



Food Research Institute

UNIVERSITY OF WISCONSIN-MADISON

FRESH Seminar: “Claims vs. Evidence for the Use of Aronia Berries, the Latest Midwest-Produced ‘Superfood’”

***Presented by Brad Bolling, PhD, Dept. of Food Science, UW-Madison
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MADISON, Wis. (FRI) – Brad Bolling, PhD, Assistant Professor in the Department of Food Science at the University of Wisconsin–Madison, kicked off the Food Research Institute’s FRESH Seminar series for the fall semester on September 16, 2014 with a presentation on the aronia berry (or chokeberry), a native Wisconsin plant which has received increasing media attention for its purported health benefits. Dr. Bolling’s research includes investigating the phytochemical composition of aronia berries in order to help mechanistically investigate the plant’s health-related claims, which span a wide area encompassing both cardiovascular disease and cancer.

To set the stage for the scientific part of this presentation, Dr. Bolling began his presentation with a primer on functional foods, which are foods that provide health benefits beyond their traditional nutritional value. While “functional food” may not be a formal regulatory category in the U.S., the claims made by functional foods do come under FDA’s regulatory oversight.

The FDA categorizes claims made by foods as either health claims, qualified claims, or structure/function claims. Health claims, such as the statement that fruits, vegetables, or whole grains can prevent cancer, require prior FDA review and must be backed by a high level of scientific evidence. Currently only 18 such claims have been approved by the FDA. Qualified claims require less stringent evidence than do health claims, but still require prior FDA approval. Examples of qualified claims include the possible ability of nuts to reduce the risk of heart disease, or the assertion that psyllium husks might reduce diabetes risk. Finally, the FDA permits more nebulous structure/function claims, which require no prior FDA review and only need to be “plausible,” a standard which can be open to many interpretations.

Turning the talk back to aronia, Dr. Bolling described the four species of aronia berries, including *Aronia mitschurinii* (the commercial chokeberry, or Viking chokeberry, produced largely in Europe), *A. melanocarpa* (the wild black chokeberry), *A. prunifolia* (the wild purple chokeberry), and *A. arbutifolia* (the wild red chokeberry). The color of the fruits is related to their polyphenol and anthocyanin content, which is responsible for both the red and purple color and also the purported health benefits of the aronia berries.

Aronia berries have the unique property of remaining on the plant in an edible state for up to 7 weeks. Commercial growers are interested in identifying the ideal time to harvest the fruit in order to reap peak health benefits. Dr. Bolling’s laboratory studied variations in the polyphenol composition of the fruit



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during the time it remains on the plant, and found that anthocyanin levels are optimal at about 5–6 weeks. Interestingly, this coincides with the time of peak flavor as assessed in sensory evaluations. Bolling's group also has characterized the variations in polyphenol content across *Aronia* species, which could suggest differences in therapeutic potential between species.

In vitro studies have demonstrated significant antioxidant activity in aronia berries; however, the polyphenols associated with this activity are often poorly absorbed or transformed during metabolism, so the Bolling lab has examined in vivo metabolic and therapeutic effects of the berries as well. Clinical studies have demonstrated beneficial anti-inflammatory and blood lipid effects following only six weeks of daily aronia-berry juice consumption. A feeding study in the ApoE $-/-$ mouse model of hypercholesterolemia also demonstrated a reduction in cholesterol levels and an increase in antioxidant enzyme activity resulting from aronia-berry juice consumption.

Additionally, Bolling has used a mouse adoptive transfer model of colitis to examine the effect that aronia berries might have on this inflammatory disease. Mice in the aronia berry treatment group maintained body weight and also showed lower levels of circulating inflammatory cytokines.

The combination of analytical, in vitro, and in vivo approaches that the Bolling lab is taking should continue to identify potential health benefits and how to best obtain them from the aronia berry.

Summary by Wendy Bedale, Science Writer, Food Research Institute

About the Food Research Institute

The Food Research Institute (FRI), a part of the College of Agricultural and Life Sciences at the University of Wisconsin–Madison, operates its own laboratories and administers its own research and service programs. The mission of FRI is to catalyze multidisciplinary and collaborative research on microbial foodborne pathogens and toxins and to provide training, outreach and service to enhance the safety of the food supply. To fulfill this mission, FRI conducts fundamental and applied research, provides accurate and useful information and expertise, delivers quality education and training, and provides leadership in identifying and resolving food safety issues to meet community, government, and industry needs.

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