

**Multistate Research Project S-294**  
**Postharvest Quality and Safety in Fresh-cut Vegetables and Fruits**

**2007-2008 Activities Report**

**Influence of Electron Beam Irradiation on Quality and Microbial Safety of Fresh-cut Cantaloupe Stored at 5<sup>o</sup>C**

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**Introduction:**

A collaborative effort between faculty of The Departments of Horticulture at Auburn University and Food Science and Human Nutrition investigated the effects low-dose electron beam irradiation (0, 0.5 and 1.0 kGy) on fruit quality (pH, % citric acid, Brix and total carotenoid content) and populations of *Salmonella* on fresh-cut cantaloupe stored at 5<sup>o</sup>C for 12 days. Results from this study indicate irradiation treatment did not adversely affect pH of stored fresh-cut cubes. However, applied dosage of 0.5 and 1.0 kGy significantly lowered acidity (% citric acid) and % Brix during the initial storage period but not during the last 8 days of storage. In addition, irradiation at higher dosage of 1.0 kGy significantly reduced total carotenoid content when compared to either control or lower irradiation dosage of 0.5 kGy. Irradiation at 0.5 and 1.0 kGy decreased initial populations of *Salmonella* on cubes by 2.07 and 3.62 log, respectively. Numbers of *Salmonella* survivors did not increase during 12 days of storage at 5<sup>o</sup>C. In conclusion, electron beam irradiation (0.5 or 1.0 kGy), followed by low temperature (5<sup>o</sup>C) storage has potential for controlling salmonellae on fresh-cut cantaloupe; however, potentially undesirable changes in quality and antioxidant levels may occur with higher dosage (1.0 kGy).

**Activities**

**Objective 2.** Develop new strategies to maintain fresh-cut product quality. In this report in addition to the efforts cited above we are also evaluating whether this technology should be used exclusively in whole fruit prior to fresh-cut process or post sanitizing methods.

**Objective 3.**

Improve understanding of biochemical, physiological and molecular mechanisms that affect fresh-cut product quality. Fruit samples will be evaluated for alteration in antioxidant metabolism (Vitamin C, phenolics, antioxidant capacity and activity as assessed by ORAC, VCEAC, DPPH and FRAP), color retention both external (L, a, b, Hue as measured with Minolta ) and internal (total carotenoid content and HPLC profile) as effected by dose- ionization response and storage temperature.

**Objective 4.** Standardize methods for recovering pathogenic and spoilage microorganisms from intact and fresh-cut produce including tree nuts.