

Plant science + animal science = a nutritional yogurt



Dairy technology students make Aronia yogurt

Q: What is the result of combining the scientific knowledge of a well-known plant breeder and an award-winning dairy microbiologist with cooperation from nutritional sciences and allied health sciences?

A: It all adds up to a tasty UConn-made yogurt that holds promise for its nutritional value because it is flavored with healthful berries from a plant called *Aronia*, also known as black chokeberry.

The plant scientist is Professor Mark Brand, who conducts research at the Plant Science Research Farm and supplies the berries. He has developed several *Aronia* cultivars, including Proven Winners® Low Scape Mound® and Low Scape Hedger®, as native alternatives to invasive shrubs such as barberry. The microbiologist and dairy scientist is Assistant Professor Dennis D'Amico, who devised a Department of Animal Science Creamery yogurt making system that uses the berries.

The Department of Nutritional Sciences' faculty members Professor Ji-Young Lee and Associate Professor Ock Chun studied the nutritional benefits of the berries. Taste tests were done by Department of Allied Health Sciences Professor Valerie Duffy, Brand, and others.

"Finding an outlet for another department's product

(*Aronia* berries) was an important part of this work," D'Amico said. Brand, who is growing about 700 commercial *Aronia* plants per acre at the plant science farm, said, "I see this as a good collaboration, and I'm happy to provide the berries."

And, there are a lot of berries! In August 2017, over thirty pounds of plump, purple berries were harvested from only six mature plants and given to D'Amico for yogurt making. "Per plant yield can average between five to eight pounds per mature *Aronia* plant, or around six to eight tons per acre," Brand said.

The two researchers agree that this collaboration is also a great way to engage their students. "There is a lot of interest in novel crops by undergraduate students," Brand said. His graduate student, Jonathan Mahoney, harvested the berries with the help of the UConn men's crew team and Spring Valley Student Farm/EcoHouse.

D'Amico included the *Aronia* project as part of his undergraduate dairy technology class. He said the students welcomed participation in the production process. Together, they decided how to develop and formulate a product made with *Aronia* that could be manufactured in the creamery. Considerations included food safety, what dairy product worked best as the base for *Aronia*, what form of the berries would work best and provide the most health benefits, and what type of milk to use.

One healthy advantage of *Aronia* was published in a 2017 *Nutrition Research* article. Co-investigator Lee said, "We found that *Aronia* berry consumption lowered blood total cholesterol and LDL cholesterol [bad cholesterol] concentrations in former smokers."

Incorporating *Aronia* into a food product was investigated using plain berry juice and ice cream. Taste test research on the juice was published in the journal *Appetite*. Duffy said about one of the results, "The juice needed more than sugar to be palatable

and something to block the astringency, or the drying/puckering sensation.” In another trial by a graduate student, adding whole *Aronia* berries to ice cream resulted in unappetizing ice crystal formation.

Attention turned toward putting *Aronia* in yogurt after a visit from the College’s 2017 commencement speaker, David Bouley. The renowned chef, who promotes the connection between food and health, tasted the juice as part of a College facilities tour with Mahoney. Bouley encouraged the collaboration to formulate a new healthy food product.

D’Amico agrees that yogurt seems to be an ideal “healthy delivery device” for UConn’s *Aronia* berries. The palatability issue was addressed when D’Amico decided to use juice instead of whole berries. He discovered that the juice has less astringency and does not require lots of added sugar when it is extracted with an enzyme and incorporated into yogurt.

D’Amico obtained a license from the state of Connecticut to use the current creamery equipment, and his class made a twenty-five-gallon test batch, which had some distinct advantages over mass-produced yogurt found in supermarkets.

Pluses include a naturally rich pink color with no artificial coloring needed and a consumer-coveted “cream top” produced from using non-homogenized whole milk fresh from the Kellogg Dairy Center. In addition, D’Amico said, “This yogurt showcases the milk, and it can shine.” The yogurt has a longer shelf life because of the quality and freshness of the locally produced milk used, according to D’Amico.

He was so proud of the yogurt, D’Amico personally took a sample to UConn President Susan Herbst. In addition, UConn Dining Services made it into parfaits and said that it was well received.

Both Brand and D’Amico are excited by the idea of the advance of *Aronia* as a crop and seeing the berries incorporated into dairy food products, perhaps for use at UConn.

For Brand, *Aronia* is a viable new berry crop that

could become mainstream in a way similar to that of cranberries. However, he thinks that product development for *Aronia* fruits is needed because the berries can’t be eaten fresh.

He also said, “It is a wide-open playing field for modifying the crop because nobody has done anything with *Aronia*. It should be possible to take some steps forward.” If *Aronia* is successful as a crop, Brand anticipates the need to enhance its large-scale commercial production potential. To that end, he wants to make it easier to mechanically harvest the *Aronia* berries by getting the shrub’s heavy branches off the ground. He is currently experimenting with grafting the native black chokeberry onto the rootstock of European mountain ash, which is related to *Aronia*. A bonus result is a more robust plant with larger fruit. It’s easier to manage the weeds, too.

Although *Aronia* is being grown around the world, ‘Viking’ is the only variety available as a food crop. This worries Brand. Pests could easily destroy all the plants in production now. He is thinking of ways to add diversity that would protect the crop.

When D’Amico speaks of expanding *Aronia* yogurt production, he says it from the perspective of the microbiologist that he is. D’Amico said, “I want to maximize the healthfulness with the polyphenols and fiber that are present and the probiotic cultures they use in the production of the yogurt.” And, he wants to know how the yogurt’s properties are enhanced by the berries and whether the yogurt’s nutritional value changes if powder or whole berries are used instead of juice.

by Patsy Evans

