Rice Bran Extract as Lecithin Replacer

Low Costs, good Quality

The natural emulsifier lecithin is expensive because it´s not easy to separate lecithin from soybean oil. Now a rice bran extract is being offered as a lecithin replacer: first tests have shown interesting results.

Lecithin probably is nature's most perfect emulsifier. Naturally occurring within many grains and egg yolk, lecithin typically is separated from crude soybean oil using water hydration followed by centrifugal separation and subsequent drying. The crude lecithin is further processed to provide reduced color, and a liquid finished product. This product can be further treated chemically to produce modified lecithins with specific applications for various uses.

The active portion of lecithins is that of a complex mixture of phospholipids, glycolipids and carbohydrates with the key functional components being found within the phospholipid group. These phospholipid groups possess the key molecular structures which contain both hydrophilic and lipophilic components. The existence of these components within one molecule is what makes lecithin a multifunctional surfactant.

REPLACING LECITHIN IN FOOD PRODUCTS

Lecithin is a very useful mixture of natural surfactant materials that recently has been criticized very strongly. The advent of genetic technology has resulted in the production of grains with novel genetic materials to provide a product with novel attributes.

Soybean crops, in particular, have been subjected to genetic modification, resulting in many new varieties in the marketplace – as we know, the marketplace has not been altogether receptive to these new food crops. With this major concern in mind, many food companies have been searching for alternatives to soybean lecithin to meet their customers' needs.

Few alternatives exist to replace lecithin. In the synthetic group, one can use one or more of the following emulsifiers, chosen for their HLB Value (Table 1): polysorbates, ethoxylated monoglycerides, glyceryl esters, sorbitan esters, and mono- and diglycerides.

Table 1: The HLB Range and the type of emulsions supported

HLB Range	Use
1 - 6	Water-in-Oil Emulsifier
7 - 9	Water-in-Oil or Oil-in-Water Emulsifier
8 - 18	Oil-in-Water Emulsifier

In looking at natural lecithin replacement, choices become even more limited. Egg lecithins are one choice but high costs and the presence of cholesterol limit this possibility. Further, the ratio of specific phospholipids in egg lecithins are different from that of soybean lecithin.

A new alternative recently has been developed from an all-natural, non-genetically modified grain source: rice bran. Using patented technology, Ribus, Inc. has developed a novel lecithin replacement extracted from enzymatically stabilized rice bran. This water extract, subsequently spray-dried, contains not only a mixture of natural glycolipids, but also amphoteric proteins and peptides, carbohydrates, and numerous antioxidant compounds. This ingredient is differentiated from rice bran by the removal of non-soluble fiber and silica; two components that possess limited functional or nutritional value.

Table 2: Technical Information

Standard	
Protein	16 - 18 %
Fat	18 - 27 %
Carbohydrate	35 - 52 %
Ash	12 - 16 %
Moisture	< 7 %

RICE BRAN EXTRACT AS LECITHIN REPLACER

Rice bran extract may not work in all applications but several have been developed that show the overall promise of this product. Unlike lecithin, rice bran extract does require the application of shear to facilitate the action of its components.

Stability
Nu-RICE can be used to replace lecithin in flavour mixtures of oil and water. Typically, the use level is about 1/3rd that of lecithin in most applications. The rice bran extract first is added to the water phase with subsequent shear being added.

Release Agent
Nu-RICE can be substituted for lecithin in waffles, wafers and confection tablets. Unlike lecithin, the rice bran extract is added to the product mix rather than directly to the molds to facilitate release after baking. Use rates are typically 1/3rd to 1/2 that of lecithin and result in reduced cleaning and discarding of the molds.

Chocolate and Confection Coatings
Rice bran extract can be substituted for lecithin in chocolates and chocolate coatings. However, because the rice bran extract is a powder, it does not facilitate the viscosity reduction of the finished product without the addition of vegetable oil. Use rates for Nu-RICE is 1 part Nu-RICE to 5 parts vegetable oil with this mixture added to chocolate at the identical level as that of non-deoiled lecithin. The rice bran extract can be added to the manufacturing process at the batching or mixing phase since the high shear, required to blend the chocolate components, helps with activation. The additional oil also can be added at this stage or at the initiation of the conching. Finally, fat bloom control also is improved in compound chocolates with the use of this ingredient.

OIL MIGRATION IN FILLINGS AND COATING SYSTEMS

Nut meats (particularly peanut) represent unique problems for formulators as the oils are usually fluid at room temperature and either can migrate through chocolate coatings or oil off in mixtures. The addition of rice bran extract at 0.25 - 0.5 % virtually eliminates oil migration in all systems tested. The oil control is far better than that seen with lecithins.

CHARACTERISTICS OF RICE BRAN EXTRACT

Rice bran extract is a spray-dried, readily soluble powder that can be added to improve production processes; it helps lower manufacturing costs while improving the overall quality of the final product.

Next to chocolate and wafer fillings Nu-RICE also is used in peanut butter and cake icing applications.

THE COMPANY

Ribus, Inc. was founded in 1992 as a manufacturing and marketing company for natural, non-GMO specialty ingredients using patented and proprietary technology. This technology currently has six patents and is patent pending in 20 countries.
The company's corporate headquarters are located in St. Louis, Missouri. For the production of its ingredients for both the domestic and international markets, RIBUS utilizes a USDA 'Grade A' manufacturing plant in Alexandria, Minnesota, which has a capacity of 30 million pounds per year. In addition, the company has a warehouse in Rotterdam, Holland, to better serve its European customers.

SUMMARY

All-natural lecithin replacement remains a challenge in the food development laboratory. However, the advent of rice bran extract provides a new means to facilitate the activity of lecithin in some situations. Like fat mimetics, one type does not meet the needs of all applications, However the all-natural mix of compounds present in rice bran extract from RIBUS, Inc. does provide the first opportunity to meet many a need for lecithin replacement.

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