

University takes on taste challenge: MREs

June 5 2013, by Renee Elder

A ready-to-eat Army meal can survive a 1,200-foot parachute drop and stay fresh for up to three years - only to go straight into the trash can if it doesn't appeal to a soldier's taste.

That's a problem researchers at North Carolina State University are hoping to solve by infusing snack bars and other prepared foods with extracts from tasty [fruits and vegetables](#) grown in North Carolina.

"The Army goes to such an expense to make rations, then watches time and time again as soldiers throw out anything that doesn't look and taste good," said Mary Ann Lila, director of N.C. State's Plants for Human Health Institute in Kannapolis.

"If it's nutty and good tasting, the guys will eat it - especially if they know it has high protein and will help with energy and muscle mass. Here, we are making an ingredient that not only will taste good but will be good for your body and your health."

Using a \$60,000 grant from the Center for Advanced Processing and Packaging Studies, an organization that links industries and university researchers, Lila and her colleagues chose one fruit and one vegetable to test their new method of extracting and transplanting vital nutrients.

"Because of our North Carolina connection, we decided on kale greens and muscadine grapes," she said.

These and other [vegetables and fruits](#) have naturally occurring properties

known as phytochemicals, sometimes called antioxidants, that enhance the immune system, repair [cellular damage](#), improve brain functions and offer other health benefits.

Delivering [fresh fruits and vegetables](#) to troops is often difficult if not downright impossible, especially in parts of the world where they are not grown, said Tom Yang, senior food technologist for the U.S. Army's Combat Feeding Directorate in Natick, Mass.

"There are logistics problems as well as the fact that these foods are highly perishable," Yang said. "Many times there is no refrigeration. We have to use food that is shelf-stable."

Shelf-stable foods, according to the Army, must be able to remain fresh for 3.5 years when stored at 80 degrees, or nine months at 100 degrees.

And they must be something soldiers are willing to eat.

"It has to taste good and look good to soldiers who are 20 or 21 years old," Yang said. "They can be pretty picky. They'd really rather be eating fried chicken or pizza or hamburgers."

Soldiers on deployment in extreme climate conditions such as Iraq or Africa have the fewest options and tend to rely heavily on [snack bars](#) that contain protein and carbohydrates but lack bioactive compounds, such as the cancer-fighting glucosinates found in kale or the heart-healthy flavonoids in grapes.

To make their products, Lila and research partners at Rutgers University have found a way to extract the fruit and vegetable phytochemicals and bind them with flour made from soybeans or hemp. The flour is used to prepare the snack and meal bars soldiers receive.

Their process also filters out excess sugars, fats and waters from the fruits and vegetables, resulting in a concentrate that can provide four or more servings of fruits and vegetables in a single tablespoon and remain suitable for consumption for several months, Lila said.

"We hired an external company to see how consumers would react, and they really loved it," Lila said. "It has a pleasant fruity aroma and texture."

Yang said he is eager to run his own tests on samples from the project and determine how the products will work as part of the Army's ready-to-eat meal program.

"The work sounds impressive so far," he said.

Meanwhile, researchers at the Plants for Human Health Institute are experimenting with various foods that could be made with the infused flour and testing them for shelf-life, nutrition and taste value. The institute is part of a public-private research campus involving nine higher education institutions and several corporations involved in the fields of health, nutrition and agriculture.

Soldiers aren't the only ones who stand to gain from easier access to phytochemicals, Lila said. Athletes, outdoor enthusiasts and people trying to control their weight could also benefit.

In a recent clinical trial, student subjects from Appalachian State University were asked to consume a drink containing blueberry and green tea phytochemical extracts for 17 days. During the final three days of the project, they worked out intensely for 2.5 hours each day.

"We found that those who had been given a placebo returned to their normal metabolism shortly after the exercise sessions," Lila said. "But

those given the phytochemicals were still burning fat in their sleep."

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SAMPLE U.S. ARMY MEAL, READY TO EAT

Veggie burger in BBQ sauce

Dried fruit

Chocolate banana muffin top

Wheat snack bread

Gum

Lemon tea

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