



## Out Of This World Results

Commercial microgravity research is offering out-of-this-world opportunities and results to a number of agribusiness researchers. International Flavors & Fragrances flew a miniature rose plant on STS-95, the historic John Glenn mission, to see if it would produce a different scent in microgravity — something very important to the multi-billion dollar a year flavors and fragrance industry. The result was an entirely new scent from the rose. Dr. Braja Mookherjee, Vice President and Director of Natural Products Research states, "This transformation has created a completely new fragrance that is not of this Earth. IFF intends to further explore space research on living plant materials to benefit mankind." An investigation on that mission performed by industry partners Rapigen, LLC, The Indiana Crop Improvement Association, Inc., Christophersen & Associates, Inc., and the University of Toledo examined whether microgravity could improve the Earth-based 0.1 percent success rate for genetic transfer of traits to plants. "The level of genetic transfer was way beyond our expectations," says Ray Bula, a Principal with Rapigen, LLC and a retired director of the Wisconsin Center for Space Automation and Robotics, a NASA Commercial Space Center. "We thought that if we could double the rate of transfer seen on Earth, it would have been promising." Instead of simply doubling, according to Bula, there was more than a tenfold increase in genetic transfer compared with the ground-based control experiment.

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