

Shelf-life science: Making produce last longer

By **Alexia Elejalde-Ruiz**
Chicago Tribune

Imagine bananas that never go bad. To Aidan Mouat, CEO of Chicago-based Hazel Technologies, it's not so far-fetched.

His company makes a product that extends the shelf life of all sorts of produce — avocados, cherries, pears, broccoli — by slowing the chemical process that causes decay. Some of the world's largest growers are using it to send their produce longer distances or reduce how much retailers throw away, and Mouat says a consumer version could be next.

"I envision, in the next 18 months or so, literally selling a banana box to consumers," Mouat said from Hazel's growing office space at University Technology Park, a startup innovation hub on the Illinois Institute of Technology campus. "You keep it on your counter; put a (Hazel) sachet in there once a month, and you have bananas that last forever."

Hazel Technologies is part of a new wave of innovation seeking to slow spoilage of produce and other perishables, which experts say is a key weapon in the battle against massive food waste in the U.S.

As much as 40% of food produced annually in the U.S., and nearly half of produce, goes uneaten, according to government estimates. While the waste happens throughout the supply chain, the vast majority of the \$218 billion worth of uneaten food annually gets tossed at home or at grocery stores and restaurants, according to ReFED, a Berkeley, Calif.-based nonprofit that seeks solutions to reduce food waste.

The average American family throws away 25% of groceries purchased, costing a family of four an estimated \$1,600 annually, ReFED said. U.S. supermarkets lose \$15 billion annually in unsold fruits and vegetables, according to the U.S. Department of Agriculture. Meanwhile, uneaten food is the No. 1 component of landfills and squanders the water and energy used to grow and transport it.

Routing unused food to charities can help keep it out of the garbage, but solutions to prevent waste at the source, such as by extending its shelf life, "have some of the greatest economic value per ton and net environmental benefit," said Alexandra Coari, director of capital and innovation at ReFED.

Spoilage prevention packaging has the potential to divert 72,000 tons of waste and 330,000 tons of greenhouse gas emissions, plus save 44 billion gallons of water a year, she said.

Technology that extends shelf life has been around for a long time, but there has recently been a "huge uptick" in innovations that expand the options, helping to drive the \$185 million in venture capital invested in combating food waste last year, Coari said.

Hazel, founded in 2015 by a group of Northwestern University graduate students, has raised \$18 million so far, including nearly \$1 million in grants from the USDA. It has 100 clients in 12 countries in



Camilla Fine/Chicago Tribune-TNS

Post harvest Scientist Fang Tham, 23, tests the firmness of a chayote with a durometer at Hazel Technologies in Chicago.

"You keep it on your counter; put a (Hazel) sachet in there once a month, and you have bananas that last forever."

— **Aidan Mouat, Hazel Technologies**

North and South America.

The company makes small sachets, the size of a salt or pepper packet included with a takeout order, that can be thrown into a box of produce to shut down the food's response to ethylene, a chemical naturally emitted by many fruits and vegetables that triggers the loss of firmness, texture and color. The sachets continuously emit a small amount of an ethylene inhibitor, changing the atmosphere in the storage box but not the food itself.

While ethylene management technology isn't new, Hazel's sachets are gaining fans because they are easy to use, whether in okra fields in Honduras or avocado packing houses in the U.S., Mouat said. The company also is working on anti-microbial reactions and will soon bring to market anti-microbial liners for packages of berries, to ward off the white fuzz.

"We can extend the shelf life of practically any perishable by targeting the specific mechanism that causes it to go bad and integrating it with the packaging that already exists today," said Mouat, who graduated from Northwestern with a doctorate in chemistry in 2016.

How much Hazel can extend the shelf life depends on the type of food. For example, tests show an unripened pear gets an extra seven to 10 days after being treated with a Hazel sachet, plus an extra three to four days once ripe, Mouat said. Testing on packaged chicken, beef, fish and pork suggests the sell-by date could be pushed back by four to six days, he said.

Mission Produce, the largest grower, packer and shipper of Hass avocados in the world, found that ripe avocados, which normally would have to be sold in two to five days once in stores, lasted seven to 10 days when treated with Hazel's product, said Patrick Cortes, senior director of business development at California-based Mission. Once they'd achieved maximum ripeness, some treated avocados kept at room temperature were still good when they were sliced two weeks later, he said.

Mission, which has developed a branded product with

Hazel called AvoLast, has completed one retail trial and is about to launch two more, as well as a food service trial, Cortes said. So far he prefers it to other shelf life extension treatments the company has tested because it is easy to use.

Mission is investing in the technology to help retain the freshness of avocados that travel long cross-ocean journeys and help U.S. retailers save money by throwing fewer avocados away, Cortes said. On average U.S. retailers waste 5% of avocados, which also has an environmental impact, he said.

"We took a retailer we sell to and said, if we can reduce their shrink (wasted produce) by 2% it would be the equivalent of powering 26 homes for a year," Cortes said. "It just makes perfect sense to do the right thing."

It also makes business sense, and investors are starting to take notice, said Coari at ReFED. California-based Apeel Sciences, which has created an all-natural coating that gives produce a spoilage-resistant skin, last year landed a \$70 million funding round that included Andreessen Horowitz, a prominent venture capital firm that has backed some of the biggest tech companies.

Apeel installed its coating equipment along Kroger's avocado supply chain and this year rolled out longer-lasting avocados at hundreds of Kroger stores. It is also starting retail tests on asparagus, which are the produce industry's biggest carbon emitters because their shelf life is so short they have to travel by air.

Other movers in the industry include Massachusetts-based Cambridge Crops, which makes an edible protective coating from natural silk proteins and recently got \$4 million in seed funding from MIT's venture fund; and U.K.-based It's Fresh, a maker of ethylene filters that last year sold a 15% stake in the company to AgroFresh, a longtime maker of freshness products, for \$10 million.

Yet adoption by the industry has a long way to go. Suppliers pay for the technology but the benefit is felt downstream at retail, complicating the business model, Coari said.

It is unclear if shoppers will be willing to pay more for longer-lasting produce or will respond to branding of products long considered commodities, she said. It's also unclear how much more it might cost them. Prices vary so

much because of weather or other production issues that consumers may barely notice, Hazel's Mouat said. Apeel, in its pilot with Kroger, found no price increase was necessary because sales increased and waste declined.

In addition, it can be complicated and expensive to introduce shelf life extension technologies into the supply chain if it involves installing equipment or training seasonal workers.

That's where Hazel has a leg up. Growers and suppliers that have tried numerous alternatives say they have been attracted to the flexibility and user-friendliness of Hazel's technology.

"It has to be simple to use or may not be worth doing," said David Ortega, director of packing operations at Orchard View Cherries in Oregon.

Orchard View conducted a small trial with Hazel two years ago and this year has more than doubled its use, primarily for cherries embarking on ocean trips to Asia that can take up to 23 days.

It found cherries treated at the end of the packaging

process were firmer than untreated cherries after 20 days, and had fewer indentations and greener stems. Consumers often reject produce that doesn't look perfect, even if it is still perfectly good, so aesthetics matter.

"It was definitely noticeable. The fruit looked fresher, more appetizing," Ortega said. "It allows us to feel more confident in where we can ship our product."

That could mean exploring new markets, such as India and Africa, which is a 35-day transit.

At WP Produce in Miami, the largest grower and importer of tropical green skin avocados in the Western Hemisphere, Vice President Chris Gonzalez hopes using Hazel will allow it to increase market share in the U.S. Tropical avocados, currently less than 1% of the U.S. avocado market, have a shorter shelf life than the much more common Hass avocado, though they last longer once they are cut open because they don't oxidize as fast, he said.

Treating tropical avocados with Hazel adds an additional four to five days of shelf life, and "that's going to help us out shipping to Malaysia, to California, to the West Coast," said Gonzalez, whose company grows avocados on 500 acres in the Dominican Republic. As U.S. consumers get to know the larger, firmer alternative to Hass, he believes there will be fans, especially among millennials who like to try new things.

"There's a lot of market share to be gained there," Gonzalez said.

Mouat declined to disclose Hazel's revenues, but said sales have grown threefold over the past year. The company, which is not yet profitable, started 2019 with 14 people and will more than double to 30 employees by the end of

the year. Hazel also will have increased its office space by more than a third, to 14,000 square feet, by year's end.

Four of the five original founders — who were graduate students in engineering, law and chemistry when they met at an interdisciplinary course at Northwestern's Farley Center for Entrepreneurship and Innovation — occupy Hazel's C-suite.

The company has grand ambitions. India, for example, grows more mangos than anywhere in the world but exports only 10%, leaving many to go to waste, Mouat said. Using Hazel's sachets to extend shelf life in countries that lack stable supply chain infrastructure could allow them to sell their fruit to new markets without investments in pricey equipment, he said.

Mouat also hopes to create a consumer-focused sachet that people can throw into the veggie crisper in the fridge, or the aforementioned banana box.

And then there's the booze.

An irony of operating an anti-food waste tech company is that food is tested in a lab to ensure the technology works, creating waste of its own. Mouat has addressed that by taking discarded passion fruit and making a sour IPA, and discarded bananas and making a banana rum. He has a fridge full of dragonfruit and is considering making a dragonfruit beer.

The company sends bottles to investors and customers as gifts for the holidays, but they have proven so popular that Mouat is looking into working with distillers or brewers to transform Hazel's food waste into alcohol.

"There is a surprising amount of appetite among our investors to add it as a legitimate arm of the Hazel business model," he said.



UPGRADE

NORTHWEST FURNITURE & MATTRESS

215 Elm Street La-Grande • (541) 963-5440
northwestfurnitureandmattress.com

Like Us On Facebook

Are you earning enough on your savings?



Gary F Anger, AAMS®
Financial Advisor

1910 Adams Ave
P O Box 880
La Grande, OR 97850
541-963-0519

Edward Jones®

MAKING SENSE OF INVESTING



TAWNY'S TOY BOX

Wishing you a Happy New Year!
Thank you for a great year!
We Wrap & Ship!

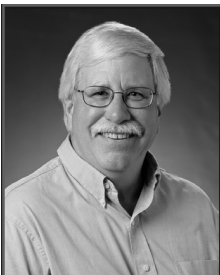
1735 Main Street, Baker City • 541-523-6526
1102 Washington Avenue, La Grande
Classic, Unique, Educational & Fun Toys for All Ages

AJ's Corner Brick Bar & Grill

Locally owned & operated • Local Beef from Clear Creek Beef

Tuesday Brewsday: \$1 off Draft • Build Your Own Pasta • 5 - close
Wednesday Whiskey: \$1 off • Happy Hour All Day Every Day
Thirsty Thursday: 50¢ off Well Drinks

Hours: Sun & Mon 11-8 • Tues-Thurs 11-9 • Fri & Sat 11-10
1840 Main Street, Baker City • 541-523-6099



Home & Auto go together. Like you & a good neighbor.

Some things in life just go together. Like home and auto insurance from State Farm®. And you with a good neighbor to help life go right. Save time and money. CALL ME TODAY.



State Farm Mutual Automobile Insurance Company, State Farm Indemnity Company, Bloomington, IL
State Farm County Mutual Insurance Company of Texas, Dallas, TX
State Farm Fire and Casualty Company, State Farm General Insurance Company, Bloomington, IL
State Farm Florida Insurance Company, Winter Haven, FL
State Farm Lloyds, Richardson, TX

CRUNCHY

Continued from Page 1B

3. Turn out the dough onto a dry wooden board; you won't need to flour it. Knead until dough has a springy consistency, about 5 minutes. Transfer to a bowl, cover with a kitchen towel, and leave to rest in a warm place until nicely risen, about 1 hour. (It will gain about 50% in volume.)

4. Heat oven to 400 degrees. Turn dough out onto a dry board. Flatten slightly with your hands. Using a bench scraper, section dough into 4 long portions. Cut those into 8 pieces each, about the size of a whole walnut. Roll a piece into a log about 1-inch wide and 12 inches

long. Cut the log in half. Shape each log into a ring, twisting ends into a loose knot (really just turn the ends over each other). Transfer to a baking sheet, leaving a little room between them. They don't expand much. Sprinkle with a little coarse salt. Continue with remaining dough.

5. Bake until nicely golden brown and crisp, 20 to 25 minutes. The taralli keep in a covered container for a couple of weeks and freeze beautifully.

Nutrition information per piece: 42 calories, 2 g fat, 0.5 g saturated fat, 0 mg cholesterol, 5 g carbohydrates, 0 g sugar, 1 g protein, 75 mg sodium, 0 g fiber