

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

**2007-2008 Activities Report**

**Institution:** USDA, ARS, Southern Regional Research Center (SRRC)

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**Introduction:**

My research program just recently got up and running again. The focus will be initially on quantifying volatile compounds, substrates (e.g. amino acids) in *Cucumis melo* var. *reticulatus* versus var. *inodorus*. Plans are to also look into ripening inhibition strategies with MAP melons.

**Activities**

**Objective 2.** Develop new strategies to maintain fresh-cut product quality

- UFPA Abstract: Fresh-cut ‘Gala’ apple (“Post-cutting flavor changes in freshly harvested Gala apples and in fresh-cuts prepared after controlled atmosphere storage”)
- IFT Abstract: Sampling freshness, SEM (“The effects of cutting and dipping treatments on quality, volatile recovery, SEM surface appearance, and freshness in cut melons”)
- Gerstel twister sorptive bar extraction (SBSE) implemented for volatile quantification
- AgroFresh – potential unfunded CRADA in the works

**Objective 3.** Improve understanding of biochemical, physiological and molecular mechanisms that affect fresh-cut product quality.

- I am in the process of looking into chemical (volatiles, amino acids, other “flavor precursors”, perhaps key enzymes) and molecular mechanisms (through collaborator) by which various *Cucumis melo* types differ. Specifically, we are trying to get a handle on how and why certain *Cucumis melo* melons (climacteric, western shippers, eastern shippers, Charentais, Peil de Sapo, Galia etc.) are considered highly aromatic whereas other melons like *Cucumis inodorus* etc. (non-climacteric, honeydew, casaba, some LSL’s) are considered non-aromatic or have low volatile production.

[Amino acid analysis via New Waters UPLC, AA Application \(kit\)](#)

**Objective 5.** Evaluate and control unintentional and intentional microbial contamination of intact and fresh-cut produce.

- Spinach inoculation study, collaborator with LSU, Beilie Ge: “Interaction of *Escherichia coli* O157:H7 with Growing Spinach Plants”

**Grants & Collaborations**

Co-Pi grant collaborator award, FCT PTDC-AGR-ALI-66144-2006, Fundação para a Ciência e a Tecnologia (FCT), Ministerio da Ciência, Tecnologia e Ensino Superior, Lisboa Portugal. Almeida, D., Beaudry, R. and J.C. Beaulieu, “Physiological basis for texture and color changes in fresh-cut ‘Rocha’ pear and melon: implications on development of products and processes”. 2007-2009, €2,040 Euros.

[Portuguese PhD student working in my lab, as grant collaborator](#)

Molecular and biochemical aspects of aroma production and regulation in *Cucumis melo* var. *reticulatus* versus var. *inodorus*, Negre-Zakharov and Beaulieu. Re-submitted to NRI, Plant Biology: Biochemistry, March 2008.

**Publications:**

Fan X, BA Annous, JC **Beaulieu**, and J Sites. 2008. Effect of hot water surface pasteurization of whole fruit on shelf-life and quality of fresh-cut cantaloupe. *J. Food Sci.* **73(3)**:M91-M98.

**Beaulieu** JC, BF Ingber, and JM Lea. 2008. The effects of cutting and dipping treatments on quality, volatile recovery, SEM surface appearance, and freshness in cut melons. *J. Food Sci.* (Submitted, in-house)

Barrett, DM, JC **Beaulieu**, and RL Shewfelt. 2008. Color, Flavor, Texture and Nutritional Quality of Fresh-cut Fruits and Vegetables: Desirable Levels, Instrumental and Sensory Measurement, and Effects of Processing. *CRC Critical Reviews in Food Science and Nutrition.* (Submitted)

**Beaulieu** JC and VA Lancaster. 2007. Correlating volatile compounds, quality parameters, and sensory attributes in stored fresh-cut cantaloupe. *J. Agric. Food Chem.* **55(23)**:9503-9513.

**Beaulieu** JC and JM Lea. 2007. Quality changes in cantaloupe during growth, maturation, and in stored minimally processed cubes prepared from fruit harvested at various maturities. *J. Am. Soc. Hortic. Sci.* **132(5)**:720-728.

**Beaulieu** JC. 2007. The effect of UV irradiation on cut cantaloupe: Terpenoids and esters. *J. Food Sci.* **72(4)**:S272-281.