

X-Ray Machines Help Kill Bacteria

US - It is not surprising to see an X-ray machine at a physician's or dentist's office, but research at Mississippi State University may help make them commonplace at seafood processing facilities and commercial produce operations.

Barakat Mahmoud, an assistant professor of food safety and microbiology with the Mississippi Agricultural and Forestry Experiment Station and spokesman for the Institute of Food Technologists, is researching X-ray machines as a way to decontaminate food products. He conducts his work at MSU's Experimental Seafood Processing Laboratory in Pascagoula.

His research shows X-ray doses can kill dangerous bacteria that make people sick, such as salmonella, E. coli, vibrio, shigella and listeria. The process simply removes harmful bacteria and does not alter the food product in any other way. In 1963, the Food and Drug Administration deemed the irradiation of food to be a safe practice.

"Vibrios are the bacteria in raw oysters that can make them dangerous to eat," Mr Mahmoud said. "This technology completely eliminates the naturally occurring bacteria, making the delicacy safe to consume. The X-rays do not kill the oysters; they stay alive throughout the entire process."

The technology is also being used on fresh produce, such as spinach, lettuce and tomatoes.

"The salmonella and E. coli outbreaks in fresh produce over the last few years have really brought attention to the importance of food safety," Mr Mahmoud said. "What I've been working on is a way to get rid of food-borne illnesses without affecting the quality and freshness of the food."

Gary Bachman, assistant MSU Extension horticulture professor at the Coastal Research and Extension Center in Biloxi, worked with Mahmoud on some of the research.

"I helped select the vegetables that would benefit most from the X-ray process," Mr Bachman said. "Given the issues leafy greens have had with contamination, they were a good choice."

Mr Bachman participated in evaluating the treated vegetables and found the quality stayed consistent.

"The process doesn't seem to affect quality," he said. "The technology is reliable, and as a result, the vegetables are free of pathogens."

Mr Mahmoud uses an RS 2400 X-ray machine to do his work. He carefully wraps the food items in plastic before putting them into the machine. In a matter of a few minutes, the food is irradiated and ready to eat. The final product looks no different than when it first entered the X-ray machine.

"The freshness of the food remains the same," he said. "There is minor loss of vitamins A and C, but they always are reduced in any type of food processing."

Mr Mahmoud and his colleagues found that not only does the X-ray technique kill pathogenic bacteria, but it also extends the shelf life of irradiated food. Spinach, lettuce and other fresh vegetables last 30 days longer after the spoilage bacteria are eliminated.

Processes using chlorine dioxide gas have been used in the past to rid leafy greens of dangerous bacteria, but the gas diminished the quality of the lettuce and spinach, Mr Mahmoud said. He also said gamma rays are often used for food irradiation, but X-ray is a more familiar technology for consumers.

"X-ray machines are more common, and their use can help consumers feel more secure," Mr Mahmoud said.

Now, Mr Mahmoud and his colleagues are working to show the seafood and produce industries how useful X-ray machines will be in their operations.

"We want the industry to adopt this technique as a way to make food safer," he said.

The research is being presented at industry and academic meetings across the country.

"This technique can be effectively used in large-scale commercial operations," Mr Mahmoud said. "Ridding food of dangerous bacteria before it reaches grocery store shelves can certainly help instill better consumer confidence."