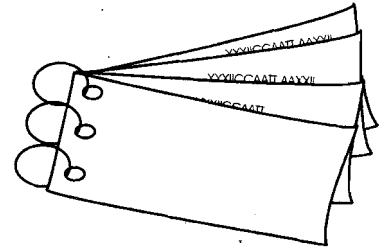


UNIT 8 CLEANING AND SANITIZING

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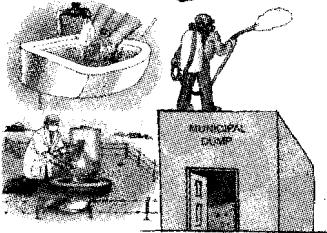
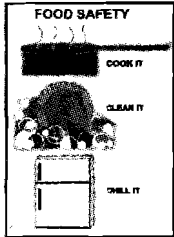
- Sanitation and hygiene of food service establishments should be achieved in terms of cleaning and disinfection.
- Sanitation is not just cleanliness, it is much more than that. A food or equipment can be free of visible dirt and still be carrying microorganisms or chemicals that can cause food-borne disease or spoilage of food.
- By cleaning we mean making free from dirt, stain or impurities. Sanitizing destroys microbes left on cleaned surfaces.

8.1 Action of Cleaning Agents

Cleaning agents have different actions such as:

- Cleaning agent (sequestering agent or sequestrant) : Chemical added to cleaning compounds to prevent salts of calcium and magnesium in hard water from forming deposits on equipment surfaces.
- Emulsification : Breakdown of fat and oil drops into smaller droplets which are dispersed in the cleaning solution. The soil is still there but the particles are smaller and are dispersed in the solution rather than settling on the surface.
- Rinsibility : Ability of a cleaning compound to be removed from a surface without leaving a residue.

- **Surfactant** : A complex molecule that is blended with a cleaning compound to reduce the energy of the bonds around the soil and allow closer contact between the soil and cleaning compound.
- **Wetting (Penetration)** : Caused by a surfactant that allows the cleaning compound to wet or penetrate the soil deposit and loosen it from the surface.
- **Suspension** : The process of loosening, lifting and holding soil particles in solution.
- **Water hardness** : Amount of inorganic salts (such as calcium chloride, magnesium chloride, sulphates and bicarbonates) in water.
- **Water softening** : Removes or inactivates calcium and magnesium ions in water.



8.2 Types of Cleaning Agents

- Most cleaning agents used in the food industry are blended products. Manufacturers combine ingredients to make a specific product for a particular type of surface or dirt.
- The following types of cleaning agents are used most often in food service facilities and processing plants:

Cleaning Agent	Effects
1. Alkaline Cleaning Solutions	<p><i>Strongly alkaline:</i> Cleaners have strong dissolving powers, very corrosive; in combination with silicates effective, in fact better at penetrating soil and rinsing away soil; useful for heavy soils in commercial ovens, smokehouses; not good at removing mineral deposit.</p> <p><i>Heavy-duty alkaline cleaners:</i> Moderate dissolving powers; slightly corrosive or not corrosive at all; often used for cleaning in place or high pressure or other mechanized systems; very good at removing fats but not removing mineral deposits.</p> <p><i>Mild alkaline cleaners:</i> Used to clean lightly soiled areas by hand; good at softening water but not removing mineral deposits.</p>

2. Acid Cleaning Agents	Remove materials dried on or encrusted on surfaces and dissolve mineral scale; especially good at removing mineral deposits; inorganic acids can be very corrosive to surfaces and irritating to skin; less effective than alkaline ones against soil caused by fats, oil, protein.
3. Solvent	Based on ether or alcohol; work well in removing lubricating oils and greases; may be mixed with wetting agents, water softeners and other additives.
4. Soaps and Detergents	Emulsifying fats, oils and grease so that they are easily washed away; usually contain chemical builders to make them clean more effectively.

8.3 Choosing a Cleaning Agent

'Like cleans Like'. An acid soil requires an acid cleaner while an alkaline cleaning agent works best to remove alkaline soil. Alkaline, general-purpose cleaning agents work best for heavy deposits of fats and proteins (organic soil); acid cleaning agents remove mineral deposits (inorganic soil) and other soils that are not removed by alkaline cleaning compounds. Phosphates complexed with organic chlorine are the most common types of cleaner-sanitizers.

8.4 Sanitizing

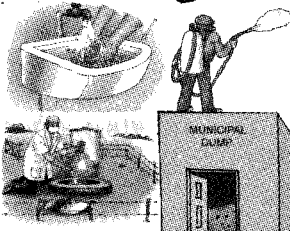
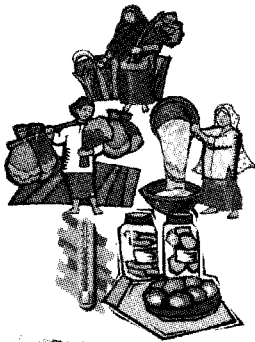
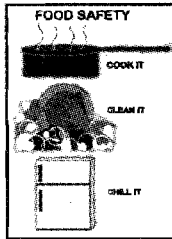
- Sanitation is an applied science and relates physical, chemical, biological and microbial principles to food, the environment and health.
- Sanitary practices and hygienic conditions are becoming more and more important because food is being processed, prepared and sold in larger volumes than before. Some microorganisms cause food spoilage and food-borne illness, but others are beneficial in food processing and preparation.
- A sanitation programme is a planned way of practicing sanitation. The benefits of a food sanitation programme include the following:
 - Compliance with statutory regulations;
 - Preventing food-borne illness outbreaks;
 - Improving quality and shelf life of foods;
 - Reducing energy and maintenance costs; and
 - Increasing quality and confidence.

- Sanitizing must follow cleaning. If the surface is still dirty, the soil protects microbes from sanitizing agents.

8.5 Types of Sanitizers

Heat, radiations, chemicals are a few sanitizers used in the food industry. Details of major sanitizers are provided in the following table:

Sanitizer	Description
1. Heat	Steam, hot water most common; steam expensive; time-temperature relationships must be considered – longer time at lower temperatures say 82°C, short time at 100°C or steam.
2. Radiation	Ultraviolet light, cathode or gamma rays destroy microorganisms; rays must actually hit microbes so kills only nearby microbes; some bacteria more resistant to radiation; dust, grease and opaque solutions absorb radiation and prevent killing of microbes.
3. Chemicals	Use of various chemical sanitizers for different areas and types of equipment; effectiveness depends on exposure time, temperature, concentration, pH; cleanliness of surface to be sanitized; water hardness.



Chemical Sanitizers

The major types of chemical sanitizers include chlorine sanitizers, iodine compounds, quaternary ammonium compounds.

1. Chlorine Sanitizers Kill all types of vegetative cells except spores; easily available as liquid or granules; not affected by hard water; usually cheap. However, their disadvantages include their instability to heat, organic soil and light sensitivity corrode stainless steel and other metals and therefore they can be kept in contact with food handling equipment only for a short time.
2. Iodine Compounds Very good hand sanitizer and hand-dipping agent — does not irritate skin; solution loses iodine during storage and use and therefore hygiene personnel should check and adjust strength of iodine solutions before use.

However, their disadvantages include their higher cost, possibility of their causing off flavours in some food products; vaporizing at approximately 50°C; sensitivity to pH changes.

3. Quaternary
Ammonium
Compounds (Quats)

Good for cleaning and sanitizing floors, walls, furnishings and equipment; especially good at penetrating porous substances; natural wetting agents also working as detergents; form a bacteriostatic film over surfaces— in other words they have some residual action and are better at killing some bacteria than other sanitizers; work better on soiled surfaces than chlorine or iodine sanitizers.

Not corrosive, stable when heated, non-irritating for skin, no taste or odour when properly diluted; work at high pH, effective against moulds.

Do not work so well against certain bacteria; react with anionic type synthetic detergents.

Key Terms

Detergent: A substance which assists in cleaning when added to water.

Disinfectant/Sanitizer: A chemical substance which is capable of killing microorganisms.

Sanitizers: A chemical which is used to reduce the bacterial count, including pathogens to a safe level on cleaned food-contact surfaces of utensils and equipment.

Sequestrant: A chemical substance which is added to the cleaning compounds to prevent the salts of calcium and magnesium in hard water from forming deposits on equipment surfaces.

Surfactants: Agents that help to spread cleaning or sanitizing compounds and the surface to be cleaned.

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