

Storing & Preserving

Storing food

How to prevent spoilage

Use quickly

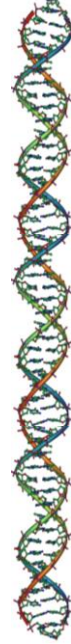
Preserving food

Early science

Trial and error



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Storage

Cold storage

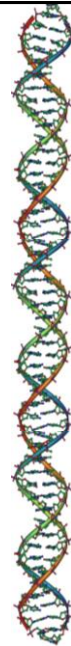
Kinetics – double every $\sim 10^{\circ}\text{C}$

Pasteurization

Vacuum



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Drying

Most “spoilage microbes” need water to survive

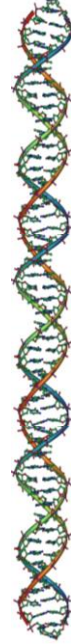
Removing water concentrates flavor

Food is slightly heated (130-160°F)

Prunes, raisins, figs, apricots



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Freeze-drying

Removes water while frozen

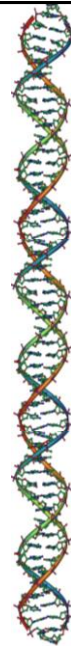
Less heat-based deterioration

Removes more water (usually)

More shelf-stable



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“Pickling”

Food is acidified

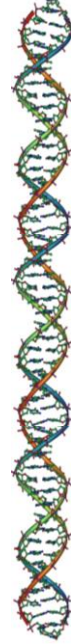
Add acid (vinegar)

Fermentation (low oxygen)

Pickles, sauerkraut, kimchi, etc



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Sugar Preserves

Too much sugar kills microbes!

Jellies and Jams:

Pectin extracted from cell walls

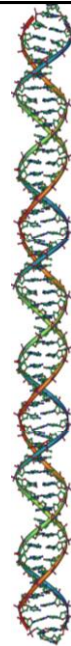
Negative charge in water

Sugar “dehydrates” solution

Acidify to allow pectin binding

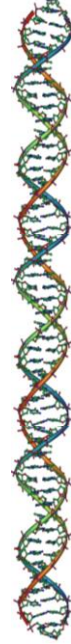


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Candied Fruits

Sugar is infused in fruit pieces
Fruit maintains more structure

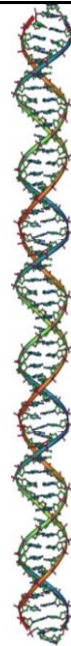


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Canning

Seal and heat
Pasteurization of shelf-stable milk
Food is cooked during canning

Safety...



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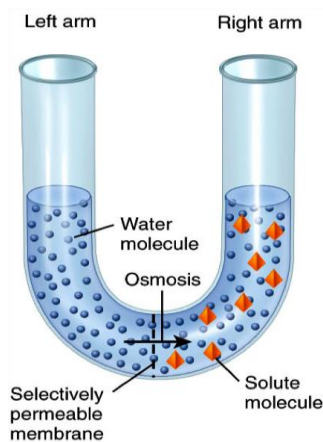
Osmosis

Transport of solvent (water) through a semipermeable membrane from areas of “low” concentration to areas of “high” concentration.



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Osmosis



(a) Starting conditions

Figure 03.08 Tortora - PAP 12/e
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Osmosis

(a) Starting conditions

(b) Equilibrium

Figure 03.08 Tortora - PAP 12/e
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Osmosis

(a) Starting conditions

(b) Equilibrium

(c) Restoring starting conditions

Figure 03.08 Tortora - PAP 12/e
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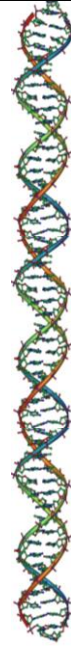
<http://www.studyblue.com/notes/note/n/cell-physiology-ii-chapter-3/deck/1069900>

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Preservation

Managing water

→ like almost ALL cooking!



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