WVU researcher using electron beams to make food bacteria-free

MORGANTOWN — Do you want electrons with that?

Mention the term, "electron beam" in conjunction with the kitchen, and you just might get an intergalactic image of a cable TV cooking show — as envisioned by a space suit-clad housewife from a 1950s science fiction movie.

But in the 21st century of today, that technology (known in the trade as "e-beam") is very much real and very much accessible. And West Virginia University researcher Dr. Jacek Jaczynski is using it to make the foods we eat that much safer.

Jaczynski, an assistant professor of animal nutrition in WVU's Davis College of Agriculture, Forestry and Consumer Sciences, wants to know in particular just how efficient the e-beam can be in removing E-Coli, Salmonella, Listeria and other potentially fatal bacteria from the food we consume every day.

That's why he spends a big part of his day deliberately contaminating samples of chicken, fish and ground beef with ample doses of the above bacteria.

After the food sits out to seal the deal, he ships it off the San Diego facilities of Sterigenics International, a company that uses e-beam technology in the sterilization of food and surgical instruments.

The idea, he said, is to see how the e-beam decontaminates the contamination, as it were.

Much like the beam that scans a document in a copy machine, electrons in the food sterilization process eject themselves from a linear accelerator that notches them up to nearly the speed of light.

It takes just seconds for the accelerated electrons to kill the bacteria, in a process Jaczynski describes as working like pasteurization — only without the heat. That means, he said, that a frozen hamburger patty going under the beam backs out the same way: still frozen.

But bacteria-free.

Jaczynski gives the e-beam an A-plus. For one thing, he said, the quality and flavor of the food isn't compromised, as it would be if conventional heat was used. It's also safer than irradiation, where isotopes — different variations of atoms — beat the bacteria, while leaving traces of radiation behind.

"No part of the food is changed," he said of the e-beam process, "except for the elimination of the bacteria."

The e-beam gets its source from electricity, he said, and that means a safer workplace for the people who get paid to process food.

When Jaczynski's food, sans Salmonella and other bacteria, makes its way back to Morgantown from San Diego, the professor pours over it, like a master chef looking for the right blend of seasonings for his latest recipe.

The idea there, he said, is the get the right blend of e-beam. While the method is most effective on thinner cuts of meat, it can get the job on thicker portions by being applied in multiple directions.

Jacking up the power isn't dangerous — but it does make the beam more difficult to control, which cuts down on efficiency. That's a prime consideration, he said, since the current equipment used in the process is very expensive.

The professor wants to use the technology in the future to stir a new pot. He wants to use the e-beam on fresh foods that aren't pasteurized, like spinach, lettuce and peanut butter.

He even sees himself of sorts as a culinary space cowboy, ridding innocent food of bad guy bacteria.

"I can kill all that moves," he said, chuckling.

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Dr. Jacek Jaczynski, a food sciences professor in WVU's Davis College of Agriculture, Forestry and Consumer Sciences, works to get a blend of bacteria to taint food that will then be sent off to a lab in San Diego for scanning under an electron beam. The e-beam works like pasteurization, but without the heat, Jaczynski says. It also works better than heat and is safer than other sterilization methods involving radioactive isotopes. "No part of the food is changed," he says, "except for the elimination of bacteria." Jaczynski has spent the past several years trying to perfect an "e-beam recipe" of sorts, by gauging the amount of electrons needed to kill specific bacteria that contaminates food.