

# Good Agriculture Practices for Melons

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## General Information

Commonly consumed melons include cantaloupe, honeydew, and watermelon. Melons have a rich, vibrant taste and great nutritional benefits, making them a popular fresh produce that is often eaten raw in salads, desserts, or by themselves.

Melons are highly susceptible to microbial contamination, particularly varieties of melons with netted rinds. Extra caution must be taken during all stages of growth, harvest, and storage of melons to ensure that contamination is prevented.

## Notable Foodborne Illness Outbreaks Linked to Melons, 2006-Present (Outbreak Database, 2015)

Between 1996 and 2008, 507 illnesses and 2 deaths were attributed to contaminated melons. Several notable foodborne illness outbreaks caused by melons occurred in 2011. A *Salmonella* outbreak severely affected the state of Kentucky, causing 8 deaths. A *Listeria* outbreak in the same year from melons produced in Colorado resulted in 133 illnesses, 33 deaths, and 1 miscarriage, making it one of the deadliest recorded foodborne illness outbreaks in American history.

Bacteria	Year	Food Vehicle	Location	States Affected	Illnesses	Deaths
<i>Salmonella</i>	2012	Cantaloupe	Indiana	11	261	3
<i>Listeria</i>	2011	Cantaloupe	Colorado	12	147	33
<i>Salmonella</i>	2011	Cantaloupe	Guatemala	6	20	0
Norovirus	2008	Melons	California	1	23	0
<i>Salmonella</i>	2008	Cantaloupe	International	8	53	0
<i>Salmonella</i>	2007	Honeydew	New Jersey	4	26	0
<i>Salmonella</i>	2006	Melons	International	6	41	0

Table 1. Selected Foodborne Illness Outbreaks Attributed to Melons, 2006-Present (Outbreak Database, 2015)

## Harvesting Tips

Melons which appear to have been disturbed by animals should be excluded from harvest. Additionally, any melons which have been exposed to pooled water should also be excluded from harvest, as pooled water can collect pathogens and allow bacteria to transfer to fruit.

Because melons have a high weight, the rind is vulnerable to machine damage or damage from being dropped. If pathogens have collected on the rind, they can easily enter the fruit if the rind is cracked. Extra care should be taken to ensure that fruit are carefully harvested with no damage, and damaged fruit should be excluded.

Cleaning the rind of melons is important for removing any pathogens which may have been transferred to the surface of a melon. Surface dirt should be first removed, after which a melon should be scrubbed with a clean produce brush. Water used for cleaning melons, including scrubbing, should be in accordance with GAPs post-harvest microbial quality. All tools, surfaces, containers, brushes, and other equipment used for the harvesting of melons should be sanitized between uses to prevent spread of bacteria.

## Storage and Cooling Conditions

Storage conditions for melons vary by variety. Generally, storing melons at 7-10°C is ideal. Ripe melons prefer 2-5°C. Before and after storage, melons should be inspected for mold, bruising, or sunken areas, as these defects indicate fruit which has become contaminated. Melons should never be stored at room temperature.

Produce	Optimal Storage Temp., °C	Optimal Humidity (%)	Cooling with top ice acceptable	Cooling with water sprinkle acceptable	Ethylene Production	Ethylene Sensitivity to	Storage Life
Melons	Varies; 7-10 Typical	85-100	Yes	-	Yes	Yes	15-21 Days

Table 2. Storage and Cooling Conditions for Lettuce (Suslow, Cantwell, & Mitchell, 1997)

### Good Agriculture Practices (FDA, 2009)

- If unusually heavy wildlife pest infestations or evidence of wildlife pest infestations occurs (i.e. presence of wildlife feces), consider discarding affected produce.
- If melons are turned by hand to reduce ground spot formation, carefully consider employee hygiene practices, especially hand washing and glove use.
- If melons directly contact soil, careful consideration should be given to the use of all soil amendments to reduce or eliminate the potential for human pathogen contamination of soil.
- Heavy rains may increase the likelihood of soil-to-melon contamination. Consider delayed harvest, extra washing, etc., when heavy rains have recently occurred.
- If cups or plastic sheeting are used, clean, sanitary materials should be used.

### Pathogenic Behavior

Melons present one of the highest risks to consumers for microbial contamination. Melon rind is a particular challenge to food safety, as it is extremely susceptible to harboring bacteria. Harmful pathogens such as *Salmonella* and *E.coli* O157:H7 have been shown to stick to the exterior of melons, multiply, and travel through the porous rind to the interior of the fruit. The high water content of melons, combined with their low acidity, are further conducive to bacterial growth. Furthermore, because melons grow on the ground, they can come directly into contact with soil and manure, and rainwater runoff may contaminate the fruit.

### References

- Centers for Disease Control and Prevention. (2012). *Multistate Outbreak of Salmonella Typhimurium and Salmonella Newport Infections Linked to Cantaloupe (Final Update)*. Retrieved from: <http://www.cdc.gov/salmonella/typhimurium-cantaloupe-0812/>
- Goetz, G. (2011). Cantaloupe: Sometimes a Rough Fruit. Retrieved from Food Safety News: <http://www.foodsafetynews.com/2011/03/cantaloupe--sometimes-a-rough-fruit/#.VgjiswXpVhBf>
- Golodner, L. (2012). Cantaloupe Contamination: What Consumers Can Do to Help Reduce their Risk of Foodborne Illness. Retrieved from Water Quality and Health: <http://www.waterandhealth.org/cantaloupe-contamination-consumers-reduce-risk-foodborne-illness/>
- Outbreak Database. (2015). Outbreaks with melon vehicle. Retrieved from the Foodborne Illness Outbreak Database, October 6, 2015: <http://www.outbreakdatabase.com/search/?vehicle=cantaloupe>
- Suslow, T., Cantwell, M., & Mitchell, J. (1997). Honeydew: Recommendations for Maintaining Postharvest Quality. Retrieved from UC Davis: <http://postharvest.ucdavis.edu/PFfruits/Honeydew/>
- US Food and Drug Administration. (2009). *Commodity Specific Food Safety Guidelines for the Melon Supply Chain*. FDA: Silver Spring, Maryland.

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This food safety factsheet can be downloaded at <http://www.wku.edu/agriculture/index.php>