

# New Solutions in Food Dehydration



Fresh (left) versus nutra-dried blueberry

EnWave Corporation's Radiant Energy Vacuum food dehydration technology sits on the brink of a major industry breakthrough

**D**r. Tim Durance, the founder and co-CEO of Vancouver, B.C.-based EnWave Corporation, is ecstatic about his company's recent Technology Innovation award at the June IFT show in Anaheim, Calif. "We had a lineup of people wanting information on our technology, and how it could work for their food products," he says. "For many of them, freeze drying and spray drying are time consuming and expensive, and they're actively searching for alternate ways to dry their products."

Enter EnWave's recently commercialized nutraREV technology for food dehydration. In March 2009, EnWave sold its first commercial-scale nutraREV equipment to CAL-SAN Enterprises of Richmond, B.C. for large-volume production of dried high-bush blue-

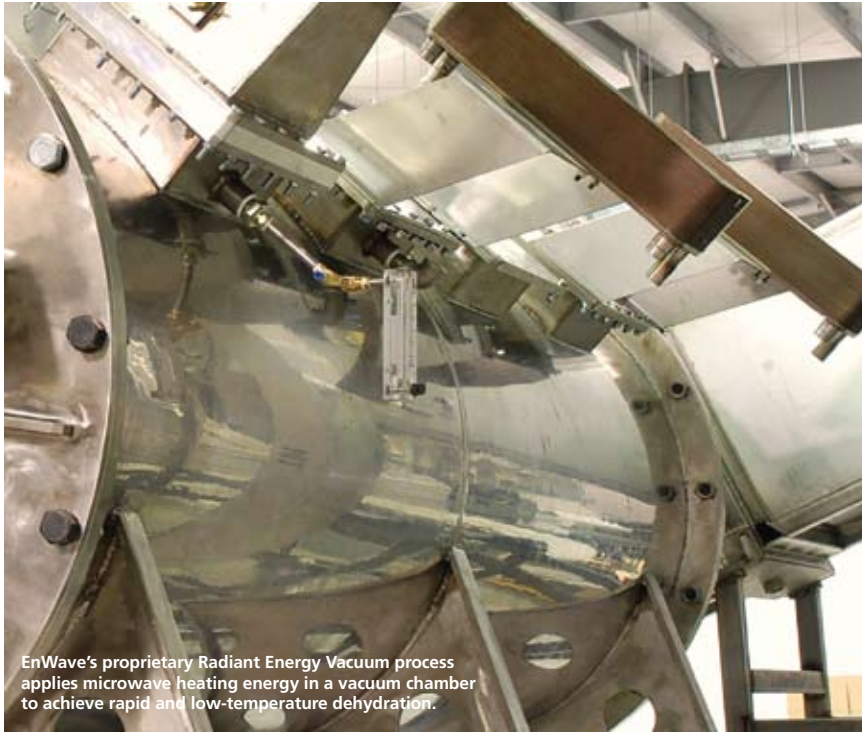
berries. CAL-SAN is now actively working towards supply deals with a number of international cereal and snack food manufacturers to introduce a new dried "puffed" blueberry product to its line.

"We tried a number of different value-added technologies for our blueberries, and have never been able to get the product we were looking for at the scale we wanted," says Dave Sandhu, president of CAL-SAN. "Our puffed berries look beautiful, they have a great crunchy texture with a similar nutritional content to freeze-dried berries. Everyone wants to know what the antioxidant values are in products these days, and we are happy to present such a nutritious and flavourful product to the market."

EnWave's proprietary Radiant Energy Vacuum process applies

microwave heating energy in a vacuum chamber to achieve rapid and low-temperature dehydration. With this method, food products can be dried at or around room temperature in minutes rather than days. The nutraREV equipment uses a series of porous polyethylene drums to tumble food products through a large stainless steel chamber that is constantly under vacuum. Microwave heating energy is guided through the chamber and can be set to produce food within a wide range of final moisture contents. The food can also be "puffed," which enables products like berries to retain close to their original size and shape.

"One of the questions I get all the time is whether using microwaves kills the nutrients in food," says Durance. "This is a common



at high temperatures. The effect is the same regardless of whether the heat comes from hot water, steam or microwaves.”

EnWave’s technology has been in development for more than 10 years at Durance’s lab at the University of British Columbia where he has been a professor in the Department of Food, Nutrition and Health Program since 1987. REV originally began as a method for drying potato chips – something Durance still believes is a viable application for nutraREV because of the fact that no oil is required to achieve that all-important crispy texture.

In addition to potato chips, nutraREV has been used to produce a wide variety of test products for food producers, including dried herbs, berries, apples, cherries, onions and shrimp. All these producers have been attracted to the technology for the combination of its nutrient retention and potential for significant cost savings. According to EnWave, one of its machines is capable of producing the same output as seven large freeze dryers, and operates using one-third of the energy cost and one-sixth of the capital cost.

Hot on the heels of this first equipment sale, Durance’s team is now moving into its expanded engineering facility in the Vancouver area where it will be possible to build the equipment and design the next generation of nutraREV, including a model for smaller producers. It’s this ability to bring innovative solutions to producers that Durance says is one of his favourite parts of growing a food technology company. “Seeing the excitement on the faces of potential customers when they realize there is now a serious alternative for food dehydration on the market has got to be near the top,” he says. ■

*For more information, visit [www.enwave.net](http://www.enwave.net)*

misconception with home as well as commercial microwave use. In fact, nutrients in food can be destroyed by excessive heat but not by microwaves themselves. Over-cooked vegetables do have decreased nutritional value, but it’s proportional to the length of time they’re held

**Nutritional Comparison for Selected Vitamins and Antioxidants**

	Fresh/ Frozen	Air-Dried	nutraDried	Freeze-Dried
Vitamin A (µg) carrot	1,500	1,150	1,280	1,380
Vitamin C (µg) carrot	450	150	400	450
Anthocyanins (mg) blueberry	5.3	2.0	5.0	5.2
Phenolics (mg) blueberry	35.5	21.5	33.5	24.5
Antioxidants (TBARS) blueberry	32	20	23	23

**Capital Cost Comparison: nutraREV versus Freeze Drying (24-hour operation)**

	nutraDried	Freeze-Dried
Initial drying temperature	30°C to 50°C	-50°C to -20°C
Final drying temperature	45°C to 60°C	30°C to 50°C
Drying time	0.2 to 2 h	24 to 36 h
Energy costs	\$0.23 per kg dried product	\$0.66 per kg dried product
Capital costs	\$0.13 per kg dried product	\$1.19 per kg dried product