

# ENSEMBLE™ Non-PHO Emulsifiers

PHOs: THE RACE TO NON IS ON.





# The clock is ticking on PHOs, will you be ready?

In the wake of the recent Food and Drug Administration (FDA) ruling to revoke the generally recognized as safe (GRAS) status of partially hydrogenated oils (PHOs), food and beverage manufacturers face a critical challenge: to find and implement non-PHO ingredients that are effective and easy to use.

Here are four key factors adding pressure to food and beverage manufacturers to make the non-PHO conversion **as soon as possible**.



**1 FDA Deadline:** Food and beverage manufacturers must be PHO compliant by June 18, 2018.



**2 Diminishing PHO Supply:** As oil producers move away from PHOs, the supply available to the market will decline.



**3 Testing Time:** Validation of PHO alternatives can be lengthy and time-consuming.



**4 International Ripple Effect:** Other countries are currently re-evaluating their own legislation regarding PHOs.

Given the challenges you face to make the conversion to non-PHO as soon as possible, the last thing you need is something that makes it more disruptive and time-consuming. To keep business thriving, **a drop-in solution** is your best bet.

## That's where ENSEMBLE™ comes in.

Corbion's ENSEMBLE™ is the full line of non-PHO-derived emulsifiers made from a proprietary mixture of non-PHOs that mimics the thermal stability and maintains the flavor, texture, quality, ease of handling and shelf stability that once only PHOs could provide.

## UNDERSTANDING YOUR NON-PHO OPTIONS

A variety of options are available to manufacture non-PHO emulsifiers; however, not every solution is equal in terms of performance and ease of handling.

### **PALM AND PALM FRACTIONS**

are readily available worldwide, but they experience flavor and color reversion, compromises in processing (crystallization) and, from a market perspective, sustainability and ecological concerns.

### **POLYUNSATURATED OILS**

such as rapeseed, sunflower and soybean oil, even when combined with predominantly saturated oils, can result in significant compromises in physical and chemical attributes such as oxidative stability, color and flavor.

### **FULLY SATURATED SOY AND PALM OIL**

alone can provide the required crystallization properties to allow excellent powder production and stability; but without the incorporation of unsaturated components, they lack the functional properties such as hydration of the particles required to make them cold-water dispersible.

# ENSEMBLE™ makes going non-PHO simple.

**ENSEMBLE™ non-PHO emulsifiers** deliver drop-in functionality that maintain flavor and texture without sacrificing quality, handling or shelf stability.

A re-engineered collection of Corbion's popular PHO-containing emulsifiers, these non-PHO solutions have been specially formulated to minimize your reformulation hurdles and operational disruptions so that you can streamline your formulation efforts and make the switch from PHOs without missing a beat.

## WHAT CAN DROP-IN FUNCTIONALITY DO FOR YOU?

The Corbion **ENSEMBLE™** portfolio provides non-PHO emulsifiers for every need. Their drop-in functionality means you can rest assured that, whichever solution you choose, it helps:

- ▶ **Maintain functionality**
- ▶ **Preserve product handling**
- ▶ **Sustain quality attributes**
- ▶ **Minimize reformulation hurdles**
- ▶ **Decrease reformulation costs**
- ▶ **Avoid production disruptions**
- ▶ **Simplify formulation efforts**

The **ENSEMBLE™** portfolio includes:

- ▶ **BFP® 550**
- ▶ **Starplex® 590**
- ▶ **Starplex® 590 F**
- ▶ **Alphadim® 570**
- ▶ **GMS® 520**
- ▶ **GMS® 540**





# Drop it in. Move on.

**ENSEMBLE™ Mimics PHO Performance in Applications.** The non-PHO solutions in our ENSEMBLE™ line have been tested in both commercial- and laboratory-scale evaluations to ensure they mimic the performance of PHO-based emulsifiers across applications. That's drop-in functionality you can trust.

## SWEET BAKED GOODS

BFP® 550 was tested against PHO-derived emulsifiers in both honeybun and muffin applications. Sensory analysis from panelists indicated that there was no significant difference between the PHO-containing emulsifiers and the ENSEMBLE™ solution, whether added at the bowl or in concentrate.

### Sensory Analysis

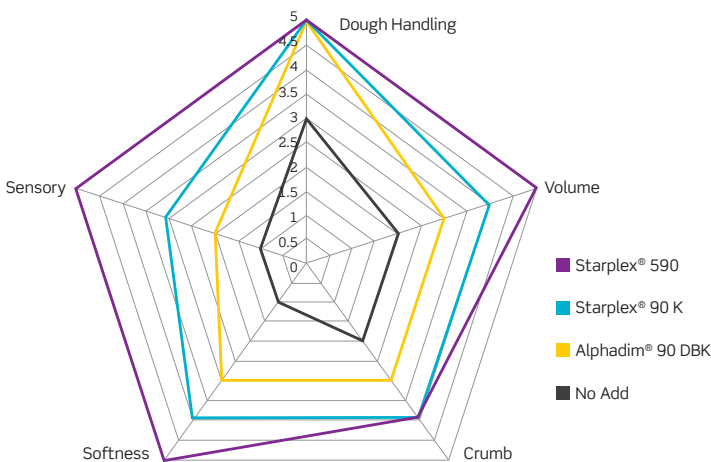
% of Panelists Unable to Detect a Difference Between Products		
	Added in Concentrate	Added at Bowl
Honeybun	Nearly 60%	Over 80%
Muffin	100%	Nearly 70%

## BREAD

In a sponge and dough white bread application, no significant difference was shown between Starplex® 590 and existing PHO emulsifiers Starplex® 90 K and Alphadim® 90 DBK across multiple categories, including firmness, adhesiveness and resilience.

Blind sensory tests among 50 panelists showed significant preference for Starplex® 590 in terms of freshness, softness, taste and texture, no matter the day (day 3 and 7) or preparation method (sponge and dough and no-time dough).

### White Bread (Sponge and Dough)



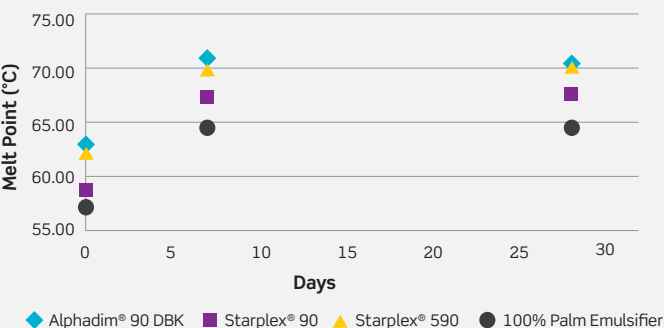
## ENSEMBLE™ Outperforms Other Emulsifier Options

At Corbion, we know maintaining product quality is at the top of your priority list. That's why we rigorously tested our ENSEMBLE™ portfolio of non-PHO emulsifiers to make certain that they meet our high standards for performance. In fact, ENSEMBLE™ outperforms products formulated with 100 percent palm oil.

### When compared to Starplex® 590, palm-based powdered emulsifiers:

- Demonstrate inferior thermal stability
- Exhibit poor powder quality
- Result in handling challenges

### Change in Melt Point Over Time

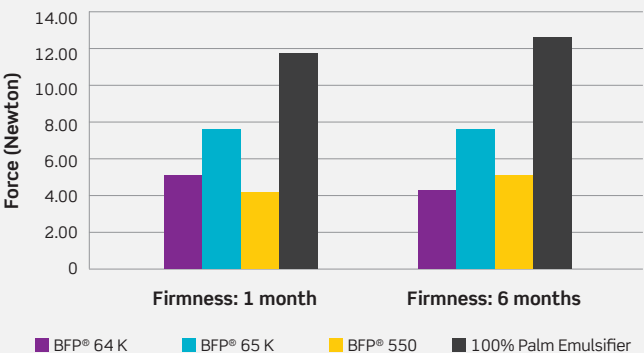


The melt point of our non-PHO emulsifier, Starplex® 590, is very similar to that of the PHO-derived emulsifier options Alphadim® 90 DBK and Starplex® 90, indicating that Starplex® 590 maintains handling tolerance in hot, humid conditions. The all-palm option shows the lowest melt point of all samples analyzed, indicating that it would be difficult to transfer and could cause severe clumping at elevated temperatures.

### When compared to BFP® 550, palm-based plastic mono-diglycerides:

- Result in a much firmer texture
- Provide creaming challenges when added directly to application

### Firmness



BFP® 550 shows comparable firmness to its PHO counterparts, enabling manufacturers to drop it into an existing formulation with minimal reformulation hurdles. The all-palm option, however, shows much greater firmness, which can lead to difficulty when scaling and incorporating the product as-is into applications.

# Make the Switch

We've re-engineered our popular emulsifiers to provide you with the perfect portfolio of non-PHO solutions that deliver drop-in ease while maintaining flavor, texture and shelf stability.

Each solution in the ENSEMBLE™ portfolio is unique, but all have been developed to perform perfectly as drop-in solutions for the PHO emulsifiers they were designed to replace.

**BFP® 550** is part of the Corbion BFP® portfolio of mono and diglycerides. It can be used in baked goods or for shortening, icing or frozen desserts to improve texture, shelf life and eating characteristics. Plus, its ease of handling makes it simple to cream into any application or to even use chilled.

**Alphadim® 570** is part of our non-PHO line of distilled monoglycerides that can be used in a variety of applications, from ice cream and sour cream to whipped toppings and pudding snacks. It's the ideal choice for

emulsifying fat, improving food texture, reducing fat and boosting mouthfeel.

**GMS® 520 and GMS® 540 hydrated monoglycerides** deliver the power of a powder in a fraction of the time. Provided in an easy to disperse, pumpable paste, the GMS product line is ideal for the no-time dough process or applications with a short mixing times. It provides the same functionality as a powdered monoglyceride without the need for a time consuming sponge stage. With this hydrated emulsifier in the mix, it's easier

than ever to bake yeast-raised breads and rolls, cakes or pasta that consistently offer the taste and texture consumers crave.

**Starplex® 590 and Starplex® 590 F** are fast-acting, non-PHO powdered, distilled monoglycerides. Known for its ability to flow, the Starplex® line improves machinability and dough handling and provides the lubrication needed during the slicing process. Starplex® is also a great extrusion aid for breakfast cereal and helps incorporate air into frozen dairy products.

## Tune up Your Products

**The non-PHO emulsifiers in our ENSEMBLE™ portfolio work in harmony with a wide variety of ingredients to provide solutions for a diverse range of products. Applications include:**

**BAKERY** – Create long-lasting breads and smooth icings.

*Starplex® 590, Starplex® 590 F, BFP® 550, GMS® 520, GMS® 540*

**BEVERAGES** – Stabilize emulsion and flavor in sports drinks and nutritional supplements.

*Starplex® 590, Starplex® 590 F, BFP® 550*

**CONFECTIONERY** – Control fat dispersion in caramels and other sweets.

*Starplex® 590, BFP® 550*

**DAIRY AND NON-DAIRY** – Maintain texture in products ranging from sour cream to whipped toppings.

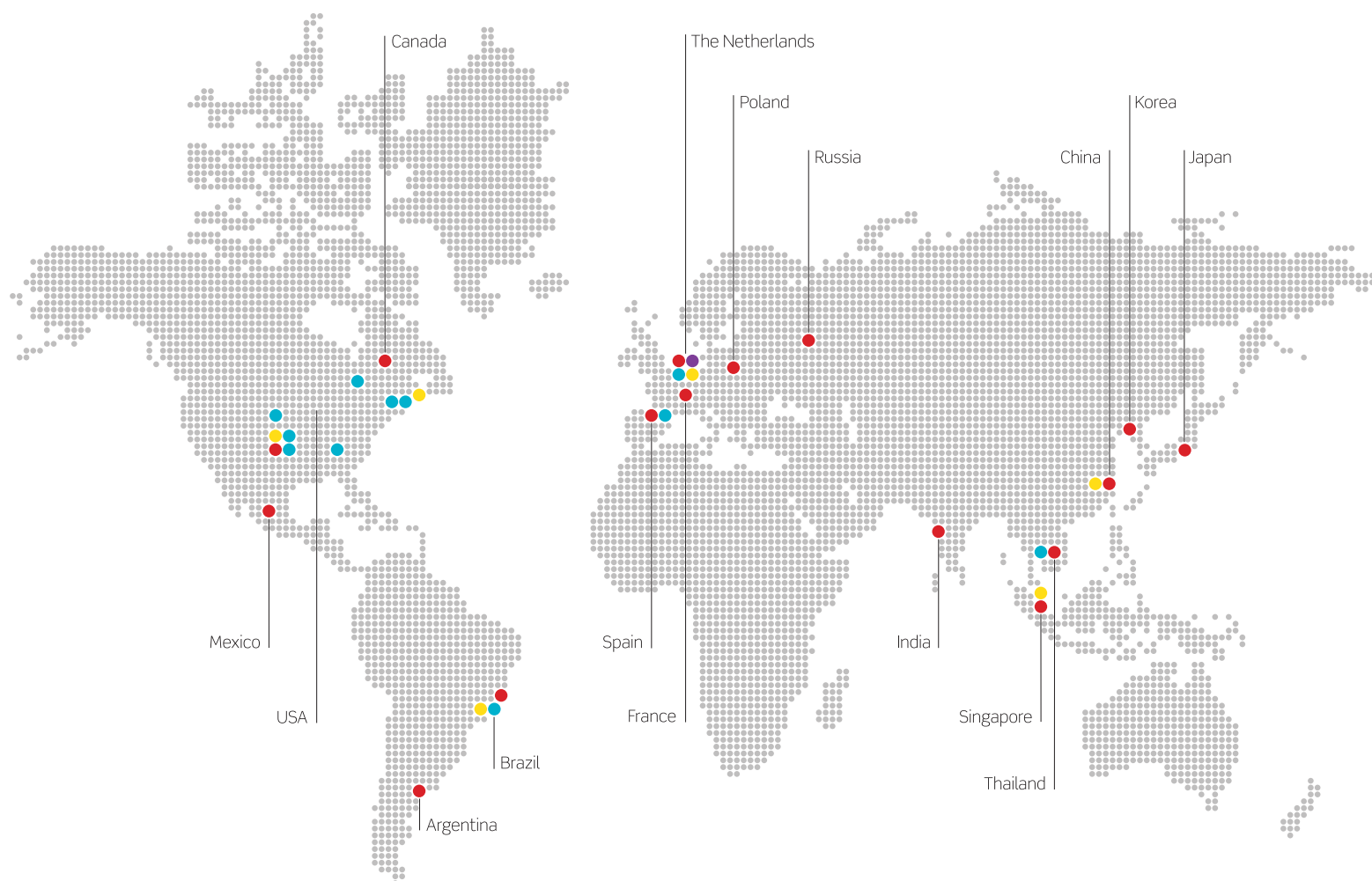
*BFP® 550, Alphadim® 570*

**PROCESSED FOODS** – Improve mouthfeel, texture, skinning, starch complexing and anti-sticking in stick-free noodles, crispy cereals, sauces and more.

*Starplex® 590, Starplex® 590 F, BFP® 550, GMS® 520*

# Let us know how we can help.

● CORBION HEADQUARTERS ● CORBION PRODUCTION LOCATION ● CORBION SALES OFFICE ● CORBION INNOVATION CENTER



Let Corbion help you make the non-PHO conversion **simple**. +1-800-669-4092

- ▶ Learn about our additional non-PHO solutions at **CorbionEnsemble.com**
- ▶ Request your free sample at **corbion.com**
- ▶ Get R&D support for your non-PHO conversion needs at **corbion.com/contact**



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