

Control of microbial growth

Effectuated in two basic ways:

- Killing microorganisms and Inhibiting microbial growth

Involves the use of: Physical/Chemical agents that kill or prevent growth

Principles of microbial control

- **Prevention** → Control of growth to prevent infection
- **Sterilization** → Complete destruction
 - No 'levels' of sterilization → **All or Nothing**
 - Utilizes; Heat, Radiation, Some chemicals and Physical removal

Disinfection → reducing growth on non-living surfaces

- (Organic matter interferes with heat treatments and chemical control agents)

Antisepsis → reducing growth on living tissue

Physical Methods

Heat	Most frequent and widely used 1. Type of heat 2. Time of Application 3. Temperature Moist & Heat (Boiling / Autoclaves) - denatures enzymes, kill most vegetative cells and inactivates viruses within 10 min 121°C for 30 minutes will kill nearly all microbes Prions may not be destroyed at the typical 134°C for 3 min Thermal Death Point (TDP) - lowest temperature to kill all the bacteria in a broth in 10 Minutes Thermal Death Time (TDT) - time required to kill all the bacteria in a broth at a given temperature Decimal Reduction Time (DRT) - length of time in which 90% of a bacterial population will be killed at a given temperature
	Autoclaving - Steam under pressure - 121° C for 30 min at 15 lb/in² - Heat-labile substances will be denatured - Steam must contact the material
	Dry heat sterilization - Direct flaming Typical temperatures of Bunsen burner flame: 1,300 to 1,600 °C - Incineration - Hot-air sterilization (Oven)
Filtration	- The passage of a liquid or gas through a filter with pores small enough to retain microbes - Especially important to sterilize solutions which would be denatured by heat (antibiotics, injectable drugs, amino acids, vitamins)
	Ultra-High-Temperature (UHT) 140°C for 3 seconds - Shelf life - Some nutritional loss can occur in UHT milk (folate, some B vitamins, vitamin C)
	Pasteurization - High temperature for a short time - Batch method 63°C for 30 min - Flash method 72°C for 15 s