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University of Florida Develops Vitamin Aâ??Rich Tomato to Tackle Global Deficiency

02 March 2026 | News

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Scientists at the University of Florida have developed a nutritionally enhanced tomato containing significantly higher levels of beta-carotene, a provitamin A compound, offering a potential food-based solution to one of the worldâ??s most widespread micronutrient deficiencies.

In newly published research from the universityâ??s Institute of Food and Agricultural Sciences (UF/IFAS), researchers Jingwei Fu, Denise Tieman and Bala Rathinasabapathi report the successful development of fortified tomatoes enriched with beta-carotene. According to Rathinasabapathi, professor of horticultural sciences at UF/IFAS, the improved tomatoes contain beta-carotene levels exceeding those found in commercial tomatoes and even many beta-caroteneâ??rich foods such as kale and sweet potatoes.

Vitamin A deficiency affects an estimated 345 million people across 79 countries, impairing growth, immunity, red blood cell production and eyesight. Children and pregnant women in low-income regions are particularly vulnerable. The researchers estimate that consuming 50 to 100 grams of the enhanced tomatoes daily could effectively help address the deficiency.

The breakthrough involved introducing the CCS gene from peppers responsible for synthesising the antioxidant pigments capsanthin and capsorubin into tomato plants. While tomatoes typically accumulate lycopene, the red pigment, they naturally contain low levels of beta-carotene. After transferring the gene, the modified plants produced orange tomatoes with elevated levels of capsanthin, capsorubin and beta-carotene.

Further crossbreeding with selected varieties resulted in hybrid tomatoes with even higher nutrient levels, larger fruit size, improved yield and enhanced flavour volatile profiles compared to unmodified controls.

With global tomato production reaching 180 million tons annually, researchers believe the cropâ??s popularity and accessibility make it an ideal vehicle for biofortification strategies aimed at improving public health through diet.