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## Finding a Way to Extend Tomato Shelf-Life

*Tomatoes spend so much time on shelves and in refrigerators that an estimated 20 percent are lost to spoilage, according to the U.S. Department of Agriculture (USDA). But scientists with USDA's Agricultural Research Service (ARS) are working with colleagues at Purdue University to extend the shelf life of tomatoes. The research also may lead to tomatoes that taste better and are more nutritious.*

ARS is USDA's Principal Intramural Scientific Research Agency, and the research results support the USDA priority of promoting international food security.

Autar Mattoo, a Plant Physiologist with the agency's Sustainable Agricultural Systems Laboratory in Beltsville, Md., joined with Avtar Handa, a Professor of Horticulture at Purdue, and Savithri Nambesee, a Graduate Student working with Handa, to focus on manipulating a class of nitrogen-based organic compounds known as "polyamines" that act as signals and play a role in the plant's growth, flowering, fruit development, ripening, and other functions. Polyamines also have been linked to the production of lycopene and other nutrients that lower the risks of certain cancers and other diseases.

The researchers wanted to see if they could increase levels of polyamines in tomatoes, and what the effects would be of any increases. They introduced a polyamine-producing yeast gene, known as spermidine synthase, into tomato plants to increase the production of a higher polyamine spermidine that is believed to modulate the plant ripening process.

The results, published in *The Plant Journal*, showed that introducing the gene not only increased spermidine levels

and vegetative growth, but extended the tomato's post-harvest shelf life. Shriveling was delayed by up to three weeks, and there was a slower rate of decay caused by diseases. The tomatoes also had higher levels of lycopene. The study also shows for the first time that spermidine has its own effects independent of other polyamines, extending shelf life and increasing growth.

The use of molecular genetics to enhance tomatoes has faced resistance from the horticulture industry and food-processing companies. But scientists have used the approach to develop improved varieties of corn, soybeans, and cotton.

Read more about this research in the February 2011 issue of *Agricultural Research* magazine at: <http://www.ars.usda.gov/is/AR/archive/feb11/tomato0211.htm>

**Source:** Savithri Nambesee, Tatsiana Datsenko, Mario G. Ferruzzi, Anish Malladi, Avtar K. Mattoo, Avtar K. Handa. Overexpression of yeast spermidine synthase impacts ripening, senescence and decay symptoms in tomato. *The Plant Journal*, 2010; 63 (5): 836 DOI: 10.1111/j.1365-3113.2010.04286.x