

# Is Fresh Best?

## I. Quality in Fresh Fruits and Vegetables

Quality can be viewed in terms of four basic characteristics of food:

- Color or eye appeal
- Odor and flavor
- Texture or feel
- Nutritive value

The first three can be evaluated with human senses and have the greatest chance of being at their peak if the product is allowed to ripen fully, is handled carefully after harvest, and reaches the consumer in the shortest time possible. This situation is most probable when produce is consumed near the place it is grown.

**Because people are more likely to consume fresh fruits and vegetables when they are of high quality, locally produced fresh foods stand to improve the nutritional quality of *total dietary intake* regardless of differences in nutrient content of a particular fruit or vegetable per se.**

Source: Jennifer Wilkins, PhD. R.D. Senior Extension Associate, Division of nutritional Sciences, Cornell University. Email Sept. 9, 2002

## II. Comparison of key nutrients in fresh fruits and vegetables vs. frozen and canned

**Summary:** One cannot say in every instance that fresh produce is more nutritious than frozen or canned—it depends on the nutrient as well as the food item. Nutrient content also varies depending on how well the fresh produce is handled post-harvest.

However, in a comparison of key nutrients in five vegetables using USDA standard nutrient tables, the fresh cooked vegetables had highest amounts of seven key nutrients most often (14 instances), followed by raw vegetables (11 instances).

Frozen vegetables had highest amounts of the key nutrients in just six instances, followed by canned vegetables with four instances.

In a comparison of the key nutrients in three fruits, the raw fruits had higher nutrients much more often (17) compared to frozen (8).

The commonly used forms of each vegetable and fruit (examples: fresh raw, fresh cooked, canned and frozen) were compared.

The seven key nutrients measured are vitamins A, C and E, calcium, magnesium, potassium and beta-carotene. These, along with fiber, are nutrients the USDA's 2005 Dietary Guidelines for America have identified as important but lacking in American diets.<sup>i</sup>

Excepting for potassium, a majority of Oklahomans are currently not meeting the recommended intake of these important nutrients.

The five vegetables compared can all be grown in Oklahoma: green beans, tomatoes, carrots, broccoli, and spinach. The three fruits analyzed were strawberries, blackberries, and blueberries, commonly grown in the state.<sup>ii</sup>

### **Analysis of results per food item:**

#### **Green beans** (comparing raw, fresh cooked, canned, frozen):

Fresh cooked - highest in 5 of 7 nutrients (Vit. A, C, E, potassium, beta-carotene)

Frozen - highest in 2 nutrients (calcium and magnesium)

#### **Tomatoes** (raw, fresh cooked and canned):

Raw - highest in 3 of 7 nutrients (Vit. A, Potassium, Beta-carotene), next highest in 1 of 7 (Magnesium)

Fresh cooked - highest in 1 of 7 (Vitamin C)

Canned - highest in 3 of 7 (Vit. E, calcium, magnesium)

#### **Carrots** (raw, fresh cooked, canned, frozen):

Raw - highest in 3 of 7 nutrients (Vit. A, Mag., Potassium), next highest in 4 of 7 nutrients (Vit.A, C, Calcium, Beta carotene)

Fresh Cooked - highest in 3 of 7 nutrients (Vit.A, E and Beta carotene)

Canned - lowest in 5 of 7 nutrients (Vit. A, Ca, Mg, K, Beta carotene)

Frozen - highest in 1 of 7 (Calcium), 2nd highest in 2 of 7 (Vit. E, Magnesium)

#### **Broccoli** (raw, cooked, frozen)

Raw - highest in 3 of 7 (Vit.C, Ca and K) and tied for 1st in 1 of 7 (Magnesium)

Fresh Cooked - highest in 3 of 7 (Vit.A, E, Beta carotene) and tied for 1st in Magnesium

Frozen - lowest in 4 of 7 (Vit.C, E, K, magnesium)

**Spinach** (raw, fresh cooked, canned, frozen)

Raw - highest in 1 nutrient (potassium)

Fresh cooked - highest in 2 of 7 nutrients (magnesium, beta-carotene)

Canned - highest in 1 of 7 nutrients (vit. C)

Frozen - highest in 3 of 7 nutrients (Vit. A, Vit. E, calcium)

**Strawberries** (raw, frozen)

Raw - highest in 3 of 7 nutrients (Vit.C, Magnesium, K) and tied with frozen in 2 of 7 (Vit.E, Calcium)

**Blackberries** (raw, frozen)

Raw - highest in 4 of 7 nutrients (Vit.A, C, K, Beta carotene) and tied with frozen in 2 of 7 (Vit.E, Ca).

Frozen - highest in 1 (vit. A)

**Blueberries** (raw, frozen)

Raw - highest in 6 of 7 nutrients (Vit.A, C, E, Mg, K, Beta carotene).

Frozen - highest in 1/7 (calcium)

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<sup>i</sup> Based on dietary intake data or evidence of public health problems, intake levels of the following nutrients may be of concern for:

Adults: calcium, potassium, fiber, magnesium, and vitamins A (as carotenoids), C and E.

Children and adolescents: calcium, potassium, fiber, magnesium, and vitamin E.

U.S. Department of Health and Human Services and U.S. Dept. of Agriculture, 2005. Dietary Guidelines for Americans. HealthierUS.gov

<http://www.health.gov/dietaryguidelines/dga2005/document/>

<sup>ii</sup> U.S. Department of Agriculture, Agricultural Research Service. 2005. USDA National Nutrient Database for Standard Reference, Release 18 Nutrient Lists. Nutrient Data Laboratory Home Page, <http://www.ars.usda.gov/ba/bhnrc/ndl>