

## Ex # 34, p 96-97

### Role of Temperature in the Growth of Bacteria

#### Additional references:

- Textbook
  - a. Ch 6, p 160-162
  - b. Ch 7, p 194-195

#### Terms:

Maximum growth temperature

Mesophiles

Minimum growth temperature

Optimum growth temperature

Psychrophiles

Psychrotrophic

Saprophytes; saprophytic (obtains nutrients from dead organic matter)

Thermophiles

Bacteria	Notes
<i>Bacillus stearothermophilus</i>	Thermophile, growth at 55 C
<i>Escherichia coli</i>	Mesophile, growth at 37 C
<i>Micrococcus cryophilus</i>	<ul style="list-style-type: none"><li>• Psychrophile, growth at 4 C</li><li>• Gram positive, spherical, non-motile</li><li>• Wax esters in membrane</li><li>• Membrane contains heat-modifiable proteins</li><li>• Responds to chilling from 20 to 0 C by changing the chemistry of its fatty acids</li><li>• Found in frozen meat products</li></ul>
<i>Serratia marcescens</i>	<ul style="list-style-type: none"><li>• Mesophile, growth at RT</li><li>• Gram negative, rods, motile</li><li>• Produces red pigment at RT (prodigiosin)</li><li>• Occurs naturally in soil, water and intestines</li><li>• Grows on bread stored in damp place, observe in shower stalls, bathtubs, toilets, pet water dishes</li><li>• Opportunistic bacteria, a major cause of nosocomial infections, associated with urinary &amp; respiratory tract infections, endocarditis, osteomyelitis, septicemia, wound infections, eye infections, meningitis</li><li>• Airborne transmission</li></ul>

**Minimum, maximum and optimum temperature for growth of certain bacteria and archaea.**

**Temperature for growth (degrees C)**

<b>Bacterium</b>	<b>Minimum</b>	<b>Optimum</b>	<b>Maximum</b>
<i>Listeria monocytogenes</i>	1	30-37	45
<i>Vibrio marinus</i>	4	15	30
<i>Pseudomonas maltophilia</i>	4	35	41
<i>Thiobacillus novellus</i>	5	25-30	42
<i>Staphylococcus aureus</i>	10	30-37	45
<i>Escherichia coli</i>	10	37	45
<i>Clostridium kluyveri</i>	19	35	37
<i>Streptococcus pyogenes</i>	20	37	40
<i>Streptococcus pneumoniae</i>	25	37	42
<i>Bacillus flavothermus</i>	30	60	72
<i>Thermus aquaticus</i>	40	70-72	79
<i>Methanococcus jannaschii</i>	60	85	90
<i>Sulfolobus acidocaldarius</i>	70	75-85	90
<i>Pyrobacterium Brockii</i>	80	102-105	115