

VEGAN'S DELIGHT

Seaweed: The versatile vegetable

There are many uses for this multi-faceted sea plant and prospective East Coast growers are preparing to explore the options.

Photos: Sarah Redmond.

BY MURIEL L. HENDRIX

At a Seaweed Workshop organized earlier this year by Maine Sea Grant and principally funded by Maine Aquaculture Innovation Center, Tollef Olsen commented that although he has been referring to seaweed as “the virtuous vegetable,” he’s wondered if instead, he should describe it as “the versatile vegetable.”

Presentations given by participants at the conference revealed that both descriptions are apt. There are myriad uses for seaweed that extend from food to cosmetics, fertilizer to biofuel, pharmaceutical research to bioremediation.



Tollef Olsen (left) talking with Dr. Charles Yarish at the Seaweed Workshop in Maine. (Photo: Muriel Hendrix)

York City. One was close to Fairfield, Connecticut, the other at the confluence of the Bronx and East Rivers.

After measuring the summer growth rate of the red seaweed *Gracilaria tikvahiae* at both sites, and the 2012 winter growth of sugar kelp, *Saccharina*, in a CT Sea Grant Project at the Fairfield site, they found the red seaweed grew twice as fast at the river site as off the coast at Fairfield, almost 12% at 0.5 meter depth. From December to May, the juvenile kelp had grown 3.0 m.

Researchers calculated the hypothetical nutrient removal at the sites and concluded that seaweed could be particularly useful as a bioremediator in “nutrient hot spots.” Yarish added that such projects could earn revenue by processing the biomass of harvested seaweed into fertilizer, biofuel or other products.



Seaweed salad.



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NUTRIENT HOG

Traditionally, macroalgae has been used as a food and as agricultural fertilizer, but recently, there has been a surge of interest in its role as a bioremediator. As Dr. Charles Yarish of University of Connecticut noted that seaweed is “a nutrient hog” and shows amazing growth in nutrient-rich waters. During the summer and fall of 2011 and winter of 2012, Yarish and fellow researchers conducted pilot projects at two sites in nutrient-rich waters near New

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THE IMTA APPETITE

IMTA projects worldwide are taking advantage of seaweeds' appetite for inorganic nutrients, including several ongoing projects in Maine, where seaweeds are being grown alongside fish and shellfish.

Dr. Eric Tamigneaux, professor at *The Cégep de la Gaspésie et des Îles* and researcher at Merinov in Quebec, reported on an even more unusual use for seaweed – kelp fiber as a component in a composite material. Researchers are working on this innovative product at Oleotek facilities in Quebec.

There also are companies that have developed a textile made of seaweed fiber and others that use seaweed in “green” bricks.

BEYOND SUSHI

In her presentation, “Beyond Sushi: A Review of Current and Potential Products from Marine Macroalgae,” Sarah Redmond, marine extension associate and seaweed specialist for Maine Sea Grant, explained that because fresh seaweed has a short shelf life, food favorites like kelp, dulse, nori and wakame have traditionally been dried. They are reconstituted for use in soups, salads and other dishes in homes and restaurants.

VEGAN'S DELIGHT



Seaweed soup.



Fried kelp chips.



Sea seasonings.



Seaweed soap.



Mermaid olives (pimento and garlic stuffed kelp stipes).



Seaweed shampoo and conditioner.



Seaweed Pringles.



Selection of dried sea vegetables.



Seaweed fish food.



Refrigerated seaweed salad.



Seaweed bath salts.

Dried seaweed is also ground for use in seasoning powders sold in salt shaker containers; other powdered seaweed shows up in seaweed seasoned value-added products like rice cakes, crisps and corn and potato chips. There are nori snack sheets and seaweed candies, even one topped with chocolate. Companies have begun to develop convenience foods like ready-to-eat seaweed salads.

Redmond displayed several books devoted to seaweed recipes, including Maine Coast Sea Vegetable's "Sea Vegetable Celebration," Prannie Rhatigan's "Irish Seaweed Kitchen" and "Fabulous and Flavorful Gim" by The Culinary Institute of America.

FREEZE YOUR WEED

Freezing provides a second way to extend seaweed shelf life. Olsen, who with Paul Dobbins, owns Ocean Approved in Portland, Maine, the first processing plant to freeze seaweed in the United States, explained that they blanch the seaweed to stabilize it, pack it in water and then freeze it. Unlike drying, this process preserves the green color and produces products that are ready to use in slaw, soups and other dishes.

An inventive cook, Olsen works with students at Johnson and Wales College of Culinary Arts to create recipes like Artichoke Stuffed with Crab and Kelp, Wakame and Shrimp Scrambled Eggs, An Asian Twist on Sea Slaw, and Dilly Kelp Pickles.

SEAWEED EXTRACTIONS

Extracting emulsifiers, gelling and thickening agents from red seaweeds has been a lucrative industry that originally relied on wild Irish Moss from Canada, but in the early 1970s, when red seaweed cultivation developed in the Philippines, farmed product took over the market. These agents turn up in multitudes of products including toothpaste, ice cream, beer and shoe polish, and some are used in pharmaceutical research.

Coastal communities have long recognized the agricultural value of seaweed nutrients, with farmers piling it around their plants and tilling it into the soil. This has morphed into an industry that uses seaweed in compost and produces both granular and liquid seaweed fertilizers.

LUCRATIVE COSMETICS

Seaweed in cosmetics is a small but lucrative market – Redmond showed a face cream priced at \$150 an ounce – and other products like seaweed bath soaks and body lotions are advertised for their restorative nutrients. Additional niche markets that rely on the high nutrient value of seaweeds include herbal botanicals and vitamin preparations for people and animals, and additives in animal feed, including fish meal.

The FAO 2010 Report on World Aquaculture shows that 15.8 million tons of aquatic plants were farmed globally in 2008, and that 99.6 % of these were seaweeds. Since 1970, the report says the average annual growth rate of seaweed aquaculture has been 7.7%. Countries in East and Southeast Asia farmed 99.8% of these plants, with China as leader in 62.8% and Indonesia and the Philippines accounting for the bulk of the rest. In East Asia, the report says, almost all farmed species are for human consumption; in Southeast Asia, most is raised for carrageenan.

SEAWEED ENTREPRENEURS

Although the United States and the Maritimes claim only a small percentage of farmed seaweed, the prospect of an increasing demand for seaweed products has piqued the interest of many growers and other entrepreneurs along the Atlantic Coast. There was broad interest in this workshop, where well over 100 participants included researchers, people who process and market seaweed as food for humans and animals, representatives from financial, pharmaceutical and health care industries, engineers, harvesters, fishermen, and shellfish and seaweed farmers.

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