



## PHOs: the race to non is **on.**

Four reasons to begin the non-PHO conversion now.

- 1 FDA Mandate:** 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.

When it comes to removing partially hydrogenated oils from formulations, it's not enough to just substitute a non-PHO option. You deserve more. That's why Corbion created ENSEMBLE - the full line of non-PHO emulsifiers that knows how to play together, right from the first note.

### Drop it in. Move on.

Corbion experts have re-engineered our popular emulsifier portfolio with one goal in mind: provide non-PHO options that deliver drop-in ease while maintaining flavor, texture, quality, ease of handling and shelf stability.

The result? ENSEMBLE non-PHO emulsifier solutions minimize reformulation hurdles and operational disruptions, allowing you to simplify and streamline formulation efforts.

### Start with Starplex®

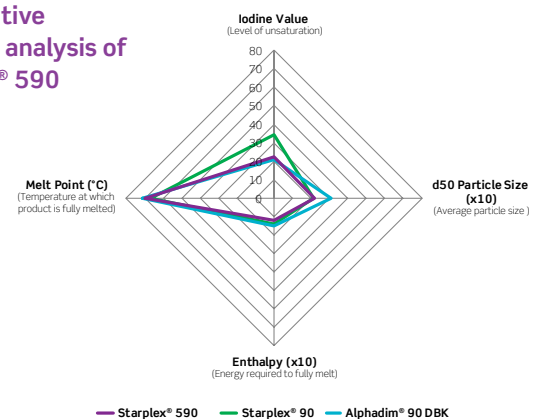
The Starplex line of emulsifiers is known for its ability to flow. Our new non-PHO versions, Starplex 590 and Starplex 590 F retain that ease of handling and deliver the same functionality and quality of their PHO counterparts, as demonstrated in Figures 1 and 2.

Starplex is easy to dispense and easier to disperse, making it more effective at interacting with starch at the temperatures associated with your baking process. This improves machinability and dough handling, adding robustness to every step in your process, resulting in baked goods that are soft, tasty and good to the last crumb.

- ▶ Drop-in solution
- ▶ Better flow for easy handling
- ▶ Improves machinability and throughput

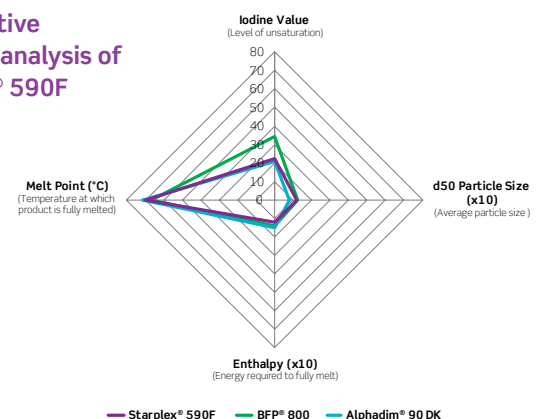
### Comparative property analysis of Starplex® 590

Figure 1



### Comparative property analysis of Starplex® 590F

Figure 2



### Starplex® disperses benefits.

As a fast-acting non-PHO powdered distilled monoglyceride, the Starplex line of non-PHO emulsifiers maintains the quality of your product while maximizing your manufacturing throughput. In addition to the dough handling and machinability improvements, Starplex provides the lubrication needed during the slicing process. Starplex is also a great extrusion aid for breakfast cereal, and helps with air incorporation in frozen dairy products.

### Starplex® 590 Applications

	Category	Function	Usage Rate	Comments
Bakery	Breads & Rolls	Shelf life extension, dough conditioning	as required	Anti-staling, crumb softener
	Tortillas & Flatbreads	Shelf life extension, flexibility, ease of wrapping	0.5%-1.0% flour basis	Processing flexibility. Gives better mouthfeel and softness
Confection	Caramel	Fat dispersion in caramel	0.5%	Controls fat dispersion in caramel
Processed Foods	Extruded/ Flaked Cereals and Grains	Anti-sticking and clumping; reduces stickiness	0.5%-1.0% flour wt	Processing aid
	Imitation Cheeses	Improved mouthfeel, reduced syneresis	0.5%-3.0%	Improves mouthfeel, reduced syneresis
	Pasta/Noodles	Starch complexing	0.5%-1.0% dry wt	Improves freeze-thaw stability, prevents sticking, gives resistance to overcooking and adds stability and firmness
	Sauces & Gravies	Reduces skinning	0.2%-0.5% formula wt	Improves freeze-thaw stability, reduces skinning, increases stability and facilitates emulsification

### Starplex® 590 F Applications

	Category	Function	Usage Rate	Comments
Bakery	Breads & Rolls	Shelf life extension/dough conditioning	as required	Anti-staling, crumb softener
	Tortillas & Flatbreads	Shelf life extension, flexibility, ease of wrapping	0.5%-1.0% flour basis	Processing flexibility. Gives better mouthfeel and softness
	Cake Mixes	Batter aeration, cell structure, anti-staling	0.5%-2.0% flour basis	Improves crumb grain and softness, extends shelf life, reduces peaking in layer cakes/sheet cakes
Processed Foods	Extruded/ Flaked Cereals and Grains	Crispness	as required	Improves crispness, process aid
	Imitation Cheeses	Improved mouthfeel, reduced syneresis	0.5%-3.0%	Improves mouthfeel, reduced syneresis

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

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