic bio-actives, thereby masking their bad taste and bitterness.

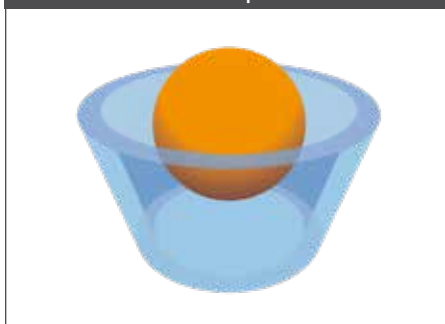
CAVAMAX® does not contribute any color, flavor or bad taste to the gummies. CAVAMAX® also does not change the nutritional value or functionality of the other ingredients in the gummy formulation.

Figure 1: Different Types of Cyclodextrins



The three types of cyclodextrins differ in their inner diameters depending on whether they have 6, 7 or 8 sugar molecules.

Figure 2: Schematic Representation of a CAVAMAX® Guest Complex



## It's Easy

The procedure of masking taste, especially bitterness, with cyclodextrins is very simple. No process or equipment adjustment in gummy manufacturing is necessary, except adding CAVAMAX® to the formulation. Additionally, no changes to other ingredients are required for CAVAMAX® to be functional. The bio-active to be masked is usually

mixed together with CAVAMAX® and dissolved in water, then added to the other ingredients in the formulation. We recommend a starting usage rate of 1–3% depending on the type and intensity of the bad taste and bitterness of the bio-actives.



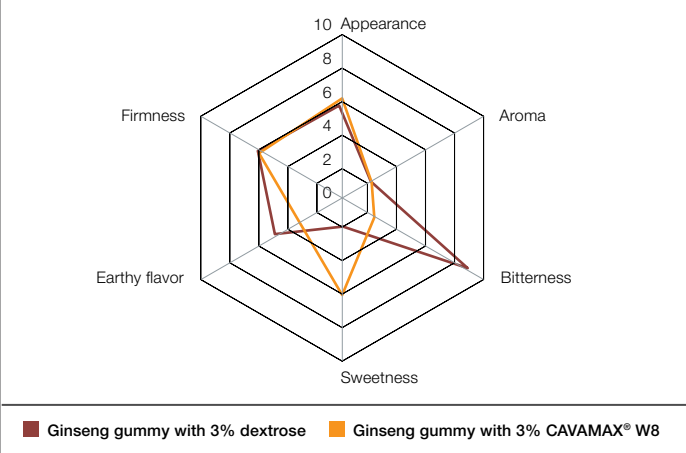
\* Grand View Research (2021), MIntel (2021)

**Our Proven Biotechnology Solution**

Ginseng is known for a variety of positive health benefits. In our lab, the team worked on a solution against its bitter taste. The sensory evaluation with CAVAMAX® W8 has shown that the bitterness of ginseng gummies was reduced significantly, while maintaining other desirable characteristics for gummies (appearance, firmness, aroma etc.).

WACKER has also been working on masking bad flavors and odors with all three types of cyclodextrins, which could have useful application in nutra gummies. Depending on the molecular size and structure of the bio-actives, one or more cyclodextrins are found to be more effective in certain situations. Gamma-cyclodextrin (W8), for example, was found to be more effective than W7 and W6 in reducing the bitterness of gymnema extract (see Graphic 2). It was also shown that the amount of W8 is proportionally related to bitterness masking in green tea (see Graphic 3).

**Graphic 1: Effect of CAVAMAX® W8 on Ginseng Gummy Supplement**



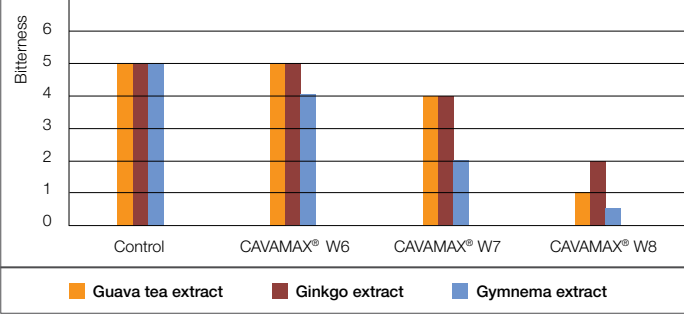
Data was collected using a panel of 24 people who compared ginseng gummies with and without 3% gamma-cyclodextrin (CAVAMAX® W8). The results show that the panelists did not detect any difference regarding firmness, appearance, and aroma, while the perception of bitterness dramatically decreased in the gummies with CAVAMAX® added. The perception of sweetness increased.  
 Scale: 0 = not detectable to 10 = very noticeable

Alpha- and gamma-cyclodextrins in the EU only approved as novel foods

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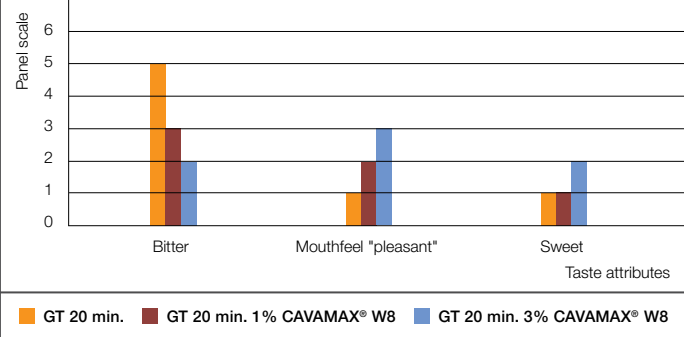
**Graphic 2: Taste Evaluation of Three Bitter-Tasting Plant Extracts After Addition of Different Cyclodextrins**



100 mg of plant extract (guava tea extract, ginkgo extract and gymnema extract) were mixed with 100 mg of CAVAMAX® cyclodextrin (control: starch) in 100 ml of water and stirred for one hour (1:1 ratio). The results show that the bitter taste can be masked, particularly by the addition of CAVAMAX® W8 (gamma-cyclodextrin).

Scale: 1 = not detectable to 5 = very unpleasant

**Graphic 3: Sensory Profile of Freshly Brewed Green Tea (20 min.) with CAVAMAX® W8**



A standard green teabag (GT) was left to brew for 20 minutes. Subsequently, the bag was removed and various concentrations (1% and 3%) of CAVAMAX® W8 were added. The addition of CAVAMAX® W8 reduces the bitterness of the green tea and improves the mouthfeel.

Scale: 1 = not detectable to 5 = very unpleasant



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