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# Researchers explain how food packaging that provides visibility can reduce shelf life

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BLACKSBURG, Va., Aug. 22, 2007 – Packaging that lets you see a food product may make you feel better as a consumer, but it is not good for the food. New ideas for plastics may help remedy that problem.

Research by Virginia Tech food scientists has provided significant evidence that visible wavelengths of light cause taste and odor changes of food. The research is being presented at the 234th American Chemical Society national meeting in Boston, Massachusetts August 19-23, 2007.

Materials research for protecting food from light damage focuses on UV light in the range of 200 to 400 nanometers, which is the range that can damage skin. “These are the same wave lengths that cause nutritional and sensory damage in food,” said Susan Duncan, professor of food science and technology in the College of Agriculture and Life Sciences. For example, visible light degrades riboflavin in milk, interacts with flavor and odor molecules, and causes pigment damage in food.

Ultraviolet wavelengths are not the only ones that cause damage, but they are important from the perspective of the food processors, who want beverages to look appealing. Packaging has moved away from paper board to polymers such as polyethylene, so the consumer can see the product. “Then they started to have color and flavor problems,” said Duncan.

Adding UV absorbers to the packaging helped and still allowed the consumer to see the product , “didn’t totally resolve the problem,” she said. “The only way to completely protect the product is to use a totally opaque container. But generally, consumers like to see a product, particularly milk, to make sure it isn’t curdled, or juice to make sure there is no sedimentation. But we also want a product to have a long shelf life.”

The Virginia Tech researchers have tested a number of new materials (not developed at Virginia Tech) that are not being used for food packaging. One material was a translucent sleeve over wrap with an iridescent shimmer that reflects wavelengths. “We found evidence of improvement, but still not as good as opaque,” Duncan said.

But she believes that material scientists can develop better materials, once they become attuned to the challenges of food packaging. “We want to find manufacturers to work with us to develop packaging products that will work with milk and the visible wavelengths. Food scientists and material scientists working together is what is on the horizon and why we are taking our food research to the polymer section of the ACS meeting.”

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The paper, “Packaging solutions for sensory degradation in foods and beverages due to photooxidation” (POLY 685), will be presented at 2:45 p.m. Thursday, Aug. 23, in Grand Ballroom B of the Westin Boston Waterfront. The talk will explore work being done in Duncan’s laboratory dealing with novel polymer materials and their effect on the sensory quality of beverages such as milk and juice. Authors are Janet B. Webster, a recent Ph.D. graduate of food science and technology; Duncan, Joseph E. Marcy, professor of food science and technology and acting department head of human nutrition, foods and exercise, and Sean F. O'Keefe, associate professor of food science and technology, all of Virginia Tech, and Susan N. Sims of Eastman Chemical Company.

Tim Long, professor of chemistry in the College of Science at Virginia Tech, and Duncan, organized the day-long session, which features several presentations from Virginia Tech chemistry, engineering, and food science faculty members and students. Duncan will preside at the morning program. Long, Craig Thatcher, professor of large animal clinical science with the Virginia-Maryland Regional College of Veterinary Medicine, and Duncan are lead investigators on the Macromolecular Interfaces with Life Sciences (MILES) National Science Foundation-funded Integrative Graduate Education and Research Traineeship program at Virginia Tech. MILES uses free radical and oxidation processes as the thematic basis for research and education at the chemistry-biology interface.