# Nutritional Quality of Locally Grown Alaska Produce


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Agricultural and Forestry Experiment Station

Celebrating a century 1917–2017

UAF University of Alaska Fairbanks

# Nutritional Quality
# Nutrient Dense Foods

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- Nutrient-dense foods provide a lot of minerals, vitamins, antioxidants and fiber, in relation to the calorie content

# Examples of Nutrient Dense Foods

- Fruits, vegetables, beans and peas
- Nuts, seeds and whole grains
- Seafood
- Eggs
- Fat-free and low-fat dairy products
- Lean meats and poultry

From: https://health.gov/dietaryguidelines/2015/guidelines/

# Nutrient Dense Vegetables

- Dark-green vegetables
  Such as kale, spinach, broccoli, leafy salad greens, green herbs
- Red and orange vegetables
  Such as tomatoes, carrots, colored peppers, winter squash, pumpkin
- Legumes (beans and peas)
  Such as pinto, white, kidney and black beans, split peas, edamame (soybean)
- Starchy vegetables
  Such as potatoes, corn, green peas, plantain, cassava
- Other vegetables
  Such as lettuce, onions, green beans, cucumber, celery, beets

From: https://health.gov/dietaryguidelines/2015/guidelines/chapter-2/a-closer-look-at-current-intakes-and-recommended-shifts/

# Factors that may influence nutrient content

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- Crop and fertilizer management
- Production system (field, high tunnel, controlled environment)
- Production method (conventional, organic, hydroponic)

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- Production method (conventional, organic, hydroponic)
- Harvest stage, distance and time to market (locally grown)
- Storage and postharvest handling

# Nutritional Quality of Alaska Grown Produce

## Objectives

- Establish baseline data on mineral nutritional quality of Alaska grown produce
- Compare the nutritional quality of Alaska grown produce with produce brought in from outside
- Develop information on nutritional quality that may be used in marketing and pricing of Alaska grown produce

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AFES Greenhouse
University of Alaska Fairbanks

From: http://registerguard.com/rg/news/local/35522632-75/16-million-remodel-will-position-fred-meyer-as-the-upscale-food-market-in-west-eugene.html.csp

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SNRE Greenhouse
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## Soluble Solids (ºBrix) Measurements

As sugars are usually the most abundant soluble solids, ºBrix is expected to be an indication of the sugar content

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Shredded carrot

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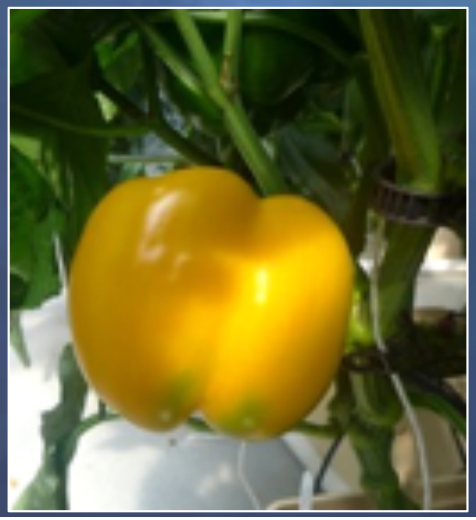

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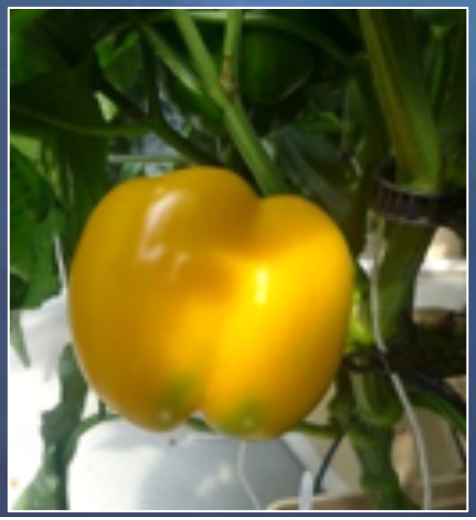

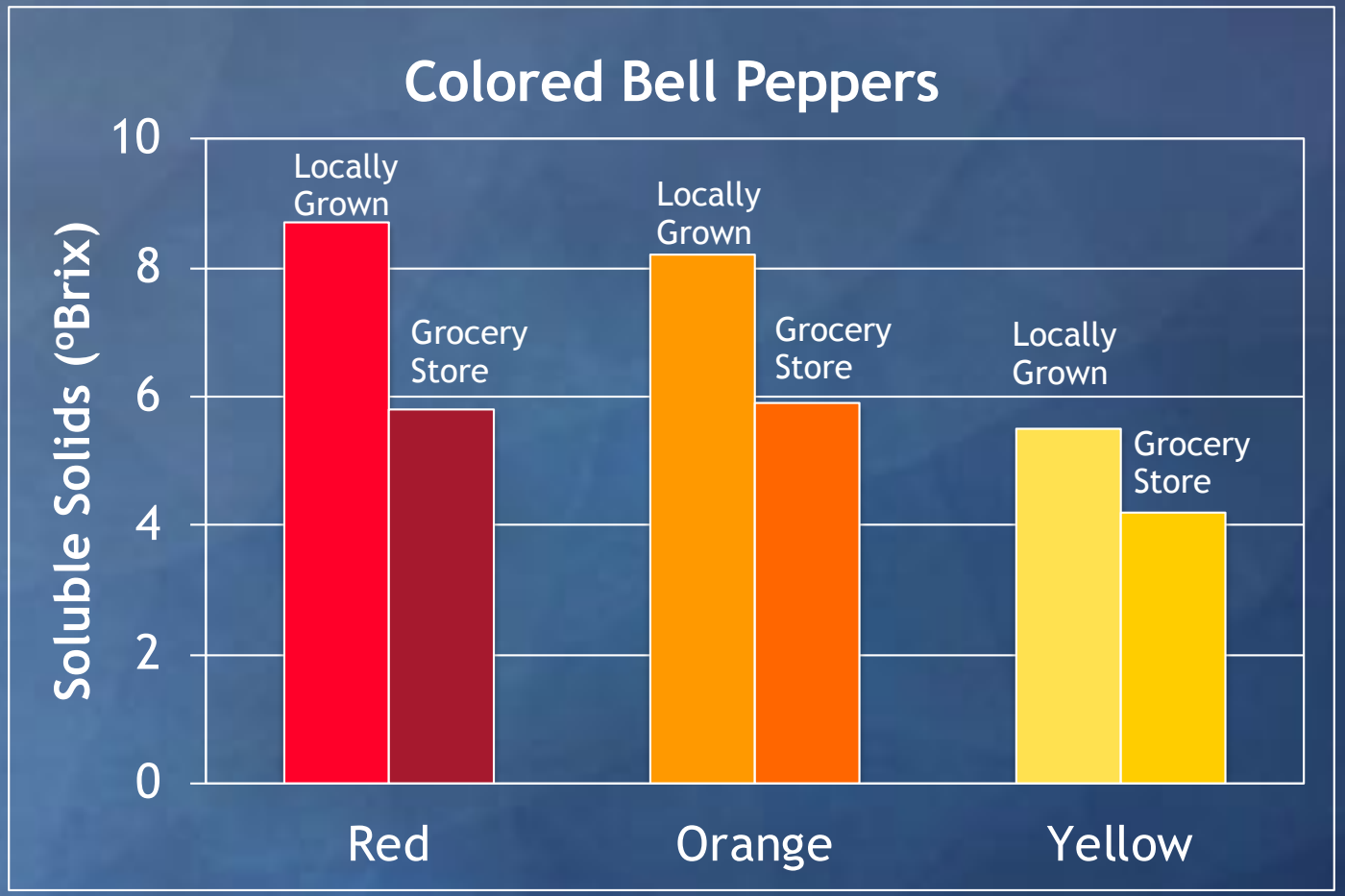

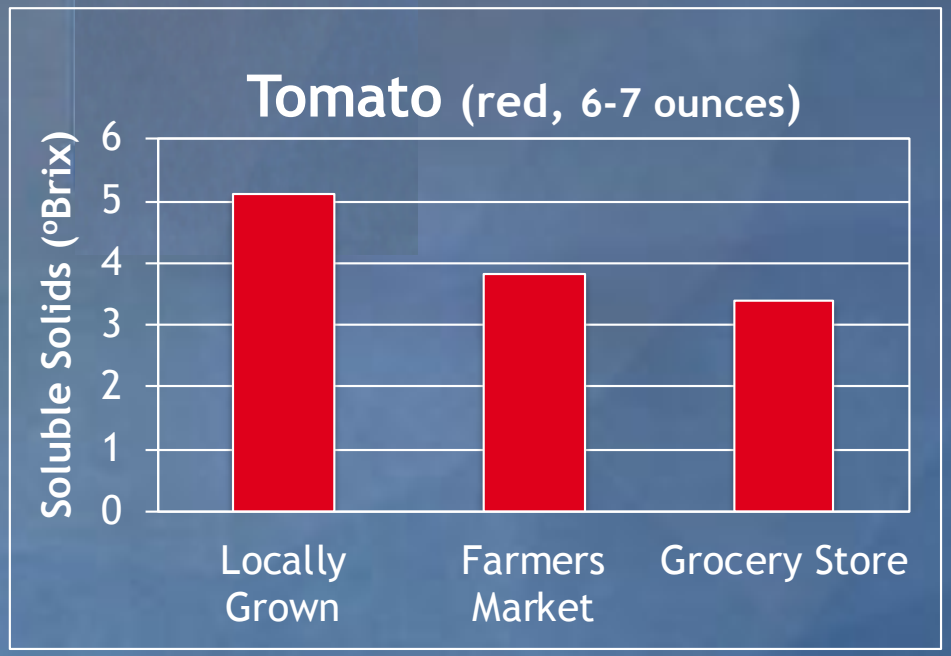


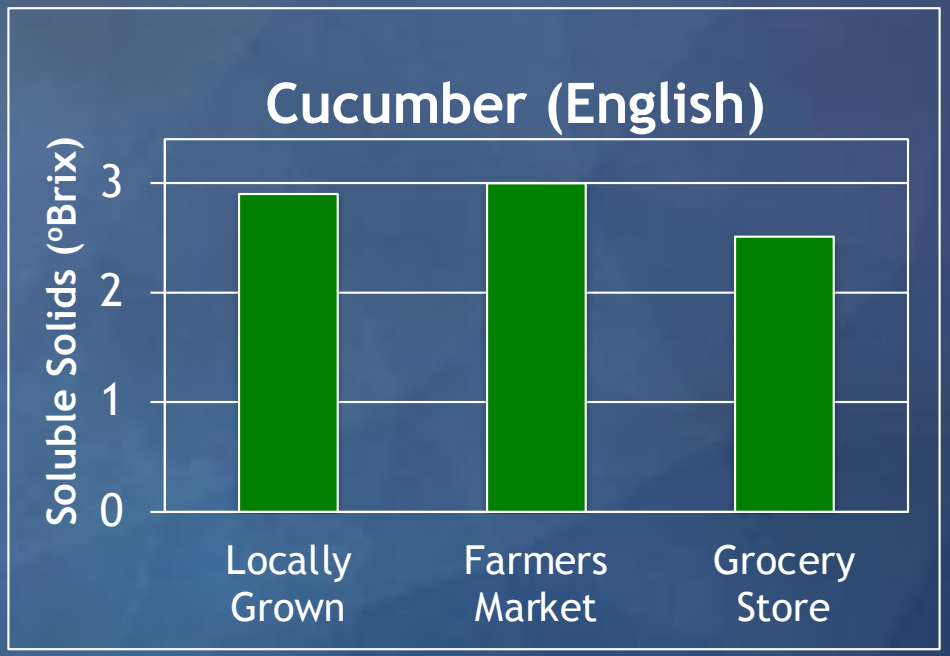

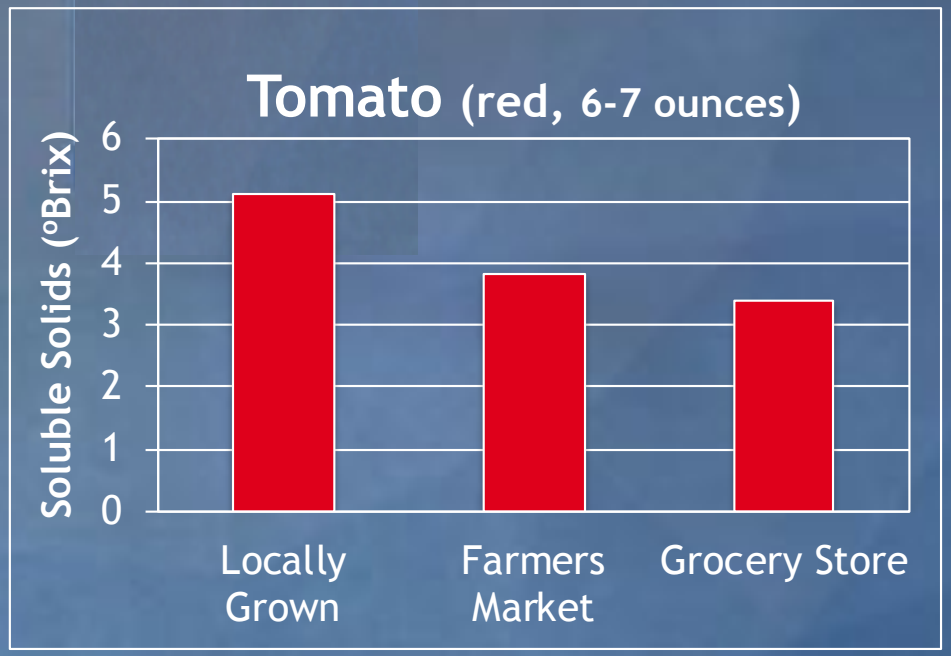


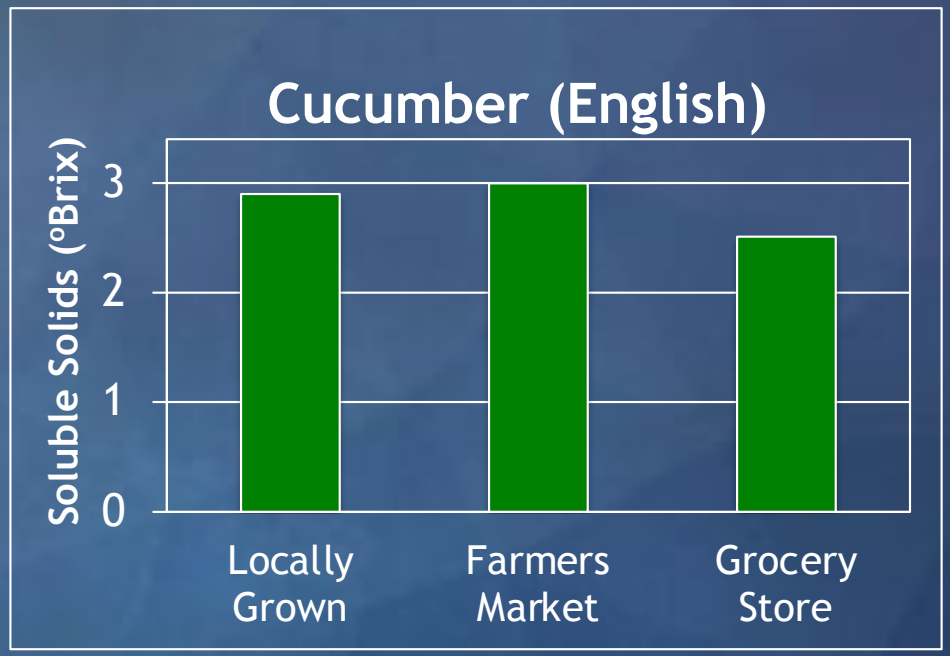


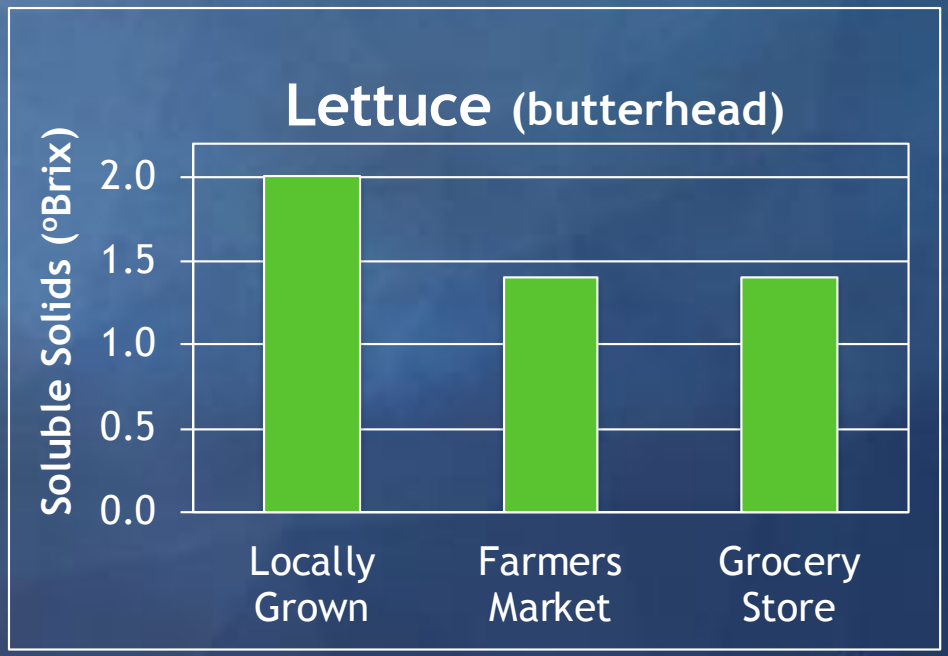

# Nutritional Quality of Alaska Grown Produce

## Mineral Nutrients

- Phosphorous (P)
- Potassium (K)
- Calcium (Ca)
- Magnesium (Mg)
- Iron (Fe)
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- Nitrogen (N)
- Sulfur (S)
- Copper (Cu)
- Manganese (Mn)

# Mineral Nutrient Content of **Butterhead** Lettuce

| Mineral Nutrient | Locally Grown | Farmers Market | Local Store |
|---|---|---|---|
| | | | |
| Nitrogen (% of DW) | 5.52 | 4.88 | 4.72 |
| Phosphorous (% of DW) | 0.82 | 0.78 | 0.74 |
| Potassium (% of DW) | 7.69 | 5.20 | 5.02 |
| | | | |
| Calcium (% of DW) | 0.93 | 0.64 | 0.99 |
| Magnesium (% of DW) | 0.32 | 0.30 | 0.34 |
| Sulfur (% of DW) | 0.31 | 0.33 | 0.28 |
| | | | |
| Iron (ppm of DW) | 153.5 | 262.0 | 115.7 |
| Manganese (ppm DW) | 84.6 | 46.0 | 80.8 |
| Copper (ppm of DW) | 12.1 | 7.3 | 5.2 |
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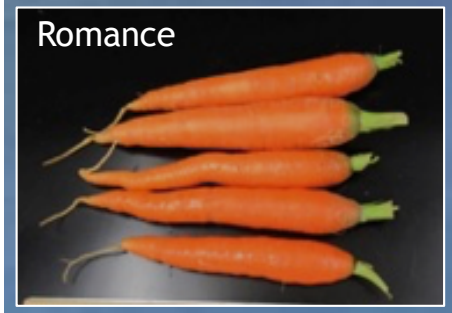
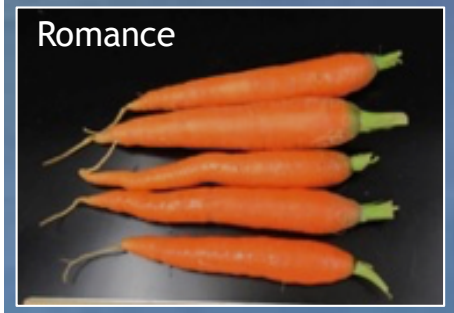
Hercules

Romance

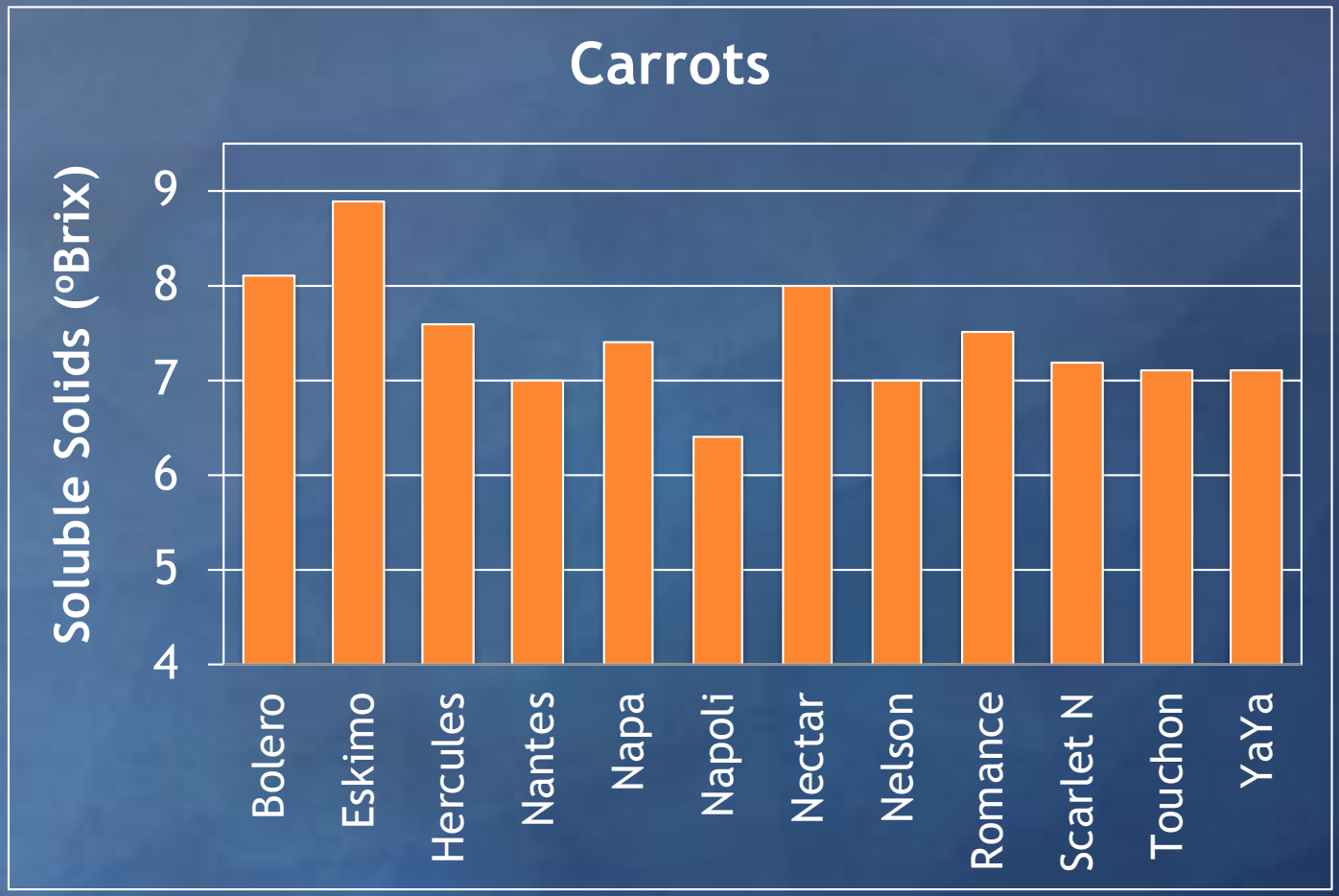


Touchon

Nantes



# Mineral Nutrient Content of **Carrots**

| Cultivar | N (%) | P (%) | K (%) | Ca (%) | Mg (%) | S (%) | Fe (ppm) | Mn (ppm) | Cu (ppm) | Zn (ppm) |
|---|---|---|---|---|---|---|---|---|---|---|
| Bolero | 1.00 | 0.39 | 2.78 | 0.25 | 0.11 | 0.10 | 35.47 | 17.47 | 2.67 | 29.37 |
| Eskimo | 1.31 | 0.51 | 2.78 | 0.29 | 0.16 | 0.11 | 57.50 | 13.73 | 4.07 | 32.93 |
| Hercules | 1.13 | 0.40 | 2.78 | 0.26 | 0.10 | 0.11 | 39.47 | 35.17 | 3.27 | 31.60 |
| Nantes | 1.69 | 0.53 | 3.65 | 0.33 | 0.17 | 0.17 | 46.40 | 18.60 | 3.93 | 32.83 |
| Napa | 1.15 | 0.44 | 2.84 | 0.27 | 0.09 | 0.11 | 58.70 | 22.93 | 3.53 | 29.73 |
| Napoli | 1.46 | 0.51 | 3.50 | 0.32 | 0.13 | 0.12 | 60.37 | 28.97 | 3.87 | 39.27 |
| Nectar | 1.20 | 0.44 | 3.15 | 0.25 | 0.10 | 0.11 | 39.17 | 28.53 | 3.07 | 34.93 |
| Nelson | 1.22 | 0.48 | 2.96 | 0.29 | 0.10 | 0.12 | 55.13 | 21.43 | 3.83 | 29.50 |
| Romance | 0.92 | 0.45 | 2.66 | 0.27 | 0.11 | 0.09 | 42.77 | 14.20 | 2.70 | 26.23 |
| Scarlet N | 1.33 | 0.50 | 3.51 | 0.29 | 0.15 | 0.15 | 57.47 | 25.13 | 3.57 | 32.43 |
| Touchon | 1.26 | 0.41 | 2.89 | 0.30 | 0.13 | 0.13 | 56.83 | 15.33 | 3.33 | 26.57 |
| YaYa | 1.02 | 0.39 | 2.93 | 0.25 | 0.12 | 0.11 | 48.77 | 11.60 | 3.07 | 26.50 |
| | | | | | | | | | | |
| **Average** | 1.22 | 0.45 | 3.04 | 0.28 | 0.12 | 0.12 | 49.84 | 21.09 | 3.41 | 30.99 |

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# Controlled Environment Agriculture and Vertical Farming

# Alaska Field Season

- Extended day lengths
- Moderate temperatures
- Limited pests and disease pressures
- High quality crops
  - Large sized flowers and vegetables
  - Bright colors
  - Great flavor, high sugar content
  - High nutrient content

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Naturally Inspiring. UAF UNIVERSITY OF ALASKA FAIRBANKS