



Our Daily Breadfruit

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So little is known about the chemistry of plants, which presents an amazing opportunity to learn and discover.

Plants are the most sophisticated chemical factories in the world, producing an estimated 500,000 unique chemicals. Plants can't move, search for food, run away from danger, or find a better place to live, therefore chemical production is the only means for plants to interact with their environments.

Susan Murch researches the control of the chemical synthesis of compounds with flavour, medicinal and nutritional uses as food additives and, in some cases, as toxins. For Murch, plants are the most interesting, fascinating organism.

"Plants are much more complex than people understand," she says. "The average piece of a plant leaf contains about 4,000 different chemical compounds, many of which we don't yet understand. There is an amazing opportunity to discover new things."

New discoveries are exactly what take place in Murch's Maui field station, where 230 75-foot-tall breadfruit (*Artocarpus altilis*) plants are housed and cared for by Murch and her colleagues—each plant a unique variety collected from a different Pacific island—with different leaf shapes, nutritional composition and environmental requirements.

Breadfruit is a traditional Polynesian food crop that has been a staple in the Pacific for more than 3,000 years. Pacific Islanders evolved sophisticated cultural systems and selected crops to survive frequent famines.

Breadfruit diversity in the Pacific is declining due to damage from hurricanes, drought, and loss of cultural knowledge. Murch is applying her expertise in plant chemistry to examine the nutritional aspects

of the breadfruit plant to understand which varieties have the highest nutrition.

"Every four seconds someone in the tropics dies of hunger, it is one of the biggest food security issues in the world at the moment. We are working towards distributing the trees for food security in these regions," says Murch.

Breadfruit trees are difficult to propagate, transport, and distribute, restrictions Murch and colleagues are addressing by determining how to regulate and produce the trees in tissue culture, a process by which many of the food crops in North America are produced.

Last year Murch's lab donated 7,500 trees for food security to tropical nations, a number that will increase to several hundred thousand trees over the next few years. It's an initiative that will serve Murch's goal of positively impacting food security and providing food to regions where food is a scarcity.

After establishing food security in the tropics, her research will look at using the plant to improve nutrition in North America. Breadfruit trees produce gluten-free flour high in vitamin A and protein, making it potentially useful as a food additive or supplement in North America.

Overall, Murch wants to understand the role of plants in human health and how it can improve health.

"Understanding the mechanisms of a plant has a huge impact on how human health will progress through the next 50 years and on how we can feed and care for the growing population in the world," Murch says.