

FROM OIL TO MARGARINE

- ENZYMES ENSURE

Businesses are always looking for innovation but seek it out more during an economic downturn as they try to stand apart from the competition. Venezuelan oils and fats producer Alimentos Polar has chosen award-winning innovation to introduce an eco-friendly way to produce trans-fat-free margarine and baking fats.



In the past years, the trans fat scare has haunted the oils and fats industry putting the hydrogenation process – the process where liquid fat is solidified – into the spotlight. Food producers and fast-food chains have subsequently removed trans fats from many of their products, and regulators around the world have imposed bans to limit the fat that is

Enzymes help to eliminate controversial trans fats from margarine and other dairy products.



TRANS-FAT-FREE PRODUCTS

thought to contribute to cardiovascular disease by increasing bad cholesterol levels.

As “trans-fat-free” labeling is making its way onto our supermarket shelves, the industry is looking for innovation to solve the problem.

Liquid oils are blended with hard fats to produce margarines and baking fats. To obtain the right consistency of the margarine, producers either need to hydrogenate the oils or use an interesterification process. “Both hydrogenation and chemical interesterification have been shown to cause health issues which is why the industry needed a better solution,” says David Cowan, Application Scientist at Novozymes.

Making margarines without trans fats

Enzymatic interesterification is a process that uses immobilized lipases to produce a change in the physical melting properties of fats. The result is a low-energy process without by-products and with minimal postprocessing, such as bleaching, to clean up the oils.

Alimentos Polar, in cooperation with DeSmet Ballestra and Novozymes, decided to introduce enzymatic interesterification as an alternative to chemical interesterification in the production of baking fats and margarine.

“It was a big step since enzymatic interesterification meant that the plant needed to introduce new reactors. The initial investment cost was, however, small compared to the USD 20 per produced ton you save by using enzymes,” says David Cowan.

To help companies face the change in production DeSmet Ballestra and Novozymes have developed a series of pilot reactors. DeSmet Ballestra supplies the engineering know-how and equipment, and Novozymes supplies the enzymes. This allows companies to evaluate the process before implementing it on a large scale.

“There’s a big demand for these pilot reactors so to speed up the process Alimentos Polar decided to

build its own reactor with the help of Novozymes and DeSmet Ballestra,” says David Cowan.

“First of all we set up the pilot plant which allowed us to evaluate and get familiar with the process, the capacity, and the characteristics of the products we generated by blending the oils to be interesterified. After that we evaluated the new interesterified oils in our product formulations for margarine, oils, and fat bases for cheese and ice cream. Finally, we made adjustments to the processes and formulas to ensure optimal performance in all our products,” says Carlos Bocaranda, Industrial Plant Manager at Alimentos Polar.

The environmental choice

Eliminating trans fats may be the main reason to introduce a new method of interesterifying oils, but using enzymatic interesterification also has environmental benefits, not just cost savings. Switching to enzymes can, for instance, save the planet 23 kg of CO₂ per ton of processed oils, which is the equivalent CO₂ output of driving 123 km with a normal car.

For Alimentos Polar the choice between chemical and enzymatic interesterification was an easy one to make. “We decided to go with enzymatic interesterification as it’s the most flexible and easily controllable process, and it creates the least environmental impact. The advantages are that enzymatic interesterification generates little waste – only used enzymes, which do not affect the environment – and we don’t have to bleach after interesterification. Using enzymes also means a lower health risk to our operators than the sodium methylate used in chemical interesterification,” says Carlos Bocaranda.

The final result was a process providing the market with trans-free products. “The capacity of the new plant allows us an output of 3,000 tons per month of fat bases for margarine. We also produce fat bases for ice cream and cheese, now

all free from trans fats. This is important to us since it’s one of the pillars of our company to produce healthy products for our consumers,” says Carlos Bocaranda.

Award-winning innovation

Some 20 companies around the world have already begun implementing enzymatic interesterification. “We see a rapid increase in companies wanting to adopt enzymatic interesterification. While food producers and distributors around the world introduce bans or limitations on trans fats, companies are trying to keep pace by changing their production,” says Hans Christian Holm, Global Marketing Manager for Oils & Fats at Novozymes.

Novozymes is the only company in the world that provides enzymes for interesterification. The close cooperation with DeSmet Ballestra to develop a plug & play solution that speeds up the implementation of an alternative way of interesterifying oils has resulted in a unique combination of enzyme and engineering expertise. In 2008 Novozymes won the Euro Fed Lipid Technology Award for having taken a lab solution to full-scale industrial implementation.

“The main reason for the award is Novozymes’ contribution to the industrial introduction of enzymatic interesterification, which is considered to be the most important innovation in oils and fats production of the last decades,” said Gerrit van Duijn from Unilever when handing over the prize to Novozymes. ■

FOR MORE INFORMATION

David Cowan
dc@novozymes.com

