

STABILIZING OIL-IN-WATER EMULSIONS WITH CYCLODEXTRINS

From salad dressing to mayonnaise: Many foods contain an oil and water phase and must be stabilized using emulsifiers. But using emulsifiers can mean difficulties in the formulation. With α -cyclodextrins (CAVAMAX® W6), this problem can be solved.

Lecithins, mono- and diglycerides, milk proteins or egg yolk are often used as emulsifiers. In most cases, these are of an animal origin, heat and acid sensitive, potentially allergenic and, in the case of egg yolk, undesired sources of cholesterol.

A Perfect Solution: α -Cyclodextrins
CAVAMAX® W6 is an α -cyclodextrin, a naturally occurring, cyclic oligosaccharide, enzymatically produced from starch. It is a well-defined, chemically pure substance and thus has consistent technical properties. It's a non-digestible, yet fully fermentable, water-soluble dietary fiber. This dietary fiber stabilizes oil-in-water emulsions very efficiently.

Emulsifying via Molecular Encapsulation

Three-dimensional, donut-shaped cyclodextrins have a hydrophobic cavity inside and a hydrophilic cover on the outside. A fatty acid tail of triglycerides is attracted by the cavity and encapsulated there. This leads to the build-up of a surfactant-like structure which has emulsion-stabilizing properties (see figure 2 and 3).

More than Stabilizing

CAVAMAX® cyclodextrins cannot, however, only be used to stabilize emulsions. Depending on the oil-to-water ratio and the amount of cyclodextrin used, the viscosity, and therefore the organoleptic properties, of the emulsion are altered. From ketchup-like viscosity to icing-like viscosity, all grades can be adjusted. Often with significant less fat content and thus reduced calories.

Figure 2

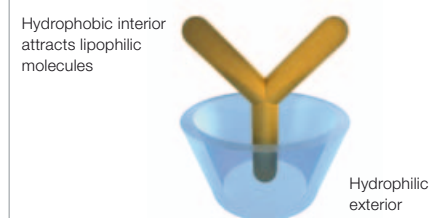
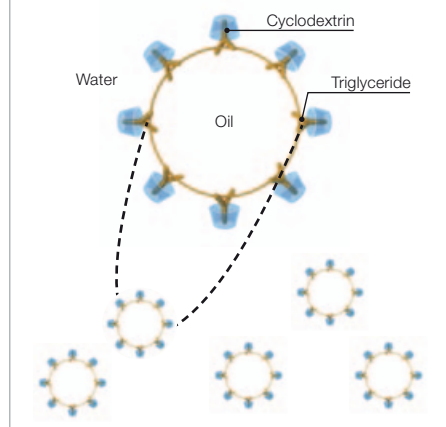
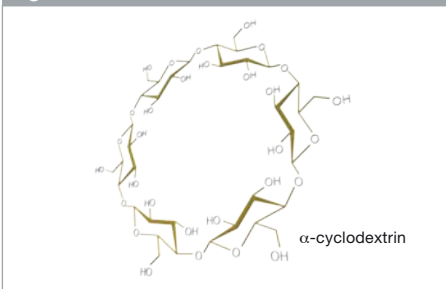


Figure 3



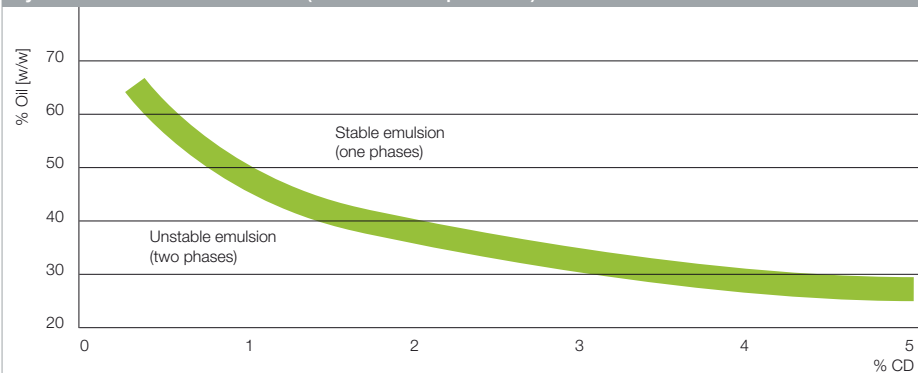
Oil-in-water emulsions can be stabilized by adding CAVAMAX® W6 cyclodextrin.

Figure 1



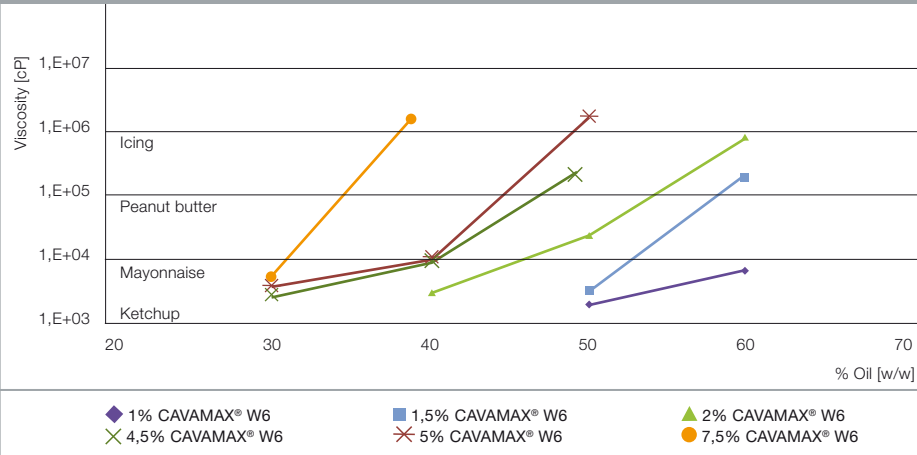
CAVAMAX® cyclodextrins are produced enzymatically from starch by WACKER using a patented process. WACKER is the only producer in the world which offers three types (sizes) of cyclodextrins. α -cyclodextrins are best suited for use with emulsions.

Graphic 1: Emulsions with Vegetable Oil (Canola), Water and Different CAVAMAX® W6 Cyclodextrin Concentrations (at Room Temperature)





Graphic 2: Viscosity Modulation of Emulsions (Canola Oil, Water) by Adding CAVAMAX® W6 Cyclodextrin

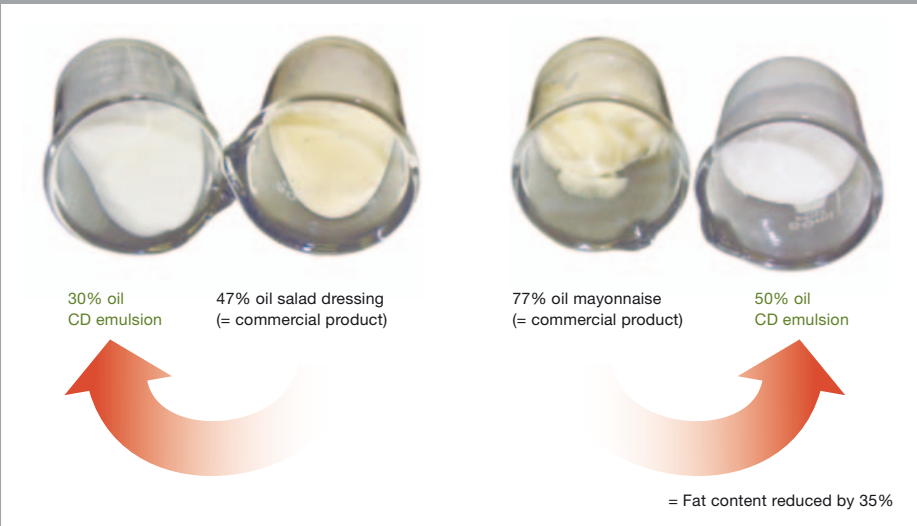


For a Variety of Applications

CAVAMAX® W6 can be used whenever an oil-in-water emulsion has to be stabilised, viscosity has to be modulated or where a stable emulsion is to be obtained. E.g. in sauces, dressings, mayonnaise-like applications, beaten foods, margarines, etc.

At room temperature viscosities of oil-in-water (canola) emulsions can easily be adjusted from ketchup-like to icing-like by adding various amounts of CAVAMAX® W6 cyclodextrin.

Graphic 3: A Broad Range of Emulsion Viscosities with Reduced Fat Content are Possible



Oil-in-water emulsions (canola oil, water) with CAVAMAX® W6 cyclodextrins show at room temperature similar viscosities as commercial products (like salad dressings or mayonnaise), but can have a markedly reduced fat content.

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