Miriam Pérez-Mateos and Alex Riemann will ensure this bird stays juicy during cooking by injecting it with a marinade containing natural meat protein.

Photo by Daniel Kim

Of fish and fowl

Improved succulence and texture in fish and poultry products is the goal of College food scientists.

By Natalie Hampton

If Dr. Miriam Pérez-Mateos and Alex Riemann have their way, no one will ever again have to endure a dry Thanksgiving turkey.

Pérez-Mateos, visiting scientist from Madrid, and Riemann, a doctoral student, are involved in research with food scientist Dr. Tyre Lanier, College of Agriculture and Life Sciences. They are investigating a process that would create juicier, more succulent poultry products.

Pérez-Mateos, a tenured scientist at the Spanish Council for Scientific Research, first worked with Lanier for two years as a post-doctoral student. She said she returned as a visiting researcher because of Lanier’s international reputation in the field of seafood and meat products. Lanier is recognized for his research on surimi, a fish product used to make imitation crab meat and other foods.

Riemann completed his master’s degree in food science with Lanier, helping to develop a microwave unit that cooks surimi quickly, preserving its texture. The product is now available commercially.

The process they are working on now can be used in surimi production to allow the use of fatty fish where currently only lean fish are used. It can also be used to create a meat-based marinade from poultry, which, when injected into
poultry, creates a juicier, tastier bird. This marinade is made from the same species that it will be injected into, making labeling much ‘cleaner.’

“No person in America will ever have to eat dry turkey again,” Riemann said. Riemann did his own research on a family turkey last Thanksgiving and determined the process to be a success.

Development of applications for this new process is a joint effort among researchers at N.C. State, the University of Florida, the University of Massachusetts and Oregon State University. N.C. State’s research portion, focusing on both surimi and poultry products, has been funded by the N.C. Agricultural Foundation and the American Egg Board for the poultry part and by North Carolina Sea Grant for the seafood part.

Presently, most meats are injected with phosphates to make them more juicy and improve their weight, a value to manufacturers. But when cooked, phosphate-treated meats tend to “shrink,” or lose most of the added water. And though these products are somewhat more moist, their succulence and texture are still not always as desired, Riemann said.

“Rather than using phosphates, our goal is to inject a marinade containing protein made from the same species that it is being injected into,” he said. “In taste tests, our cooked poultry is much more succulent and juicy tasting than that treated only with phosphates.” Similar results were obtained when marinades have been injected into turkey and pork.

Pérez-Mateos says that because the marinades they have developed contain natural meat protein, they satisfy consumers’ desire for an all-natural product. While the consumer benefits from a consistently more succulent texture, the marinades also provide added value for manufacturers in the form of higher product weight and yield.

The process to create the marinades involves mixing meat portions with water, then raising the pH of the product to solubilize meat proteins. Fat, skin, bones and collagen are removed, and the remaining product consists of soluble meat proteins and water. The pH is then lowered, and the protein recovered is separated from the process water. This protein isolate is then resolubilized and injected back into meat in the form of a marinade.

When the process is used to make surimi from fish, the waste water resulting from the process is less polluting (lower content of dissolved proteins), making the process more environmentally friendly, Pérez-Mateos said.

The process can also be used to create high-quality surimi from underutilized and unmarketable fish species. Usually Alaska pollock from the Bering sea is used to create surimi, but now there is great pressure on these fish stocks. So it is desirable to use other species, which previously have been difficult to convert to surimi with the old process. “When applied as a surimi process, this new isolate process makes good quality surimi from fatty fish,” Pérez-Mateos said.

Riemann says the food industry is very interested in the process for both poultry meat injection and surimi manufacture from fish, and he expects to see both applications commercialized soon.