

## Encapsulating new ideas

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Encapsulation is a means to hide the fishiness of omega-3s and to protect other nutrients from processing and digestion.

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"It creates a dry free flowing powder with a 60 percent payload of oil," says Lucas. "Interestingly, it loves heat and moisture and a wide variety of pH ranges. We have successfully commercialized 15 different food applications in the past year."

A similar product is developed by Martek Biosciences ([www.martek.com](http://www.martek.com)), Columbia, Md. "Martek oils are made into small particles surrounded by a coating or shell. The shell materials can be starch, lactose, milk proteins and/or fat," says Cassandra France-Kelly, spokesperson. "The shell provides protection from oxygen, water and light and some food manufacturing processes. Also, powders are often more-operations friendly and can be more readily incorporated into various foods."

"The encapsulation technology allows omega-3s to be added to orange juice without taking anything away from the great taste and appearance," adds Andon. In fact, many feel the omega-3 actually improves the taste. "[The double encapsulated EPA and DHA] does have a positive organoleptic effect on some products," says Lucas. "Notably, lowfat yogurt is more creamy tasting with Meg-3 powder in it."

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Indeed, Stonyfield Farm, Londonderry, N.H., claims to be the first baby yogurt to feature DHA, one of the omega-3 fatty acids, via encapsulation in its YoBaby Fruit & Cereal with DHA. Ditto for ZenSoy's new Soy on the Go line of soy milks.

### Encapsulating everything

Micoencapsulation is not limited to omega-3 fatty acids. Many nutritious fat-soluble substances are more effectively added to foods via this new technology.

P.L. Thomas & Co. ([www.plthomas.com](http://www.plthomas.com)), Morristown, N.J., developed a delivery system for food and beverage applications based on "nano-sized, self-assembled, structured lipids." In fact, the technology is not unlike the natural system of lipoproteins that transport various fats and fat-soluble vitamins in our bloodstream, with some important differences of course.

Capturing nutraceutical ingredients in nano-sized spheres that self assemble provides several important advantages, according to Roger Jonas,



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national business development manager for P.L. Thomas. It allows the creation of water-soluble concentrates from insoluble materials, which means nutraceuticals can be added to clear beverages. It improves the pH and thermal stability of products, thus preserving the activity of the added nutrient. And it increases absorption of active components because the nanosized particles have a greatly increased surface area.

**Encapsulation delivers DHA, a derivative of omega-3s, in Stonyfield Farm's Yo-Baby yogurt.**

P.L. Thomas' process, appropriately named Nutrelease, can deliver nano-sized concentrates of such important compounds as vitamins E, D, A, K, coenzyme Q10, lutein, isoflavones, essential oils and phytosterols. For very large molecules like coenzyme Q10, bioavailability always has presented a challenge, as they are poorly absorbed and insoluble in water.

"We've integrated micro-encapsulated fish oil into a nutritious wellness bar that actually tastes great," says Gursh Bindra, CEO of Aristo Health Inc. ([www.aristohealth.com](http://www.aristohealth.com)), Morristown, N.J. "Ours is the first commercially available nutrition bar that combines ocean-derived omega-3s, which are more bioavailable than those from flaxseed, with cholesterol-lowering plant sterols and high amounts of 'superfruit' antioxidants."

Phytosterols are plant counterparts of cholesterol. They are of similar shape, only much more poorly absorbed. When included in the diet, they tend to inhibit the absorption of dietary cholesterol. The problem with using them is that they are virtually insoluble in an aqueous medium.

"Our technologies can be used to enhance bioavailability, improve stability, to protect color, enhance taste, deodorize and make ingredients that are normally insoluble in water not just dispersible but 100 percent soluble in cold water," says Cecilia McCollum, executive vice president for Blue California ([www.bluecal-ingredients.com](http://www.bluecal-ingredients.com)), Rancho Santa Margarita, Calif. "Our new ingredient, introduced in 2007, is VitaSterols, containing 40 percent phytosterols completely soluble in cold water.

"A more bioavailable form of phytosterols offers a safe and efficacious way to control high cholesterol levels, the No. 2 concern for adult Americans," adds McCollum. Other products developed by Blue California with this new technology are CoQ10 (10 percent and 40 percent) and Biolut 5 percent WS — soluble lutein for beverages. "The potential for improving solubility, flavor color protection, enhancing stability and bioavailability for many products is significant. Blue California is currently working on many projects and working solutions for challenges in the food and dietary supplements," says McCullum.

DSM Nutritional Products Inc. ([www.dsm.com](http://www.dsm.com)), Parsippany, N.J., provides a unique solution for the poor absorption of molecules such as carotenoids. It is a beadlet technology called Actilease, based on microparticles of active ingredients as small as 0.2 micrometers in diameter, encapsulated and stabilized in a protective matrix, which is then coated in starch. This allows easy dispersal in water and improved bioavailability of such important molecules as lutein, zeaxanthin, lycopene, beta-carotene, coenzyme Q10 and fat-soluble vitamins.