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## Fueling Functional Foods

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Associate Professor Mingruo Guo has UVM on the cutting edge of the rapidly expanding functional foods market.  
 (Photo: Bill DiLillo)

It's late at night and Mingruo Guo can't sleep. Visions of buffalo milk, whey-based environmentally safe wood finish, flavored tofu, and deicers are dancing in his head, preventing him from getting his eight hours.

Morning comes and Guo, an associate

professor and researcher in the department of nutrition and food sciences, heads sleepily to his lab in the Carrigan Dairy Sciences building with a list of ideas from the previous night. It's here where he will attempt to turn his dreams into actual products.

"I think a lot in the middle of the night," Guo says. "I get a lot of good ideas then. I'm not a patient guy. I think too fast, but I'm starting to get older and a little slower."

Guo has proven more than just a dreamer. An expert in the area of functional foods - foods with physiological benefits that reduce the risk of chronic disease beyond basic nutritional functions - Guo has sold patents through UVM to a number of companies who in turn give a small percentage of sales back to the university. His research has helped secure a number of major USDA grants for the university.

### A potential cash cow

The potential market for functional foods is massive. In 2002, the functional foods market was a \$20.2 billion business with an anticipated growth rate of 7-10 percent a year. Guo says in 20 years, 85 percent of all food will be functional, primarily due to the increased awareness by consumers of the benefits of healthier foods that also help prevent disease such as tomatoes, grapes, tea, seafood, olive oil, low fat milk and enriched bread. Guo has also created soy-based products and expects that market to reach 7.3 billion by 2007.

Guo and his team of scientists have developed a number of functional food products that include antioxidants, prebiotics and probiotics. In addition to enhancing the immune system and helping to prevent cancer, these live microbial food supplements have a number of other health benefits. Guo created oagurt, (oats and yogurt), buffalo yogurt, tofu skin, and is working on infant formula, a nutritional supplement for pregnant women, and a smoothie-like drink.

"We're near the forefront on a lot of this," he says. He's sold the rights for some of these products to the Vermont Butter & Cheese Company in Websterville, Liberty Yogurt of Canada, which has a plant in Enosburg Falls, Star Hill Farms in Woodstock, and others.

### **Surrounded by ideas**

Many of the products created by Guo are scattered around his office. Cups of yogurt and a coffee table with a fresh coat of whey-based, environmentally safe wood finish sit near his computer desk. "Feel how smooth that is" he says slowly running his hand across the shiny wooden table. Guo clearly loves what he does and is continuously coming up with new ideas to test in his lab, which used to serve as the UVM dairy bar where people would stop for an ice cream cone in the summer.

"I have so many ideas that you have to choose the ones that are scientifically feasible," Guo says. His idea to use whey protein as a binding material to formulate environmentally friendly wood finish was designed to decrease pollution and benefit the dairy and wood industries. Ethan Allen uses the wood finish on some of its furniture products.

Another of Guo's ideas came to him while driving on the interstate. He noticed the damage to the bridge, the road and nearby plants caused by the use of more than five million tons of salt each winter season. He says he found out later that for every dollar spent on salt, forty more dollars were spent to repair the damage it caused.

Following a trip to the airport where he watched ice being removed from the runway with a deicing machine, Guo started thinking of ways to develop environmentally safe deicers by converting lactose in cheese whey to potassium acetate by using a two-stage fermentation.

The dream of a nation using his environmentally-safe deicer to clear its roadways is well underway at the lab and should be completed soon, assuming Guo can get some sleep.

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