

# Reproduction of Bacteria

- ✓ Reproduction in optimum media and environmental conditions
- ✓ Reproduction is limited on laboratory conditions
- ✓ Changing of optimum conditions (pH, osmotic pressure, oxygen, surface tension, accumulation of toxic metabolites)
- ✓ *Escherichia coli* schizogenous in every 20 mins
- ✓ Reaches  $2^{14}$  cells in 48 hours
- ✓ Cocci are schizogeneses in the middle; basils and spirals schizogeneses in short axis

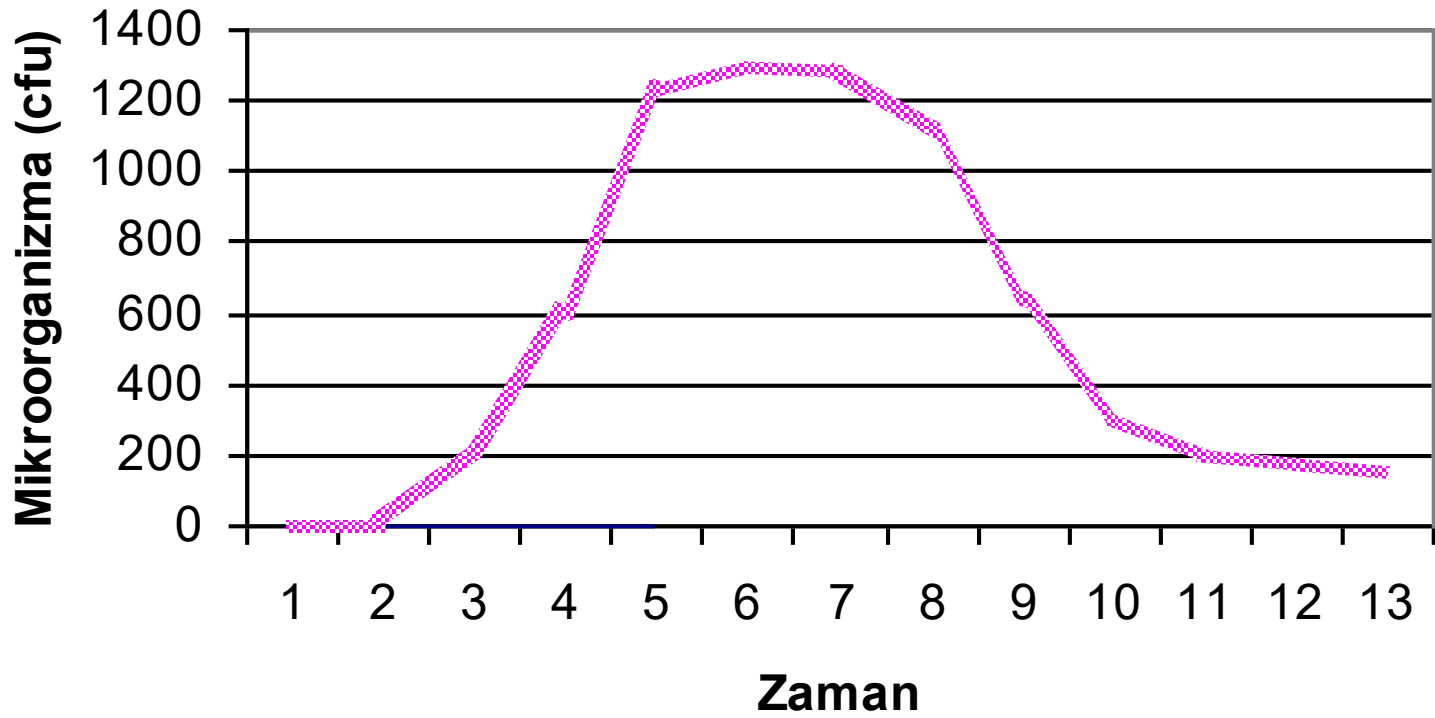
## Growing in liquid media

- ✓ logarithmic growth
- ✓ Generation
- ✓ Time of generation
- ✓ *In E. coli* 18-20 mins, in *S. aureus*'da 27-30 mins, in *M. tuberculosis*' around 792-793 mins

## Growing in liquid media

- ✓ a) Latent period
- ✓ b) Growth period (logarithmic period)
- ✓ c) Standstill period
- ✓ d) Dying period

## Bakteriyel Üreme



## Growing in agar medium

- ✓ Growing is restricted than liquid media
- ✓ Nutrients can't pass to upper of colonies with diffusion
- ✓ Decrease of the nutrients under the colonies
- ✓ Nutrients Located far from colony can't reach to colony
- ✓ Metabolic waste can't thrown out of the colonies
- ✓ Degeneration of bacteria located upper of the colony because of malnutrition
- ✓ Decreases of feeding areas due to contraction of the surrounding colonies
- ✓ Cell degeneration in the bottom of the colony due to pressure
- ✓ Agar surface spread of toxic substances from under the colony
- ✓ No free growth of bacteria in the colony
- ✓ It is hard to diffusion of nutrients in agar medium
- ✓ Water loss, drying and deterioration of diffusion in media due to temperature

# The factors on reproduction of bacteria

- Physical Factors
- Chemical Factors
- Biological Factors
- Mechanic Factors

# The factors on reproduction of bacteria

## ■ Physical Factors

### Temperature (Hot - Cold)

- psychrophilic bacteria (-5 and 20 °C)
- mesophilic bacteria (20 and 45 °C)
- thermophilic bacteria (50 and 60 °C)

- Radiation (ionizing radiation - non-ionizing radiation) (UV, infrared, Ultrasonic waves, X-rays, Gama rays)
- Surface tension
- Osmotic pressure (hypotonic-isotonic- hypertonic)
- Hydrostatic pressure
- Damp
- Electirc (+: cathode; -: anode)

# The factors on reproduction of bacteria

- Chemical Factors
  - Affect of oxygen
    - Aerobic
    - Facultative
    - Anaerobic
    - Microaerophilic
    - Aerotolerant
  - Redox Potential
  - pH (0-7-14)



# The factors on reproduction of bacteria

- Biological Factors
- Resident microflora and bakteriocins (colicins)
  
- Mechanic Factors
  - Rinsing
  - Filtration
  - Santrifigation
  - Vibration