



PRODUCE SAFETY UNIVERSITY

Panel Discussion

Equity • Quality • Collaboration • Community



Agenda:

- What is Produce Safety University
- What we learned
 - Market Watch/Ordering Produce
 - Receiving Produce
 - Storage and Safe Preparation of Produce
- Resources
- Q & A's



Market News Portal



<https://www.ams.usda.gov/market-news>

USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

ABOUT AMS NEWS & ANNOUNCEMENTS CONTACT US

HOME MARKET NEWS RULES & REGULATIONS GRADES & STANDARDS SERVICES RESOURCES COMMODITY PROCUREMENT

USDA Market News



<https://www.ams.usda.gov/market-news>

The screenshot shows the USDA Agricultural Marketing Service website. The URL <https://www.ams.usda.gov/market-news> is circled in red. The website header includes the USDA logo and the text "Agricultural Marketing Service U.S. DEPARTMENT OF AGRICULTURE". A green navigation bar contains the links "HOME", "MARKET NEWS", and "RULES". The "MARKET NEWS" link is circled in red. Below the navigation bar is a large image of a green forest. At the bottom of the image, the text "USDA Market News" is displayed in a black box.

ams.usda.gov/market-news

An official website of the United States government [Here's how you know](#)

USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

HOME MARKET NEWS RULES

USDA Market News

Market News captures data for:

- [Cotton and Tobacco](#)
- [Dairy & milk products](#)
- [Fruits, vegetables & specialty crops](#) ←
- [Livestock, meats, poultry, eggs, grain & hay](#)
- [Organic](#)
- [Local & regional foods](#)



<https://www.ams.usda.gov/market-news>

The screenshot shows the website [ams.usda.gov/market-news](https://www.ams.usda.gov/market-news). The page features the USDA logo and the text "Agricultural Marketing Service U.S. DEPARTMENT OF AGRICULTURE". A navigation bar includes "HOME", "MARKET NEWS", and "RULES & REGULATIONS". A large image of a green field is visible, with the text "USDA Market News" overlaid at the bottom. A dropdown menu titled "By Report Type" is open, listing several categories: "Terminal Market", "International Market", "Shipping Point", "Movement", "Retail", "Daily Movement", and "Truck Rate". A blue arrow points to the "Terminal Market" option.

ams.usda.gov/market-news

An official website of the United States government [Here's how you know](#) ▾

USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

HOME MARKET NEWS RULES & REGULATIONS

USDA Market News

By Report Type

- [Terminal Market](#) ←
- [International Market](#)
- [Shipping Point](#)
- [Movement](#)
- [Retail](#)
- [Daily Movement](#)
- [Truck Rate](#)



Pick the "Market" closest to your location (other options are Atlanta, Baltimore, Boston, Chicago, Columbia, and Dallas).

Market News

AMS Home Newsroom Opportunity Online Forms

Specialty Crops

[Browse by Report Type: Domestic](#) [Go to International](#) ▶

<p>Atlanta</p> <ul style="list-style-type: none"> • All Fruits & Vegetables • Only Fruits • Onions & Potatoes • Only Vegetables • Herbs • Nuts 	<p>Baltimore</p> <ul style="list-style-type: none"> • All Fruits & Vegetables • Only Fruits • Onions & Potatoes • Only Vegetables • Herbs • Nuts 	<p>Boston</p> <ul style="list-style-type: none"> • All Fruits & Vegetables • Only Ornamentals • Only Fruits • Onions & Potatoes • Only Vegetables • Herbs • Nuts
<p>Chicago</p> <ul style="list-style-type: none"> • All Fruits & Vegetables • Only Ornamentals • Only Fruits • Onions & Potatoes • Only Vegetables • Herbs • Nuts 	<p>Columbia</p> <ul style="list-style-type: none"> • All Fruits & Vegetables • Only Fruits • Onions & Potatoes • Only Vegetables • Herbs • Nuts 	<p>Detroit</p> <ul style="list-style-type: none"> • All Fruits & Vegetables • Only Fruits • Onions & Potatoes • Only Vegetables • Herbs • Nuts





Close Window

Report Results

Location: Chicago

Commodity: BANANAS

Report Type: Terminal Market

Aggregate by: Daily

Date(s): 07/19/2023

Download as: [Excel](#) [Text](#) [XML](#) [PDF \(adobe reader required\)](#) [Printable View \(adobe reader required\)](#)

Refine results

Commodity: Environment:
 Variety: Type: Hide Empty Columns:
 Date:
 Date Format: mm/dd/yyyy

CHICAGO : BANANAS Market : ABOUT STEADY.

BANANAS Package: 40 lb cartons

Date	Low-High Price	Mostly Low-High Price	Origin	Origin District	Item Size	Environment	Color	Unit of Sale	Quality	Condition	Storage	Appearance	Crop	Trans Mode	Repacked	Comment
07/19/2023	23.00 - 24.00		COSTA RICA													
07/19/2023			GUATEMALA													Offerings insufficient to quote.
07/19/2023			HONDURAS													Offerings insufficient to quote.
07/19/2023	21.00 - 21.00		MEXICO													

BANANAS Package: 40 lb cartons Type: Organic

Date	Low-High Price	Mostly Low-High Price	Origin	Origin District	Item Size	Environment	Color	Unit of Sale	Quality	Condition	Storage	Appearance	Crop	Trans Mode	Repacked	Comment
07/19/2023	32.50 - 32.50		ECUADOR													



Ordering: Specifications

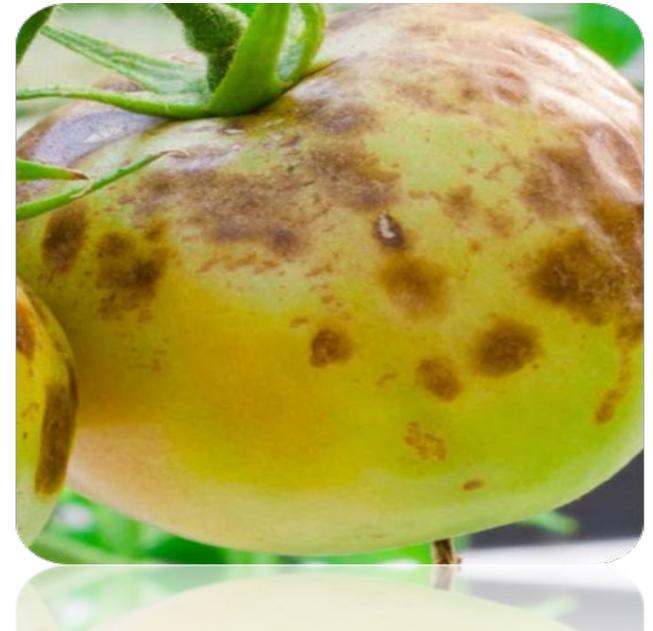
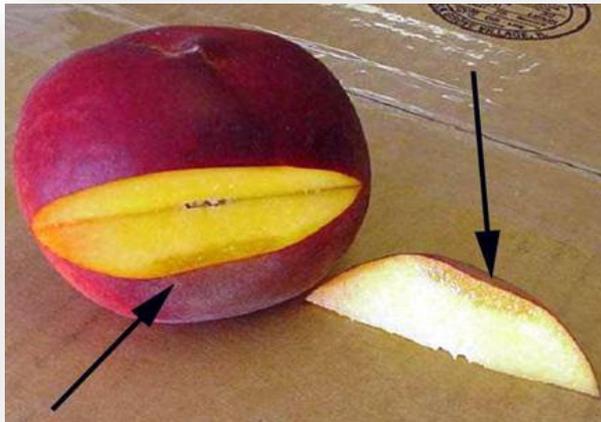
May ensure you get what you want, which may minimize costs and reduce waste.

- Size
- Count
- Quality or grade
- Appearance
- Quantity ordered





When to contact your distributor:





Receiving Produce



- **Take action** if produce does not meet specifications.
- **Train staff** to receive and store your specified produce.
- **Do not** accept poor quality fresh fruits and vegetables.



Receiving Produce

- Reject if specifications are not met
- Provide staff training

Accepting poor quality affects
eye appeal of fresh fruits and
Vegetables!





What is a quality defect?

Quality defects are permanent factors that affect produce that will not change.

Commonly referred to as "**Grade**" defects.

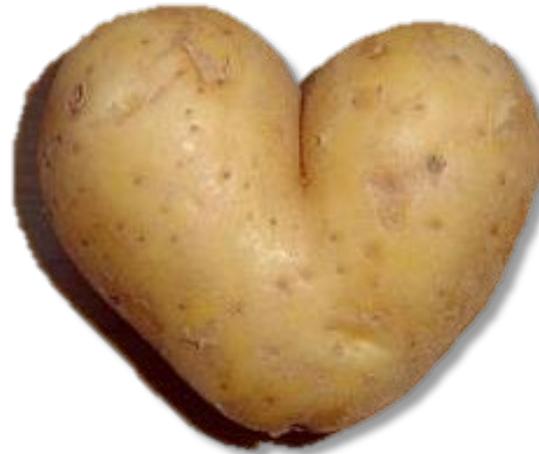
Directly determine the "U.S. grade designated".

Examples:
Scars, misshapen, undersize.



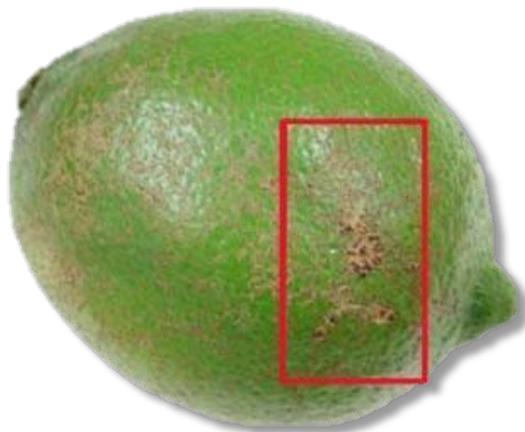
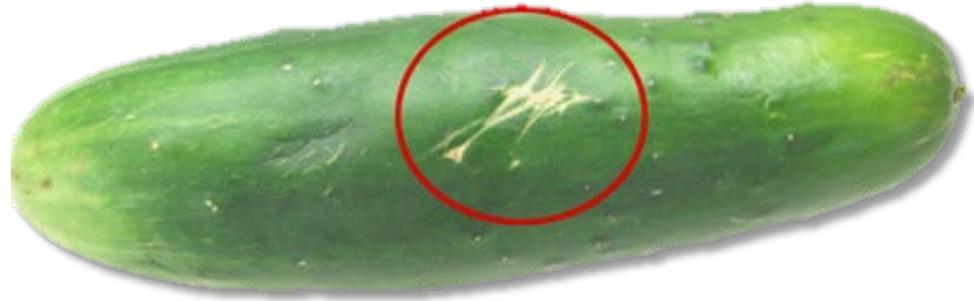
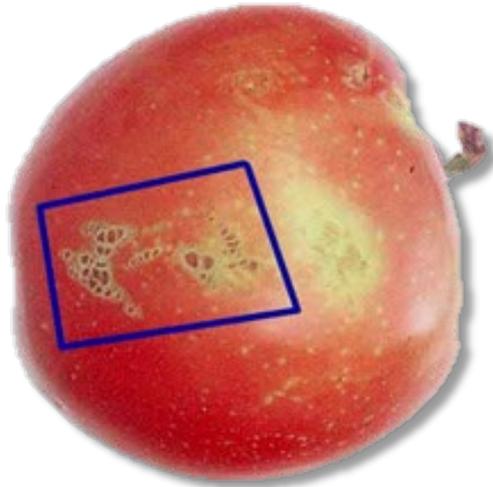


Quality: Misshapen





Quality: Scars





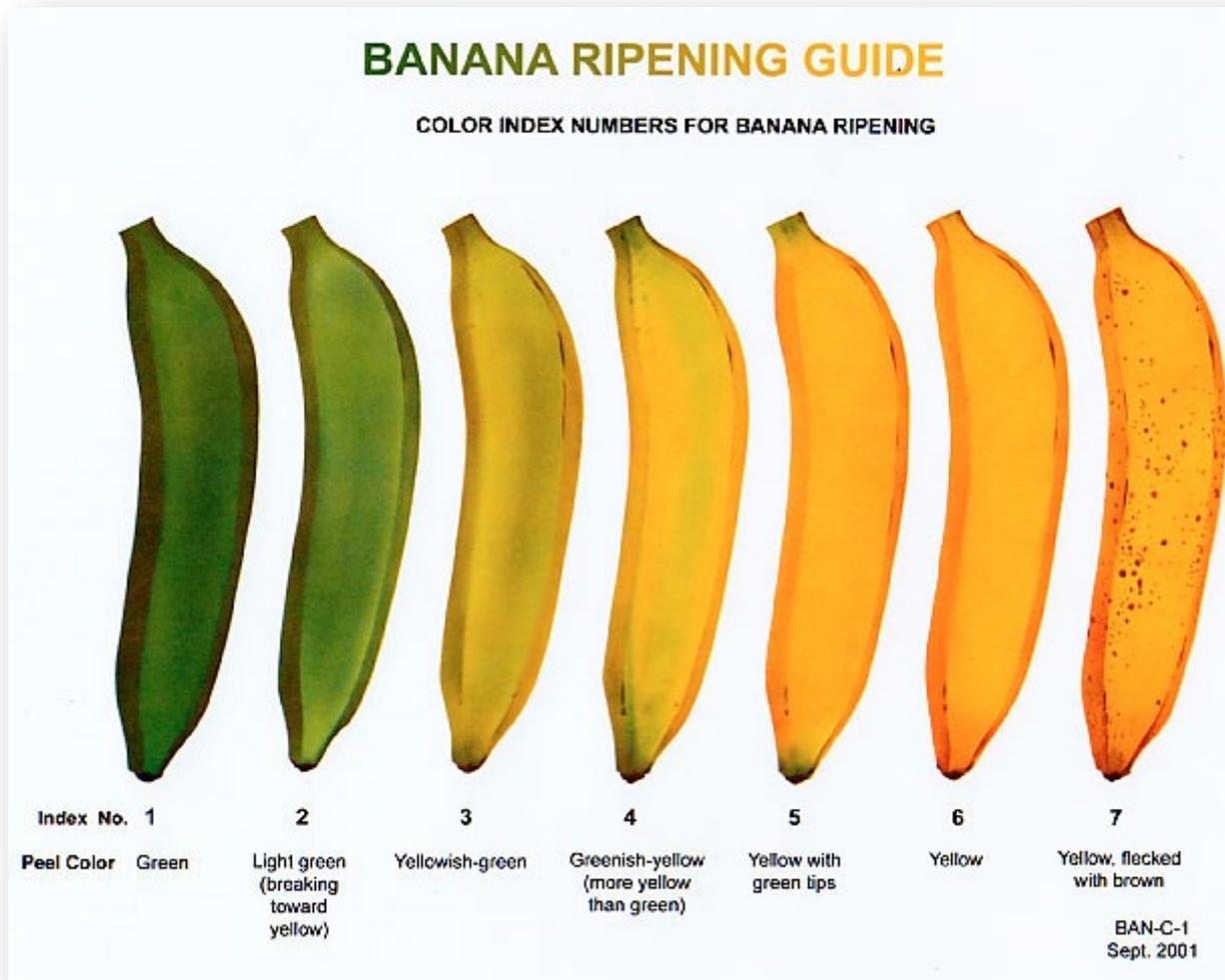
What is a condition defect?

Condition includes, but is not limited to, its firmness, or stages of:

- ripeness,
- decay,
- shriveling,
- or any other progressive factor which affects its marketability.



Condition: Colored





Condition: Decay

- **Early** – approximately 10% or less of the surface or specimens affected.
- **Moderate** – approximately 11 to 25% of the surface or specimen affected.
- **Advanced** – approximately 26% or more of the surface or specimen affected.





Receiving Produce

Check produce BEFORE the truck leaves

- Verify quantity
- Check temperature
- Evaluate quality & condition
- Cut for internal defects & ripeness
- Check dates of fresh-cut products
- Check marked weights
- Check all sections of containers



Receiving Produce—Specifications

- Check carton
 - weights.
- (25 lb. NET WT)





Receiving Produce

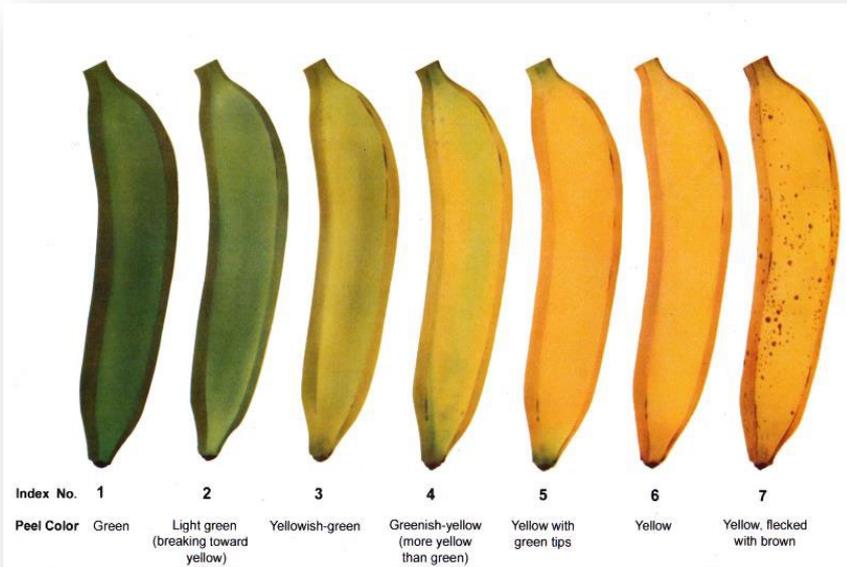
- Open cartons from bottom to inspect contents.





Receiving Produce—Check Color

Color is an indication of ripeness



COLOR CLASSIFICATION REQUIREMENTS IN
 UNITED STATES STANDARDS FOR GRADES OF FRESH
TOMATOES

United Fresh Fruit and Vegetable Association
 in cooperation with:
 U. S. Department of Agriculture
 Agricultural Marketing Service
 Fruit and Vegetable Division
 U.S.D.A. Visual Aid TM-1-1, February 75
 The John Henry Company,
 P.O. Box 1410, Lansing, Mich. 48904

(1) "Green" means that the surface of the tomato is completely green in color. The shade of green color may vary from light to dark;

(2) "Breakers" means that there is a definite break in color from green to tannish yellow, pink or red on not more than 10 percent of the surface;

(3) "Turning" means that more than 10 percent but not more than 30 percent of the surface, in the aggregate, shows a definite change in color from green to tannish yellow, pink, red, or a combination thereof;

(4) "Pink" means that more than 30 percent but not more than 60 percent of the surface, in the aggregate, shows pink or red color;

(5) "Light red" means that more than 60 percent of the surface, in the aggregate, shows pinkish-red or red; Provided, that not more than 90 percent of the surface is red color; and,

(6) "Red" means that more than 90 percent of the surface, in the aggregate, shows red color.

The above photographs are only guides illustrating the shade and percentage of surface color specified for each of the color terms. These photographs do not necessarily depict absolute limits of minimum or maximum shades and/or percentage of color required for each term.





Receiving Produce

Receive based on bid specifications

- Size
- Count
- Quality or grade
- Appearance
- Quantity ordered





Receiving Produce

- Inspect based on specifications
- Check temperatures for refrigerated produce
- Check produce “best if use by” dates
- Reject produce that does not meet specifications





Receiving Produce

Check temperatures for refrigerated produce, including fresh-cut produce

- Infrared thermometer
- Probe thermometer
- Clean and sanitize before touching produce
- Do not pierce sealed plastic bags
- Calibrate





Receiving Produce

Check dates on fresh-cut produce

- Best if used by date
- Produce quality and appearance should aid in determining shelf life
- Maximum shelf life based on ideal conditions





Evaluating Produce

- Quality
 - Fine, Good, Fair, Ordinary, Poor
- Condition
 - Good, Fair, Ordinary, Poor, Hold Overs
- Appearance
 - Fine, Fair, Ordinary, Poor
- Qualifying Terms
 - Occasional, Few, Some, Many, Mostly, Generally, Fine, Fair, Ordinary, Poor



Quality

Quality

Quality includes size, color, shape, texture, cleanness, freedom from defects, and other more permanent physical properties of a product which can affect its market value.

The following terms, when used in connection with “quality,” are interpreted as meaning:

Fine: Better than good. Superior in appearance, color, and other quality factors.

Good: In general, stock which has a high degree of merchantability with a small percentage of defects. This term includes U.S. No. 1 stock, generally 85 percent U.S. No. 1 or better quality on some commodities, such as tomatoes.

Fair: Having a higher percentage of defects than “good.” From a quality standpoint, having roughly 75 percent U.S. No. 1 quality with some leeway in either direction.

Ordinary: Having a heavy percentage of defects as compared to “good.” Roughly 50 to 65 percent U.S. No. 1 quality.

Poor: Having a heavy percentage of defects, with a low degree of salability, except to “low priced” trade. More than 50 percent grade defects.



Condition

Condition

Condition includes stage of maturity, decay, freezing injury, shriveling, or any other deterioration which may have occurred, or progressed since the product was harvested and which may continue to progress.

The following terms, when used in connection with “condition,” are interpreted as meaning:

Good: Such condition does not justify price reduction because of condition factors.

Fair: Having a slight degree of off-condition factors which may warrant a small price reduction as compared to “good.”

Ordinary: Having a heavier degree of off-condition factors which may warrant a substantial price reduction as compared to “good.”

Poor: So badly off-condition as may warrant heavy price reduction.

Hold Overs: Refers to merchandise that has been on the terminal market or at shipping point longer than normal, but remains near its original condition. Prices are discounted in order to clear supplies because shelf-life is reduced.



Appearance

Appearance

Appearance refers to color, texture of the skins, uniformity of the pack and other external conditions.

The following terms, when used in connection with “condition,” are interpreted as meaning:

Fine: Appearance that is higher than average, often justifying a price increase.

Fair: Having a slight degree of off-appearance factors which may warrant a small price reduction as compared to normal appearance.

Ordinary: Having a heavier degree of off-appearance factors which may warrant a substantial price reduction as compared to normal.

Poor: So badly off-appearance as may warrant heavy price reduction.



Qualifying Terms

Qualifying Terms

The following terms, when used in Market News, Perishable Agricultural Commodities Act (PACA), or Federal-State inspection documents, are interpreted as meaning:

Occasional: 1 to 5%

Few: 6 to 10%

Some: 11 to 25%

Many: 26 to 50%

Mostly: 51 to 90%

Generally: 91 to 100%



Storing Produce





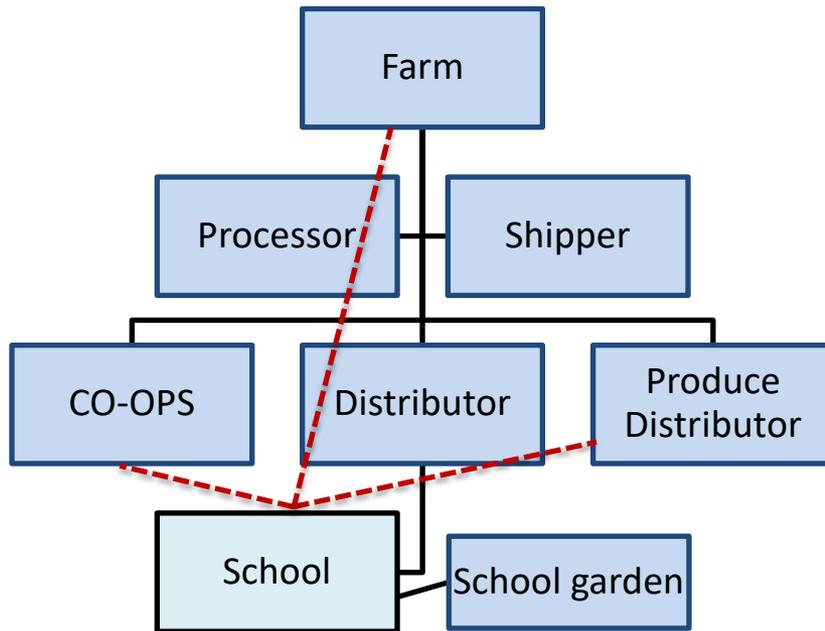
Storing and Preparation—Handwashing



- Wash your hands
 - Before starting work
 - After using the restroom
 - Before putting on or changing gloves
 - After handling chemicals
 - When changing tasks
- Handwashing benchmark found to be 11 times per hour for school nutrition staff!



Maintain Traceability



- Maintain purchasing records
- Avoid co-mingling produce in storage
- Track internal distribution
- Document service of fresh produce
- Conduct mock recalls

Ensuring Traceability of Fresh Produce

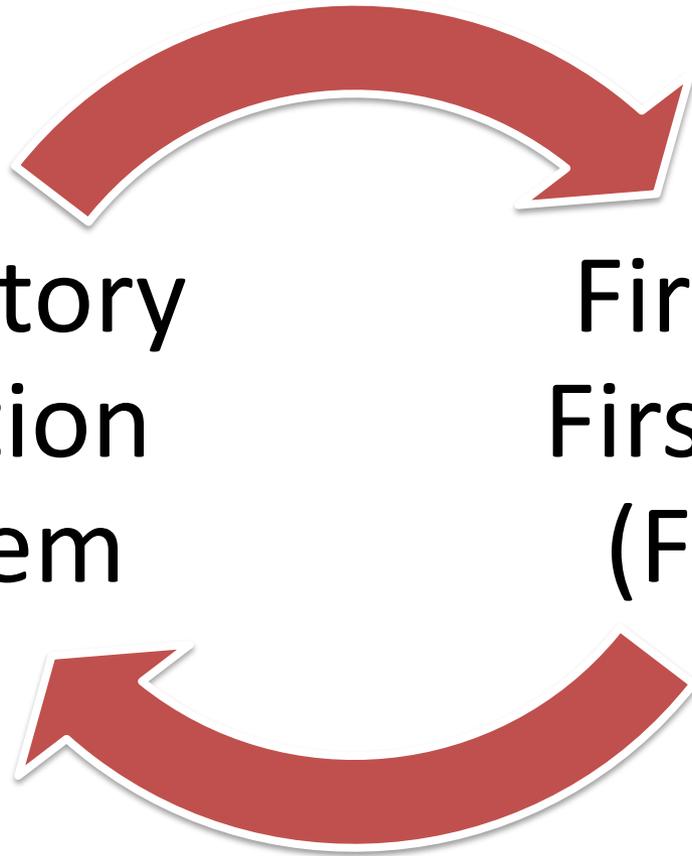
https://fns-prod.azureedge.us/sites/default/files/foodsafety_traceability.pdf



Storing Produce

Inventory
rotation
system

First In,
First Out
(FIFO)





Storing Produce

- **Do not wash fresh fruits and vegetables before storing them.**
- **Dampness encourages bacterial growth, so **WAIT TO WASH!****





Storing Produce



Ethylene is **"introduced"** to ensure **"uniform"** **ripening** of:

- Avocados
- Bananas
- Mangoes
- Tomatoes



Storing Produce

- Does produce need to be refrigerated?
- At what temperature? Ethylene producer or ethylene sensitive?
 - sensitive?



- The best way to **improve shelf life** of produce is to **receive in good condition and store properly.**



Storing Produce

Ethylene Sensitive



Ethylene Producer





Storing Produce

Ethylene Sensitive	Ethylene Producers
Broccoli	Apples
Cabbage	Avocados
Cauliflower	Bananas
Leafy Greens	Melons
Lettuce	Pears
	Stone Fruits
	Tomatoes
	Squash



Storing Produce

Apples	Broccoli
Cabbage	Carrots
Cauliflower	Celery
Corn	Cucumbers *
Fresh-cut	Grapes
Green Beans *	Lettuce
Oranges *	Peppers *
Spinach	Strawberries

* Ideal to store at 45-50°F



Storing Produce

Store at 55-65°F

Bananas	Garlic
Onions	Potatoes
Pumpkins	Tomatoes
Sweet Potatoes	Watermelons
Winter Squash	

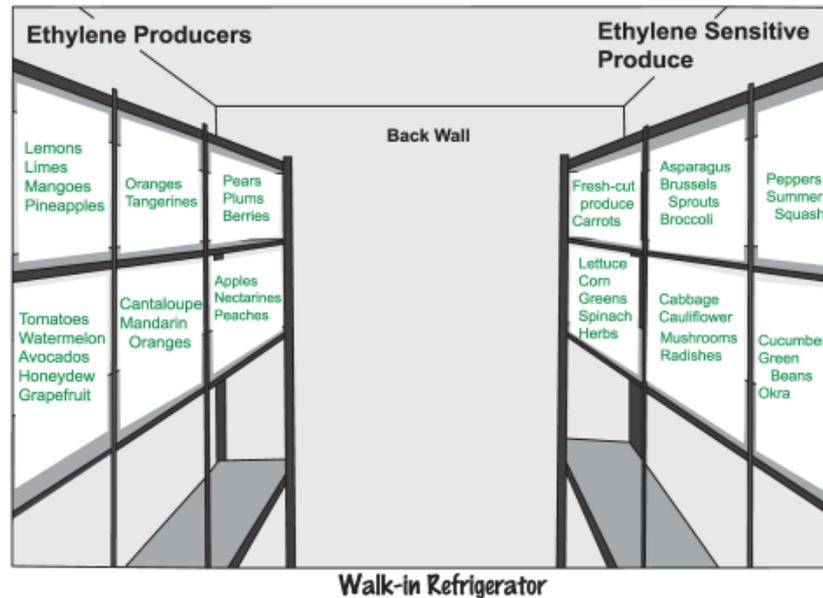


Storing Fresh Produce

Refrigerators should maintain a temperature of 41 °F, or less, but temperatures inside a refrigerator can range from colder (32 °F) to warmer (41 °F), depending on the location. Colder temperatures are found in the back and warmer temperatures in the front, near the door. Some kinds of produce should be stored at warmer temperatures near the door for best quality. Location of fruits and vegetables is important because fruits, in general, produce ethylene gas, which fosters natural ripening, but it also can cause most vegetables and a few non-ethylene producing fruits to deteriorate more quickly and develop undesirable characteristics. Ideally, ethylene-producing fruits should be stored in the refrigerator as far from ethylene-sensitive fruits and vegetables as possible.

These items should not be refrigerated. Place in dry storage 60 °F and 70 °F.

Bananas Sweet Potatoes Potatoes Dry Onions

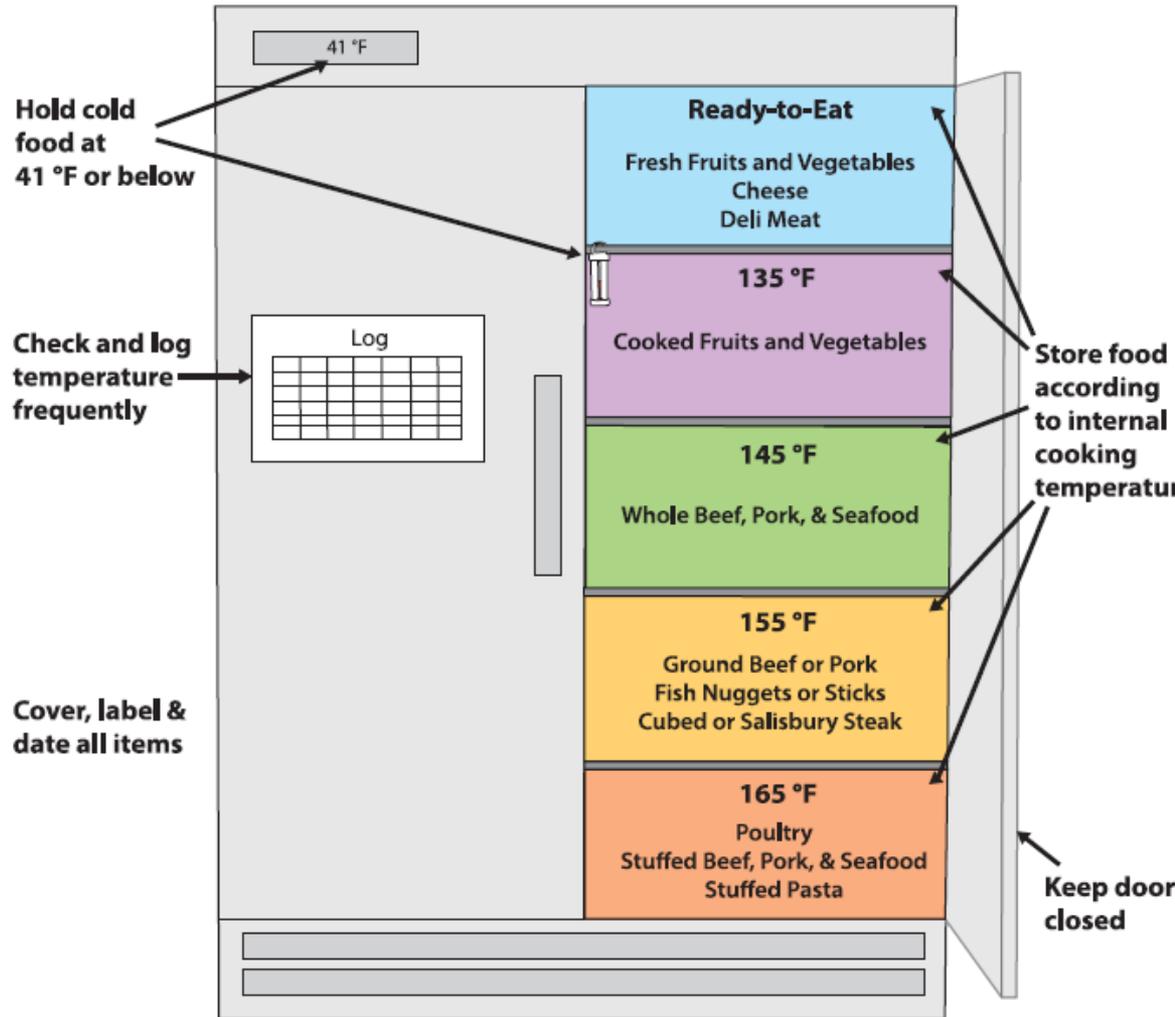




Ready to Eat
Product

Fully Cooked
and Leftovers

Iced or Wet





4 STEPS TO FOOD SAFETY




CLEAN




SEPARATE




COOK




CHILL



FOOD FACTS

Safe Food Handling: Four Simple Steps



CLEAN

Wash hands and surfaces often

- Wash your hands with warm water and soap for at least 20 seconds before and after handling food and after using the bathroom, changing diapers, and handling pets.
- Wash your cutting boards, dishes, utensils, and counter tops with hot soapy water after preparing each food item.
- Consider using paper towels to clean up kitchen surfaces. If you use cloth towels, launder them often in the hot cycle.
- Rinse fresh fruits and vegetables under running tap water, including those with skins and rinds that are not eaten. Scrub firm produce with a clean produce brush.
- With canned goods, remember to clean lids before opening.

SEPARATE

Separate raw meats from other foods

- Separate raw meat, poultry, seafood, and eggs from other foods in your grocery shopping cart, grocery bags, and refrigerator.
- Use one cutting board for fresh produce and a separate one for raw meat, poultry, and seafood.
- Never place cooked food on a plate that previously held raw meat, poultry, seafood, or eggs unless the plate has been washed in hot, soapy water.
- Don't reuse marinades used on raw foods unless you bring them to a boil first.

COOK

Cook to the right temperature

- Color and texture are unreliable indicators of safety. Using a food thermometer is the only way to ensure the safety of meat, poultry, seafood, and egg products for all cooking methods. These foods must be cooked to a safe minimum internal temperature to destroy any harmful bacteria.
- Cook eggs until the yolk and white are firm. Only use recipes in which eggs are cooked or heated thoroughly.
- When cooking in a microwave oven, cover food, stir, and rotate for even cooking. If there is no turntable, rotate the dish by hand once or twice during cooking. Always allow standing time, which completes the cooking, before checking the internal temperature with a food thermometer.
- Bring sauces, soups and gravy to a boil when reheating.

CHILL

Refrigerate foods promptly

- Use an appliance thermometer to be sure the temperature is consistently 40° F or below and the freezer temperature is 0° F or below.
- Refrigerate or freeze meat, poultry, eggs, seafood, and other perishables within 2 hours of cooking or purchasing. Refrigerate within 1 hour if the temperature outside is above 90° F.
- Never thaw food at room temperature, such as on the counter top. There are three safe ways to defrost food: in the refrigerator, in cold water, and in the microwave. Food thawed in cold water or in the microwave should be cooked immediately.
- Always marinate food in the refrigerator.
- Divide large amounts of leftovers into shallow containers for quicker cooling in the refrigerator.

July 2023 4

www.fda.gov/media/77178/download

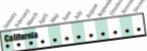


Resources

Lettuce, Romaine

Availability

A major production area includes:



Variety/Type Descriptions

Head-type lettuce consisting of long, leaf-shaped, narrow leaves. Leaf color ranges from dark green outer leaves to bright yellow inner leaves. Very crisp texture.

Ordering Specifications

Common packaging: 25- to 40-lb. crates, cartons, 2-7 cartons, and bushel cartons holding 24 count.

Grades: U.S. No. 1

NOTE: Not all romaine is graded. Ungraded romaine is called "unclassified."

Receiving and Inspecting

Good quality romaine should be fresh, crisp, and well-colored. Avoid romaine that appears wilted or has damaged leaves.



Storing and Handling

Temperature/humidity recommendation for short-term storage of 7 days or less: 32-36 degrees F/0-2 degrees C, 90-95% relative humidity.

Retail display life: Water sprinkler: OK
Top ice: No

Ethylene production/sensitivity: Produces ethylene: No
Sensitive to ethylene exposure: Yes

Storing tips: Keep romaine away from drafts to prevent dehydration. Store away from ethylene-producing fruits and ripening rooms.

Handling tips: Follow good rotation practices; first shipments received should be displayed or used first. Because of its shape, or used first. Because of its shape, romaine can be easily damaged; always handle with care. To crisp romaine before using, plunge in ice water and drain thoroughly.

Nutrition*

Serving Size 1 cup Lettuce, Romaine (2)

Amount Per Serving
Calories 10
Total Fat 0g
Saturated Fat 0g
Cholesterol 0mg
Sodium 0mg
Total Carbohydrate 1g
Sugar 0g
Protein 1g
Vitamin A
Vitamin C
Calcium
Iron

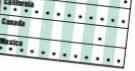
NOTE: Not all romaine is graded. Ungraded romaine is called "unclassified." Differences between grades are based primarily on external appearance.



Broccoli

Availability

Some major production areas include:



Variety/Type Descriptions

Calabrese - Most predominant variety sold commercially. Light green stalks with compact head clusters that are dark green with some purple tinge.

Ordering Specifications

Common packaging: 25-lb. cartons or case holding bunches

Grades: U.S. Fancy
U.S. No. 1
U.S. No. 2

NOTE: Not all broccoli is graded. Ungraded broccoli is called "unclassified." Differences between grades are based primarily on external appearance.

Receiving and Inspecting

Good quality broccoli should have fresh-looking, light green stalks of consistent thickness. Head clusters should be compact and dark green with some purple tinge. Where pulled apart, some head clusters may appear rotten around the edges. This does not affect product quality; it simply means that the clusters were not exposed to multiple drying, freezing, mold/broccoli with open, flowering, discolored, or water-soaked head clusters and tough, woody stems.

Storing and Handling

Temperature/humidity recommendation for short-term storage of 7 days or less: 32-36 degrees F/0-2 degrees C, 90-95% relative humidity.

Retail display life: Water sprinkler: OK
Top ice: OK

Ethylene production/sensitivity: Produces ethylene: No
Sensitive to ethylene exposure: Yes

Storing tips: Keep broccoli away from ethylene-producing fruits and ripening rooms.

Handling tips: Handle broccoli with care to avoid damage to head clusters. To receive slightly wilted broccoli, apply ice directly to bunches and plunge in cold water, drain, and place in cooler.

Nutrition*

Serving Size 1 medium stalk Broccoli (146g)

Amount Per Serving
Calories 41
Total Fat 0.5g
Saturated Fat (Not Available)
Cholesterol 0mg
Sodium 10mg
Total Carbohydrate 8g
Dietary Fiber 5g
Protein 5g
Vitamin C 13%
Vitamin K 220%
Calcium 6%

*Percent Daily Values are based on a diet of other people's misdeeds.



Troubleshooting

Yellow bud clusters; loss of buds: Broccoli is sensitive to ethylene; exposure to the gas may cause bud clusters to turn yellow or drop off. Keep broccoli away from ethylene-producing fruits and ripening rooms.

Discarded leaves; buds dropping off; softening of texture:

Holding broccoli for long periods of time may cause discoloration, loss of buds or poor quality, use or display broccoli soon after receiving.

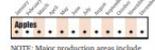


Apples

Storing tips: Store apples in original cartons with lids closed to prevent absorption of ethylene from other fruits, some varieties (like Honeycrisp and Gala) are sensitive to ethylene. Store apples in a refrigerator at 32-40 degrees F/0-2 degrees C for up to 6 weeks. Do not separate from other fruits. Do not separate from other fruits.

Receiving and Inspecting: Rough handling may cause bruising. To prevent bruising, keep handling to a minimum and store apples in original cartons with lids closed. Do not separate from other fruits.

Availability



NOTE: Major production areas include California, Idaho, Michigan, New England, New York, North Carolina, Oregon, Virginia, Washington, and West Virginia.

Variety/Type Descriptions

Braeburn - Solid red to red with some greenish-gold; sweet tart flavor. Good for eating out of hand and salads.

Crispin/Mutsu - Yellow green with some pink blush; sweet flavor. Good for eating out of hand and salads.

Empire - Dark red with some yellow flesh; sweet tart flavor. Good for eating out of hand, salads, and cooking.

Fuji - Color ranges from yellow-green with red highlights to very red; sweet flavor. Good for eating out of hand and cooking.

Gala - Yellow-orange skin with red striping; heart-shaped; sweet flavor. Good for eating out of hand and salads.

Golden Delicious - Yellow-green skin with firm white flesh. Good all-purpose cooking apple as well as for eating out of hand.

Granny Smith - Bright green skin with pink blush; crisp texture and tangy flavor. Good for eating out of hand, salads, and cooking.

Honeycrisp - Juicy with yellow flesh; sweet tart flavor. Very crisp. Good for eating out of hand, salads, and cooking.

Idared - Two-toned red and green apple with some pink blush; moderately tart flavor. Good for eating out of hand and cooking.

Jonagold - Orange-tinged color; tangy-sweet flavor. A cross of Golden Delicious and Jonathan apples. Good for eating out of hand and cooking.

Jonathan - Brilliant red color with firm juicy texture; tart flavor. Good for eating out of hand and cooking.

McIntosh - Two-toned red and green color; slightly tart flavor. Good for eating out of hand and salads.

Newtown - Green skin with yellow highlights; aromatic flesh with tangy flavor. Good for cooking and baking.

Red Delicious - Heart-shaped with deep ruby red skin; mild sweet flavor and juicy texture. Good for eating out of hand and salads.

Rome - Bright red skin with sweet, slightly juicy flesh. Good for baking and cooking.

Winesap - Dark red with some yellow flesh; sweet tart flavor. Good for eating out of hand, salads, and cooking.

Common packaging: 2, 5-, 8-, 10-lb. bags in boxes 40- to 50-lb. cartons, cartons, and bushel baskets cartons holding loose, bagged, or tray-packed/cell-packed apples 20-lb. 1/2-carton 128 count 2 layer - 26-lb. cartons

Grades: U.S. Extra Fancy
U.S. Fancy
U.S. No. 1
U.S. Utility
Combination
Washington Extra Fancy
Washington Fancy

Differences between grades are based primarily on external appearance. Individual states may set their own grades.

Size: 48-, 56-, 64-, 72-, 80-, 88-, 100-, 112-, 125-, 138-, 150-, 163-, 175-, 198-, and 216-count

Ethylene production/sensitivity: Produces ethylene: Yes-high
(NOTE: Fuji and Granny Smith varieties produce low levels of ethylene.)
Sensitive to ethylene exposure: Yes



Equivalents

1 medium apple = 1 cup diced
3 medium apples = 1 pound
2 pounds apple = 1 1/2 inch pie

Receiving and Inspecting

Good quality apples should be crisp, flavorful, and well-colored with firm smooth skin. Crispeness may be determined by measuring flesh firmness with fruit penetrometer. Avoid fruit with bruises, broken skin, or internal browning.

Storing and Handling

Temperature/humidity recommendations for short-term storage of 7 days or less: 32-36 degrees F/0-2 degrees C, 85-95% relative humidity

Retail display life: Water sprinkler: No
Top ice: No

Ethylene production/sensitivity: Produces ethylene: Yes-high
(NOTE: Fuji and Granny Smith varieties produce low levels of ethylene.)
Sensitive to ethylene exposure: Yes

Receiving and Inspecting: Rough handling may cause bruising. To prevent bruising, keep handling to a minimum and store apples in original cartons with lids closed. Do not separate from other fruits.

Storing and Handling: Store apples in original cartons with lids closed to prevent absorption of ethylene from other fruits, some varieties (like Honeycrisp and Gala) are sensitive to ethylene. Store apples in a refrigerator at 32-40 degrees F/0-2 degrees C for up to 6 weeks. Do not separate from other fruits. Do not separate from other fruits.

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Resources

Produce Safety Resources

PROGRAMS > FOOD SAFETY > PRODUCE SAFETY UNIVERSITY > GRADUATES

Resource Type

Technical Assistance & Guidance

Resource materials

Are training materials available?

Training materials and resources have been developed with the following federal agencies and partners:

- [USDA Agricultural Marketing Service](#) (AMS)
- [Food and Drug Administration](#) (FDA)
- [Institute of Child Nutrition](#) (ICN)
- [School Nutrition Association](#) (SNA)

What resources can graduates use to train others?

We offer many types of resources to help PSU graduates teach produce safety topics. Use the menu below to learn more about each type of resource available for PSU graduates.

▼ Take-Home Training for Professional Standards
▼ Produce Safety Fact Sheets
▼ Produce Safety Information Sheets
▼ Produce Safety Training Videos
▼ Produce Safety Hack Video Series
▼ Additional Produce Safety Training Videos



Produce Safety Hack Video Series

Available in both English and Spanish, Produce Safety Hack videos are short and designed to help food service operators keep produce safe and at a high quality. They cover a range of topics.

- [Ethylene Gas \(en Español\)](#)
- [Ready to Eat \(en Español\)](#)
- [Storage Temperatures \(en Español\)](#)
- [Temperature Readings \(en Español\)](#)
- [Washing Produce \(en Español\)](#)

www.fns.usda.gov/psu/graduates



Resources

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- [Washing Produce \(en Español\)](#)



Illinois State Board of Education



Apple Information Sheet

Purchasing Specifications
Specifications should state grade, type, size, and quantity. Select an appropriate grade for the intended use. Apples should be firm to touch, have evenly distributed color according to variety, and have a characteristic apple shape. No more than 10% should have defects that make apples unsuitable, and no more than 1% have defects that are affected by decay.

Measure	Diameter	Approximate Count per box
Small	2 1/4"	250
Medium	2 1/2"	185
Large	2 3/4"	135

U.S. Grades
The five grades for apples are U.S. Extra Fancy, U.S. Fancy, U.S. No. 1, U.S. No. 2 and U.S. Utility. The amount of surface area that is allowed to be affected by particular defects, and the amount of surface area that is allowed to be affected by particular defects, vary between grades in the amount of surface area that is allowed to be affected by the Fancy being the most restrictive. For apples that have a color requirement compared to the U.S. Extra Fancy has the highest color requirement.

*The apple varieties that have color requirements are Red Delicious, Red Rome, Empire, Idared, Winispaj, Jonarum, McIntosh, Cortland, Rome Beauty, Delicious, and York varieties.

Domestic Harvest

- 2, 3, July - September
- 4, 5, August - October
- 6, September - November
- 7, October - November
- 8, 9, 10, June - September



Apples are domestically available all year, with the highest volume and lowest cost typically in May. Many apples are held in controlled atmosphere storage after harvest for seven to eight months. Apples are held in storage, the more the quality may decline. Contact your county or state Cooperative Extension for additional details about apple production in your area.

Receiving Guidelines

- Apples should produce a "snap" sound when cut with a knife or bitten.
- Apples should not feel soft when held in the palm of your hand and gently squeezed.
- Shape is important only if you are serving whole fruit.



Broccoli Information Sheet

Purchasing Specifications

Specifications should state grade, type, size, and quantity. High quality broccoli has either a dark or bright green to purplish color with closed flower buds. Heads should be firm to hand pressure and compact. Stalks should be clearly cut to the appropriate length for a particular grade standard or for crowns or florets. No more than 10% should have defects that make the broccoli unusable, and no more than 1% should be affected by decay.

U.S. Grades

All U.S. Fancy Grades have an absolute range for diameter only, which is primarily what sets the grade apart from the others. Other U.S. Grades allow for the diameters and lengths to be specified by the customer. The broccoli shall be free from decay and damage caused by overmaturity, discoloration of bud clusters or leaves, freezing, wilting, dirt or other foreign material, disease, insects, or mechanical or other means. The bud clusters should be fairly compact.

U.S. Grade	Min. to Max Diameter	Approximate Count per box
U.S. Fancy Bunched	Not less than 2 1/2"	
U.S. Fancy Crowns	2 1/2" to 5"	6 to 8 1/2"
U.S. Florets	3 1/4" to 3"	2 1/2 to 5"
U.S. No. 1 Bunched	No requirement	1 to 3 1/2"
U.S. No. 1 Crowns	No requirement	5 to 9"
U.S. No. 1 Florets	1 to 4"	3 1/2 to 6"
U.S. No. 2 Bunched	No requirement	1 1/2 to 4 1/2"
U.S. No. 2 Crowns	No requirement	No requirement
U.S. No. 2 Florets	No requirement	No requirement

Domestic Harvest

- 2, 3, 4, August - September
- 5, 6, July - November
- 7, 8, October - December
- 9, 10, November - April



Check with your county or state Cooperative Extension Office for specific information regarding broccoli production in your area.



Grape Information Sheet

Purchasing Specifications

Specifications should state grade and color. Individual bunches should be full. Grapes should be plump and firmly attached to green pliable stems, and grapes should be uniform in size and seedless. No more than 12% should have defects that make grapes unusable, and no more than 1% should be affected by decay.

U.S. Grades

- U.S. Extra Fancy Table - 90% of grapes must meet minimum size (1 1/16" or 12/16" depending on variety) or 13/16" depending on variety.
- U.S. Fancy Table - 90% of grapes must meet minimum size (9/16" or 10/16" depending on variety).
- U.S. Fancy Table - 75% of grapes must meet minimum size (9/16" or 10/16" depending on variety).
- U.S. No. 1 Table - 75% of grapes must meet minimum size (9/16" or 10/16" depending on variety).
- U.S. No. 1 Institutional - 75% of grapes must meet minimum size (9/16" or 10/16" depending on variety).

*U.S. No. 1 Table Grapes consist of bunches of grapes of one variety, except when designated as assorted varieties. U.S. No. 1 Table Grapes are mature and fairly well colored. The berries are firm, firmly attached to capstems, and not split, shatter, crushed, dried, or wet. Grapes are free from decay, waterberry and sunburn, and should not be damaged by any other cause. Stems should not be dry and brittle. Stems should be free from mold and decay and not damaged by freezing or any other cause.

Color Requirements

- Red and black grapes have a minimum color requirement depending on grade.
- White varieties have no color requirement.

Minimum percentage of grapes showing characteristic color	Black Grapes	
	Red Grapes	Black Grapes
Grade	75%	95%
U.S. Extra Fancy Table	60%	85%
U.S. Fancy Table	60%	75%
U.S. Number 1 Table	60%	75%
U.S. Number 1 Institutional	60%	75%

Domestic Harvest



Domestic Harvest

- 2, 3, July - September
- 4, 5, August - October
- 6, September - November
- 7, October - November
- 8, 9, 10, June - September



Lettuce Information Sheet

Purchasing Specifications

Specifications should state grade, type, size, and quantity. Lettuce should have a light to dark green color and be bright and crisp. Depending on variety and type, lettuce also may have a slightly to dark burgundy appearance on the inner leaves. Any variety or type of lettuce should have not more than 12% defects that make lettuce unusable, and no more than 2% should be affected by decay. Iceberg-type lettuce shall have not more than 10% and 2%, respectively, if lettuce is purchased in sealed bags, it should be unwashed and display the same characteristics as loose product.

Lettuce Varieties with U.S. Grades

- Lettuce - Includes iceberg (very compact head), Boston, and Bibb types (loosely connected heads).
- Field Green Leaf Lettuce - Most common are red leaf and green leaf with loosely connected heads.
- Romaine - Generally the longer and broad green leaf type with a whitish sweet core.
- Greenhouse Leaf Lettuce - Includes the varieties of field lettuce grown in a controlled atmosphere.

Most Common U.S. Grades

U.S. No. 1 is common to all lettuce varieties and types, and is considered the standard for commercial use. U.S. No. 1 consists of lettuce of similar varieties and types, and is well developed, fairly well stemmed, free from decay, double, and firming. U.S. No. 1 lettuce should be free from damage by broken middle, bruising, dirt or foreign material, discoloration, decay, mildew, rot, insect, aphid, watermarked yellowing, insects, worms, or mechanical or other means.



Many lettuce varieties are grown throughout the United States and are harvested at varying times throughout the year. Check with your county or state Cooperative Extension Office for specific information regarding lettuce production in your area.





Produce Safety University Resources and References

Where Your Produce Comes From

- AMS: Food Hub Directory
<https://www.ams.usda.gov/local-food-directories/foodhubs>

Food Safety and Fresh-Cut Produce

- FDA: Foodborne Illness Causing Organisms in the U.S. (In the PSU Binder)
<https://www.fda.gov/media/77727/download>
- USDA FNS: Produce Safety Fact Sheets and Videos
Including Food Safety Practices to Expect, Verifying Farm Food Safety, Conducting a Mock Recall of Produce in a School Nutrition Operation, and Produce Safety Hacks (Videos)
<https://www.fns.usda.gov/psu/graduates>

Growing Food Safely

- FDA: Produce & Plant Products Guidance Documents & Regulatory Information
<https://www.fda.gov/food/guidance-documents-regulatory-information-topic-food-and-dietary-supplements/produce-plant-products-guidance-documents-regulatory-information>
- USDA AMS: Companies that Meet USDA GAP&GHP Acceptance Criteria
<https://apps.ams.usda.gov/GAPGHP/reportG05.aspx>
- ISU Extension and Outreach: Checklist for Retail Purchasing of Local Fresh Produce (In the PSU Binder)
- PSU Extension: Understanding FSMA - The Produce Safety Rule (In the PSU Binder)

Buy Smart, Save Smart

- FDA: Food Safety Modernization Act (FSMA) and FSMA Final Rule for Preventive Controls for Human Food
<https://www.fda.gov/food/guidance-regulation-food-and-dietary-supplements/food-safety-modernization-act-fsma>
<https://www.fda.gov/food/food-safety-modernization-act-fsma/fsma-final-rule-preventive-controls-human-food>
- USDA FNS: Food Buying Guide
<https://foodbuyingguide.fns.usda.gov/>
- NC Cooperative: Insurance Coverage Options for Fresh Produce Growers (In the PSU Binder)

Farm to School

- DC Government: Garden Safety Checklist (In the PSU Binder)
- USDA FNS: Farm to School Fact Sheets
Including Decision Tree, Buy American, and Get the Facts on Food Safety
<https://www.fns.usda.gov/f2s/fact-sheets>

Quality and Condition

- USDA AMS: U.S. Grades and Standards for Fruits and Vegetables
<https://www.ams.usda.gov/grades-standards/fruits>
<https://www.ams.usda.gov/grades-standards/vegetables>

Produce Safety University Resources and References

Market News

- USDA AMS: USDA Market News
<https://www.ams.usda.gov/market-news>

Receiving and Storage

- Optimum Storage Temperature and Factor Guide (In the PSU Binder)
- ARS: The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks
<https://www.ars.usda.gov/arsuserfiles/oc/np/commercialstorage/commercialstorage.pdf>

Writing Specifications

- USDA AMS: Commercial Item Descriptions
<https://www.ams.usda.gov/market-news>
- USDA FNS and ICN: Product Information Sheets (The Rainbow Book)
<https://theicn.org/icn-resources-a-z/produce-safety>
<https://www.fns.usda.gov/psu/graduates>
- PMA: Fresh Produce Manual
<http://www.americanfruitandproduce.com/uploads/data/pm.pdf>
- USDA FNS: Fresh Fruits and Vegetables Galore
<https://archive.org/details/CAT30919019/page/n7/mode/2up>

Safe Preparation and Service

- Study: Hand Washing Frequencies and Procedures used in Retail Food Service
https://www.researchgate.net/profile/Jeannie_Sneed/publication/23191542_Hand_Washing_Frequencies_and_Procedures_Used_in_Retail_Food_Services/links/0912f50eac90680889000000/Hand-Washing-Frequencies-and-Procedures-Used-in-Retail-Food-Services.pdf
- Study: CDC EHS-Net Hand Hygiene
http://www.cdc.gov/nceh/ehs/ehsnet/plain_language/food-worker-handwashing-restaurant-factors.htm
- Study: Implementation of School Districts' Food Safety Plans and Perceptions of Support for Food Safety and Training in Child Nutrition Programs in One USDA Region
<https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=3316&context=etd>
- Study: Increasing Hand Washing Compliance with a Simple Visual Cue
<https://www.proquest.com/docview/1564432943?pg-origsite=gscholar>
- Study: Observational Assessment of Glove Use Behaviors among Foodservice Workers in a University Dining Setting - Testing a Visual Intervention Tool
<https://www.foodprotection.org/files/food-protection-trends/Sep-Oct-13-rajagopal.pdf>
- UM Cooperative Extension: Best Ways to Wash Fruits and Vegetables
<https://extension.umaine.edu/publications/4336e/>

Additional Produce Safety Resources:

- ICN: Produce Safety Resources
<https://theicn.org/icn-resources-a-z/produce-safety>
- USDA FNS: Food Safety Flashes (Videos)
<https://www.fns.usda.gov/ofa/food-safety-flashes>



Resources—FDA Food Facts

FOOD FACTS

U.S. FOOD & DRUG ADMINISTRATION

Raw Produce

Selecting and Serving it Safely



Fruits and vegetables are an important part of a healthy diet. Your local markets carry a wide variety of nutritious fresh fruits and vegetables. However, harmful bacteria that may be in the soil or water where produce grows can come in contact with fruits and vegetables and contaminate them. Fresh produce may also become contaminated after it is harvested, such as during storage or preparation.

Furthermore, like any fresh produce that is consumed raw or lightly cooked, sprouts (such as alfalfa or mung bean) that are served raw or lightly cooked may contain bacteria that can cause foodborne illness. Unlike other fresh produce, sprouts are grown from seeds and beans under warm and humid conditions. These conditions are also ideal for the growth of bacteria, including *Salmonella*, *Listeria*, and *E. coli*. If just a few harmful bacteria are present in or on the seed, the bacteria can grow to high levels during sprouting, even if you are growing your own sprouts under sanitary conditions at home.

Eating contaminated produce can lead to foodborne illness, often called "food poisoning." Recent Food and Drug Administration regulations for produce help reduce the risk of these causing contamination but they do not eliminate it entirely. So, as you enjoy fresh produce, follow these safe handling tips to help protect you and your family.

Buy Right

You can help keep produce safe by making wise buying decisions.

- Choose produce that is not bruised or damaged.
- When buying pre-cut, bagged or packaged produce — such as half of a watermelon or bagged salad greens — choose only those items that are refrigerated or surrounded by ice.
- Bag fresh fruits and vegetables separately from raw meat, poultry and seafood when packing them to take home from the market.

Store Properly

Proper storage of fresh produce can affect both quality and safety.

- Store perishable fresh fruits and vegetables (like strawberries, lettuce, herbs, and mushrooms) in a clean refrigerator at a temperature of 40° F or below. Use a refrigerator thermometer to check if you're not sure whether an item should be refrigerated to help its quality, ask your grocer.
- Refrigerate all produce that is purchased pre-cut or packaged.

July 2013

FOOD FACTS

Separate for Safety

Keep fruits and vegetables that will be eaten raw separate from raw meat, poultry, and seafood — and from kitchen utensils used for these products.

- Wash cutting boards, dishes, utensils, and countertops with soap and hot water between preparing raw meat, poultry, and seafood and preparing produce that will not be cooked.
- If possible, use one cutting board for fresh produce and a separate one for raw meat, poultry, and seafood.
- If you use plastic or other non-porous cutting boards, run them through the dishwasher after use.

Prepare Safely

When preparing any fresh produce, begin with clean hands. Wash your hands for at least 20 seconds with soap and warm water before and after preparation.

- Cut away any damaged or bruised areas on fresh fruits and vegetables before preparing and/or eating. Throw away any produce that looks rotten.
- Wash all produce thoroughly under running water before preparing and/or eating, including produce grown at home or bought from a grocery store or farmers' market.
- Washing can reduce bacteria that may be present, but it will not eliminate it. Washing fruits and vegetables with soap, detergent, or commercial produce wash is not recommended. Produce is porous. Soap and household detergents can be absorbed by fruits and vegetables, despite thorough rinsing, and can make you sick. Also, the safety of the residues of commercial produce washes is not known and their effectiveness has not been tested.
- Soak firm produce, such as melons and cucumbers, with a clean produce brush.
- After washing, dry produce with a clean cloth towel or paper towel to further reduce bacteria that may be present on the surface.
- Cooking produce thoroughly kills harmful bacteria and reduces the risk of illness.

What About Pre-Washed Produce?

Many pre-cut, bagged, or packaged produce items are pre-washed and ready to eat. If so, it will be stored on the packaging, and you can use the produce without further washing.

If you choose to wash produce marked as "pre-washed" or "ready-to-eat," be sure that it does not come in contact with unclean surfaces or utensils. The wash will be used to avoid cross contamination.

July 2013

FOOD FACTS

About Foodborne Illness

Know the Symptoms

Consuming dangerous foodborne bacteria will usually cause illness within 1 to 3 days of eating the contaminated food. However, illness can also occur within 20 minutes or up to 8 weeks later. Although most people will recover from a foodborne illness within a short period of time, some can develop chronic, severe, or even life-threatening health problems. Children, older adults, pregnant people, and people with weakened immune systems (such as transplant patients and individuals with HIV/AIDS, cancer, and diabetes) can be especially vulnerable to foodborne illness.

For more information on FDA's food safety advice for vulnerable populations, see the following:

- People at Risk of Foodborne Illness: <https://www.fda.gov/food/foodborne-illness/people-risk-foodborne-illness>
- Safe Eats – Food Safety During Pregnancy: <https://www.fda.gov/food/foodborne-illness/safe-eats-food-safety-during-pregnancy>
- Food Safety for Older Adults and People with Cancer, Diabetes, HIV/AIDS, Organ Transplants, and Autoimmune Diseases: <https://www.fda.gov/food/foodborne-illness/food-safety-for-older-adults-and-people-with-cancer-diabetes-hiv-aids-organ-transplants-and-autoimmune-diseases>

People who are more vulnerable to foodborne illness (as identified above) should avoid eating raw or lightly cooked sprouts of any kind including onion, alfalfa, clover, radish, and mung bean sprouts.

Foodborne illness can sometimes be confused with other illnesses that have similar symptoms. The symptoms of foodborne illness can include:

- Nausea, vomiting, and abdominal pain
- Flu-like symptoms, such as fever, headache, and body aches

Take Action

You think that you or a family member has a foodborne illness, contact your healthcare provider immediately. Also, report the suspected foodborne illness to FDA.

- Contact the Consumer Complaint Coordinator in your area. Locate a coordinator here: <http://www.fda.gov/Safety/ReportProblem/ConsumerComplaintCoordinators>
- Contact MedWatch, FDA's Safety Information and Adverse Event Reporting Program. By Phone: 1-800-FDA-1088
- Online: File a voluntary report at <http://www.fda.gov/medwatch>

For more information on preventing foodborne illness, see Safe Food Handling: Four Simple Steps at <https://www.fda.gov/food/buy-store-serve-safe-food/safe-food-handling-what-you-need-know>

July 2013

FOOD FACTS

Safe Food Handling: Four Simple Steps



SEPARATE

Separate raw meat from other foods

- Separate raw meat from other foods to avoid cross-contamination.
- Use separate cutting boards for raw meat, poultry, and seafood.
- Use separate cutting boards for fresh produce and other foods.
- Use separate dishes, utensils, and containers for raw meat, poultry, and seafood.
- Use separate dishes, utensils, and containers for fresh produce and other foods.

CLEAN

Wash hands and produce often

- Wash hands often with soap and water for at least 20 seconds.
- Wash hands before and after handling raw meat, poultry, and seafood.
- Wash hands before and after handling fresh produce and other foods.
- Wash hands before and after handling dishes, utensils, and containers.
- Wash hands before and after handling raw meat, poultry, and seafood.
- Wash hands before and after handling fresh produce and other foods.

CHILL

Refrigerate promptly

- Refrigerate promptly to keep food safe.

COOK

Cook to the right temperature

- Cook to the right temperature to kill harmful bacteria.
- Cook to the right temperature to kill harmful bacteria.
- Cook to the right temperature to kill harmful bacteria.
- Cook to the right temperature to kill harmful bacteria.
- Cook to the right temperature to kill harmful bacteria.

July 2013

www.fda.gov/food/buy-store-serve-safe-food/selecting-and-serving-produce-safely



PSU- UC Davis, CA





PSU- UC Davis, CA



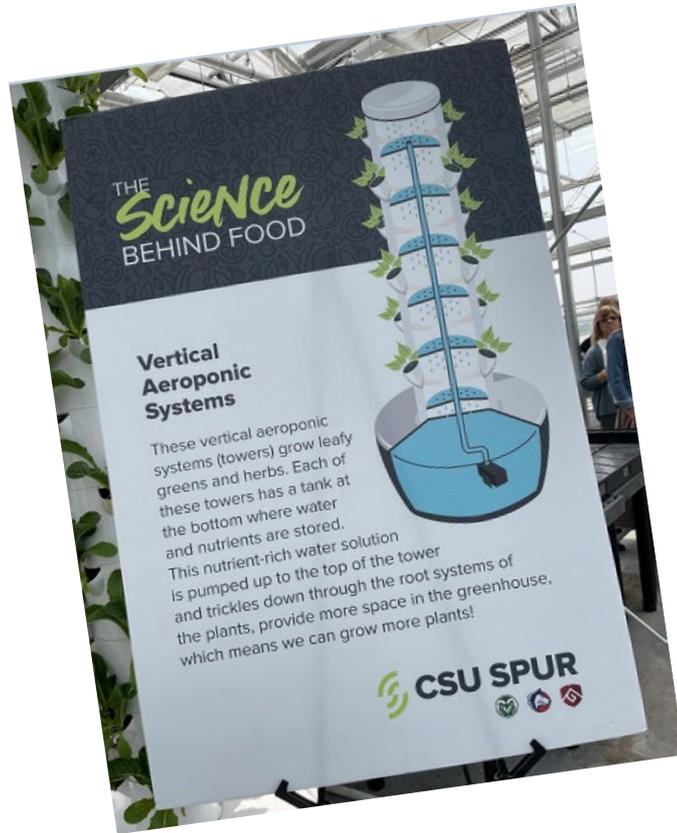


PSU- UC Davis, CA





PSU- Denver, Colorado





PSU- Denver, Colorado



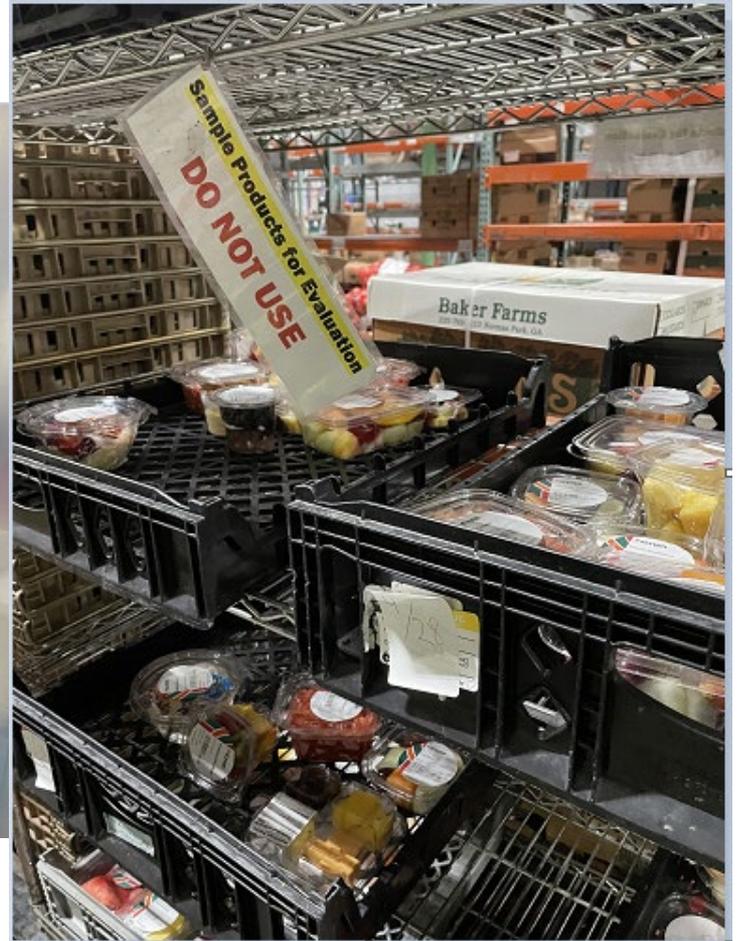


PSU- Denver, Colorado





PSU- Fredericksburg, VA





PSU- Fredericksburg, VA





PSU- Fredericksburg, VA





PSU- Fredericksburg, VA





