

Preventing the ravages of time

1

The guidelines in The Good Food Handling Guide below don't make much sense because they have been mismatched. Try to make them meaningful by joining the 'heads' (in capital letters) and 'tails' (in italics) correctly.

THE GOOD FOOD HANDLING GUIDE	
1. WHEN YOU'VE BOUGHT CHILLED OR FROZEN FOOD	a. <i>keep them cool.</i>
2. KEEP HOT FOOD HOT	b. <i>and cooked food apart.</i>
3. IN THE FRIDGE STORE RAW MEAT	c. <i>beyond its 'use by' or 'best before' date.</i>
4. KEEP RAW FOOD	d. <i>and cold food cold.</i>
5. WASH CHOPPING BOARDS, KNIVES AND OTHER EQUIPMENT	e. <i>in their place.</i>
6. COOL LEFTOVERS QUICKLY AND	f. <i>get them home quickly.</i>
7. DON'T KEEP FOOD	g. <i>below food that's not going to be cooked before it's eaten.</i>
8. KEEP ALL FOOD	h. <i>after they've been used for raw food.</i>
9. KEEP PETS	i. <i>covered.</i>

Most foods are natural culture for microorganisms. The diet of modern civilized peoples consists very largely of perishable foods, that is, foods that are susceptible to deterioration by the activities of bacteria, yeasts and moulds. Collectively, these organisms have a wide variety of metabolic activities and, consequently, they affect foods in different ways.

Microorganisms contaminating foods may be saprophytic and non-pathogenic, yet they may cause chemical changes that render the food unfit for human consumption; or they may

be pathogenic and cause serious infections or poisoning when eaten. The major foodstuffs are composed of proteins, carbohydrates, and fats, all of which may be regarded as substrates in terms of microbial deterioration of foods. Certain organisms alter or destroy constituents of food by oxidation reaction, for example the vitamin C content of foods can be destroyed by this type of reaction. Plant and animal tissues themselves contain certain enzymes that bring about chemical transformation in the foodstuffs.

Foods can be preserved by a wide variety of methods, some of which date back to antiquity. All methods of food preservation are based upon one or more of the following principles: 1) prevention or removal of contamination, 2) inhibition of microbial growth and metabolism, and 3) destruction of microorganisms.

Heat is widely used to destroy organisms present in food products and to preserve food products in cans, jars, or other types of packages that restrict entrance of microorganisms after processing. Steam under pressure, or autoclaving, is the most effective method, since it can be relied upon to kill all vegetative and spore forms. Successful food preservation by heat requires a thorough knowledge of the heat-resistance of microorganisms, particularly spores.

Some foods are pasteurized, however, since this treatment does not kill all the microorganisms, it may be necessary to store these products at low temperatures.

Boiling of foods kills vegetative cells but cannot be relied upon to destroy spores. At the same time, not all foods can be preserved by high-temperature treatment without impairing their palatability or nutritional value.

Temperatures approaching 0 °C and lower impose a static condition upon microorganisms. Frozen foods are now widely used because, when properly processed and stored, they retain the palatability and nutritional properties of natural products. Quick-freeze methods, using temperatures of -32 °C or lower, are considered most satisfactory because smaller crystals of ice are formed and cell structures in the food are not disrupted. Before freezing, produce is steamed sufficiently to inactivate natural enzymes that would alter the product even at low temperatures. Freezing of

foods, no matter how low the temperature, cannot be relied upon to destroy organisms.

Dried foods have been used for centuries. Removal of water by natural drying in sun and air or with heat applied by artificial methods constitutes dehydration. The growth and multiplication of microorganisms are prevented by the lack of moisture and in some instances by the resulting increase in osmotic pressure. The preservative effect of desiccation is due mainly to a microbe-static condition imposed by lack of moisture but the microorganisms are not necessarily killed.

The antimicrobial condition imposed by increased osmotic pressure is related in principle to inhibition by desiccation. Yeasts and moulds are relatively resistant to osmotic changes, but processes of food preservation based on this principle are nevertheless very useful. Jellies and jams are rarely affected by bacterial action because of high sugar content. Condensed milk owes its resistance to microbes in part to increased concentration of lactose and supplemental sucrose. Similar results are obtained by “curing” meats and other foods in brines composed of high concentration of salts. Foods prepared by fermentation processes owe their preservative quality in part to the lactic acid produced by microorganisms. The smoking of meats imparts a degree of preservation because of the formation of cresols and other compounds which come in contact with the meat surface and penetrate sufficiently to exert a bactericidal effect. Ultraviolet radiation is used to reduce surface contamination of some foods.

Food may also be preserved by ionizing radiation. The dose of radiation may be adjusted to sterilize or to reduce the microbial population, producing a condition equivalent to pasteurization.

(from: Pelczar-Reid, *Microbiology*, McGraw-Hill)

2 Join 'heads' (a-i) and 'tails' (1-9) into a short summary of Preventing the ravages of time.

- a. Most foods we eat are perishable
 - b. Both pathogenic and non-pathogenic microorganisms
 - c. Proteins, carbohydrates and fats
 - d. To be successful in preserving food, heat treatment
 - e. Pasteurization does not kill all microorganisms in food
 - f. Freezing retains the palatability and nutritional value of foods
 - g. Dehydration, that is the removal of water from foods,
 - h. High concentrations of salt and sugar
 - i. Some foods contain chemicals
1. arrest the metabolic activities of microorganisms by increasing osmotic pressure.
 2. but it does not destroy microorganisms, it just slows their growth down.
 3. does not necessarily kill microorganisms but it prevents their growth and multiplication.
 4. may make food unfit for human consumption.
 5. must kill all bacteria and all spores as well.
 6. serve as a good medium for the growth of certain microorganisms in food.
 7. that is, they may be deteriorated by the activities of bacteria.
 8. therefore also pasteurized foods must be stored at low temperatures.
 9. which act as preservatives.

3 Match verbs a-j and synonyms 1-10. Tip: copy the pairs in your indexed book.

- | | | |
|----------------|--------------------------|----------------|
| a. affect | <input type="checkbox"/> | 1. approximate |
| b. approach | <input type="checkbox"/> | 2. avoid |
| c. bring about | <input type="checkbox"/> | 3. cause |
| d. impart | <input type="checkbox"/> | 4. damage |
| e. impair | <input type="checkbox"/> | 5. give |
| f. prevent | <input type="checkbox"/> | 6. limit |
| g. rely | <input type="checkbox"/> | 7. make |
| h. render | <input type="checkbox"/> | 8. modify |
| i. restrict | <input type="checkbox"/> | 9. remove |
| j. withdraw | <input type="checkbox"/> | 10. trust |