

Cucumber

Cucumis sativus



Best practice

Cucumbers are fruit, and approximately 95% water. They are harvested while still immature, before the seeds enlarge and harden. In some varieties the core flesh develops a translucent appearance at maturity.

Cucumbers are extremely variable. Some varieties (green field, crystal, apple) have a relatively hard, waxy skin. Others (Continental, Lebanese) have a thin skin that is easily damaged. Gentle handling of these varieties is essential to prevent cuts, scratches or bruises, as these are likely to develop into rots.

Cucumbers should never be packed wet as this is likely to increase disease. Washing thin skinned varieties is not recommended.

Cucumbers are difficult to store. Cold temperatures cause chilling injury, while warmer temperatures increase rots and yellowing.

Chilling sensitivity is strongly affected by variety and the growing conditions leading up to harvest. Chilling sensitivity can be reduced by methods including short heat treatments, cooling in stages and packaging in plastic films, especially under modified atmospheres.

Ethylene production by cucumbers is normally very low. However, cucumbers are sensitive to ethylene, which increases yellowing and shortens storage life. Yellowed or rotting cucumbers have greatly increased ethylene production, which in turn increases yellowing in neighbouring fruit.

Storage life

Temperatures below 7–10°C reduce storage life due to chilling damage. At temperatures over 12°C cucumbers rapidly yellow and rot.

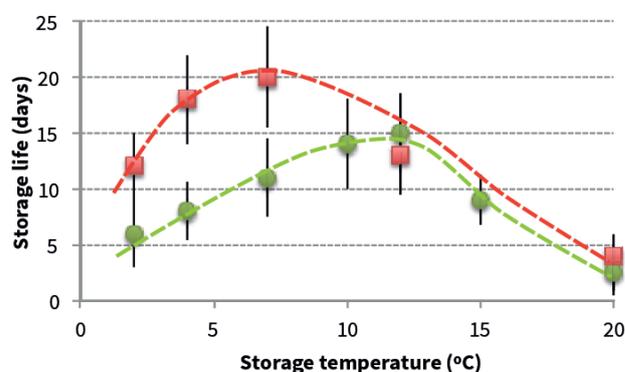
Thin skinned varieties are particularly sensitive to chilling damage, with as little as 1–2 days at 2°C enough to induce symptoms in susceptible fruit.

Storage life varies widely between varieties, and even between individual batches of fruit. It is generally ended by rots, although at higher temperatures yellowing is also a significant issue.

Packaging can extend storage life, especially for thin skinned varieties. Modified atmosphere packaging can increase storage life, especially at chilling temperatures. However, packaging that creates a beneficial atmosphere (high CO₂ and low O₂) at low temperatures results in anaerobic conditions when cucumbers warm up.

Weight loss

- ▶ Weight loss of 3–5% results in noticeable softening and reduced marketability.
- ▶ Continental cucumbers are sold shrink wrapped. This greatly reduces water loss without the risk of condensation.
- ▶ The rate of water loss from Lebanese cucumbers is 3–4 times that of green field cucumbers at the same temperature and humidity.



Storage life of green field (red) and Lebanese (green) cucumbers at different temperatures, bars indicate the likely range around each mean value.

Key points

- ▶ Cucumbers are immature fruit, harvested before their seeds enlarge and harden.
- ▶ Different cucumber cultivars vary widely in rates of water loss and storage characteristics.
- ▶ Cucumbers are extremely chilling sensitive. Temperatures below 10°C can cause pitting, increased water loss, rots, and internal breakdown.
- ▶ Higher storage temperatures increase water loss and yellowing.
- ▶ Chilling sensitivity is highly cultivar dependant, and is reduced if cucumbers are grown under non-stressing environmental conditions.
- ▶ Sensitivity to low storage temperatures can be reduced by packaging, short heat treatments and staged cooling
- ▶ Ethylene production by cucumbers increases if fruit are yellowing or rotting. Ethylene induces further yellowing.

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Summary

Storage conditions	Optimum temperature	Green field 5–9°C Lebanese 10–12°C
	Optimum RH	90–95%
	Storage life (best)	Green field 2–4 weeks Lebanese 10–16 days
	Storage life at 5°C	Green field 2–3 weeks Lebanese 5–10 days
Cooling	Cooling method	Forced air or room cooling
	Freezing point	-0.5°C
	Susceptibility to freezing	Moderate
	Chilling sensitive?	Yes
Physiology	Respiration rate	Green field Low Lebanese Moderate
	Ethylene production	Moderate
	Ethylene sensitivity	High – results in yellowing and increases disease.
Packing	Cleaning	May be washed but should not be packed wet
	Rate of water loss	Moderate to high, good benefits from point of sale packaging
	Display	Should not be misted or displayed on ice



control



30 seconds @ 55°C

Heat treatments can reduce chilling sensitivity. Untreated cucumbers (left) show severe chilling injury after 12 days at 5°C + 2 days at 20°C, whereas those showered with 55°C water for 30 seconds before storage (right) are still acceptable.

Diseases

Fusarium – *Fusarium* spp.

Postharvest infection by fusarium is usually the result of injuries or chilling stress. Sunken lesions are topped with white, downy growth on the fruit surface, and black spore development.



Grey mould – *Botrytis* spp.

Infection with botrytis often occurs during flowering. However, the fungus is unable to develop until after harvest. Brown, water-soaked lesions often develop from the blossom end, topped with soft, grey fungal growth.



Disorders

Chilling injury

Cucumbers are very chilling sensitive, with only a few days below 5°C enough to cause damage to some cultivars. Symptoms include the development of sunken pits and lesions which may or may not have a water-soaked appearance, detachment of the skin from the underlying flesh, internal flesh breakdown and increased rot development.



water-soaked pitting



sunken pitting



skin detachment

Yellowing

Yellowing is a natural symptom of senescence. It will occur more quickly at warm temperatures and is increased by exposure to low levels of ethylene (1ppm).

