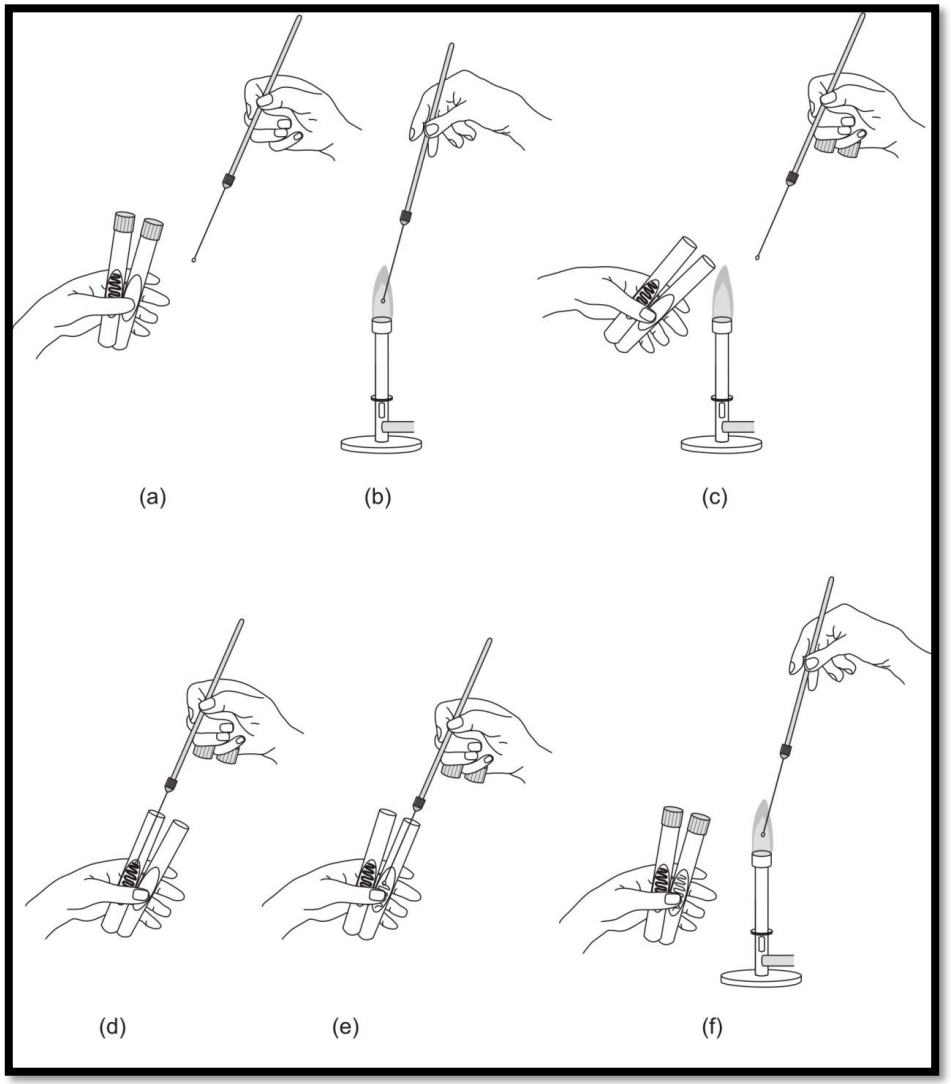
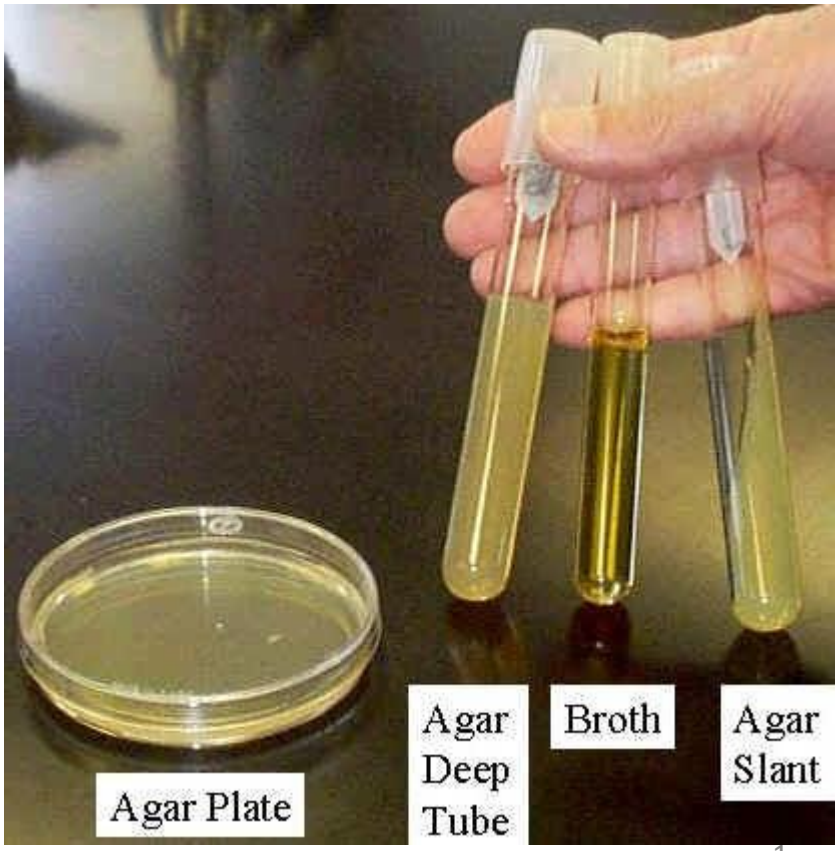
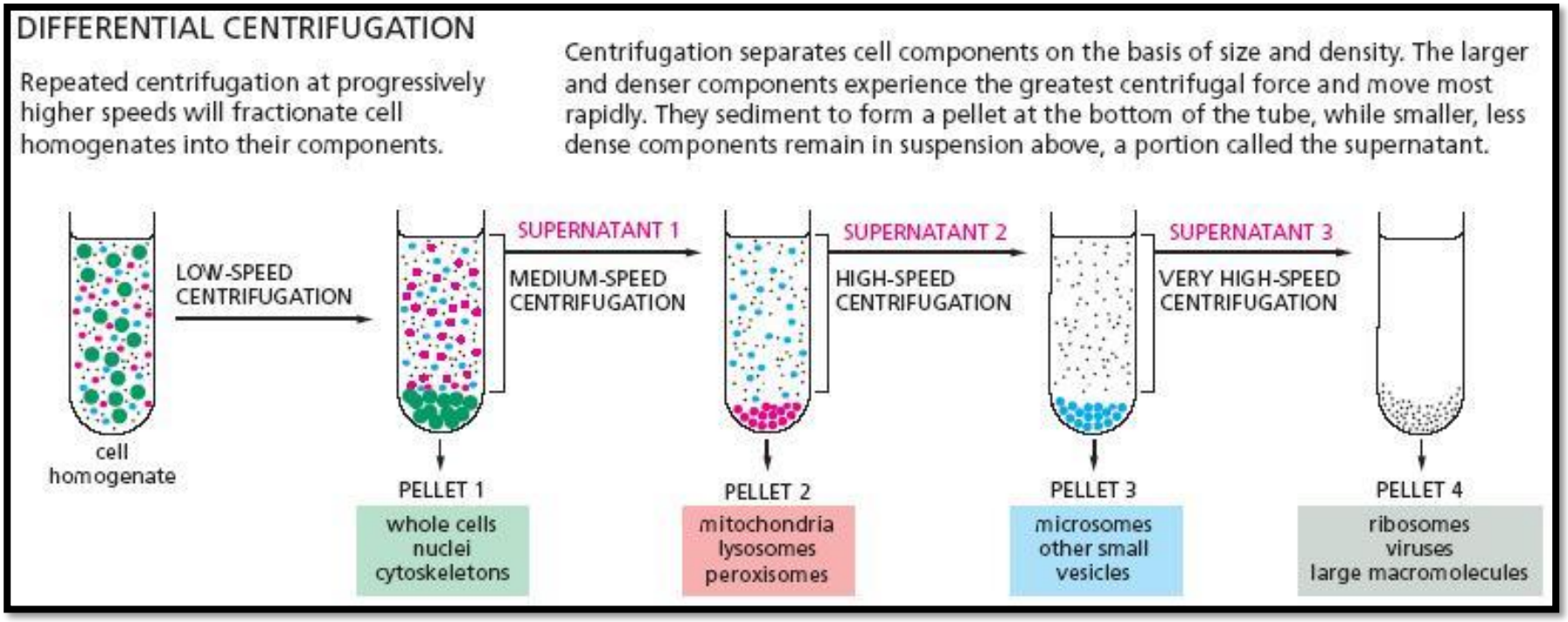
Growth media - Inoculation

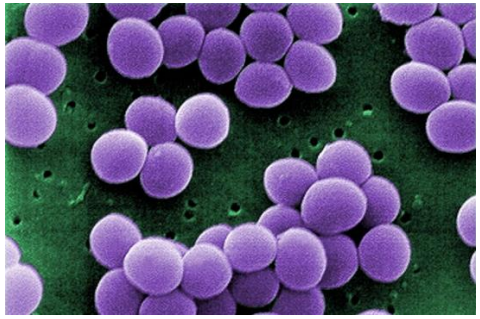




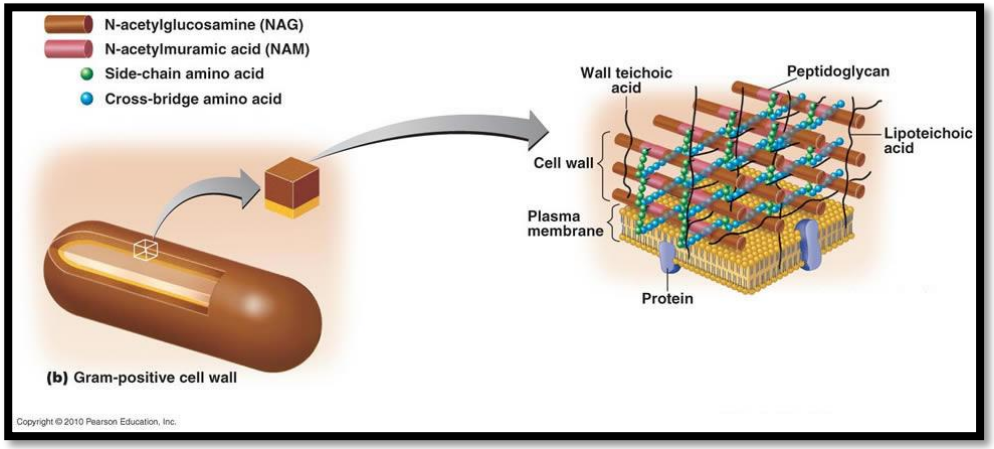
Growth media - Inoculation

Centrifugation





Cell lysis


N-acetylglucosamine (NAG)
N-acetylmuramic acid (NAM)
Side-chain amino acid
Cross-bridge amino acid
Wall teichoic acid
Peptidoglycan
Lipoteichoic acid
Cell wall
Plasma membrane
Protein
(b) Gram-positive cell wall
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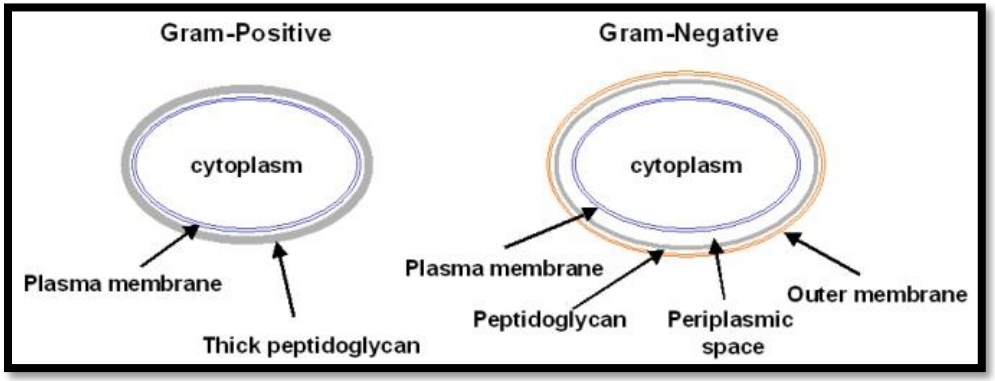
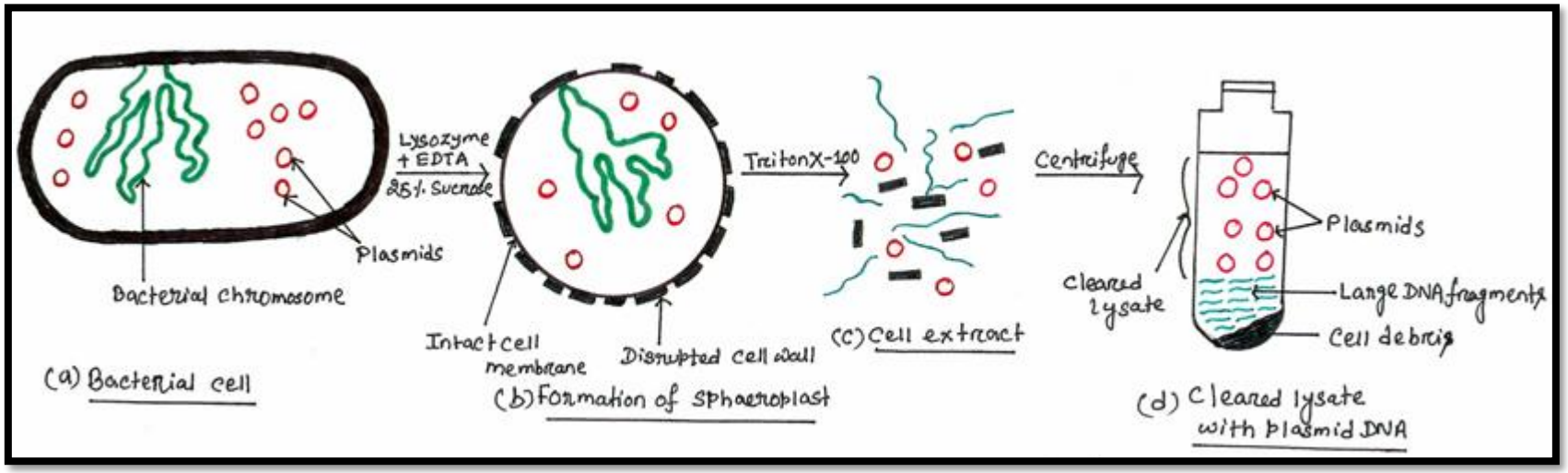
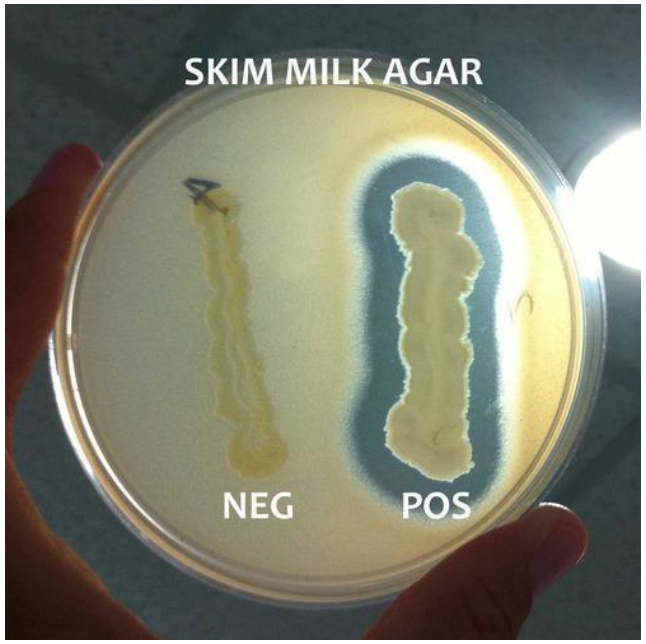
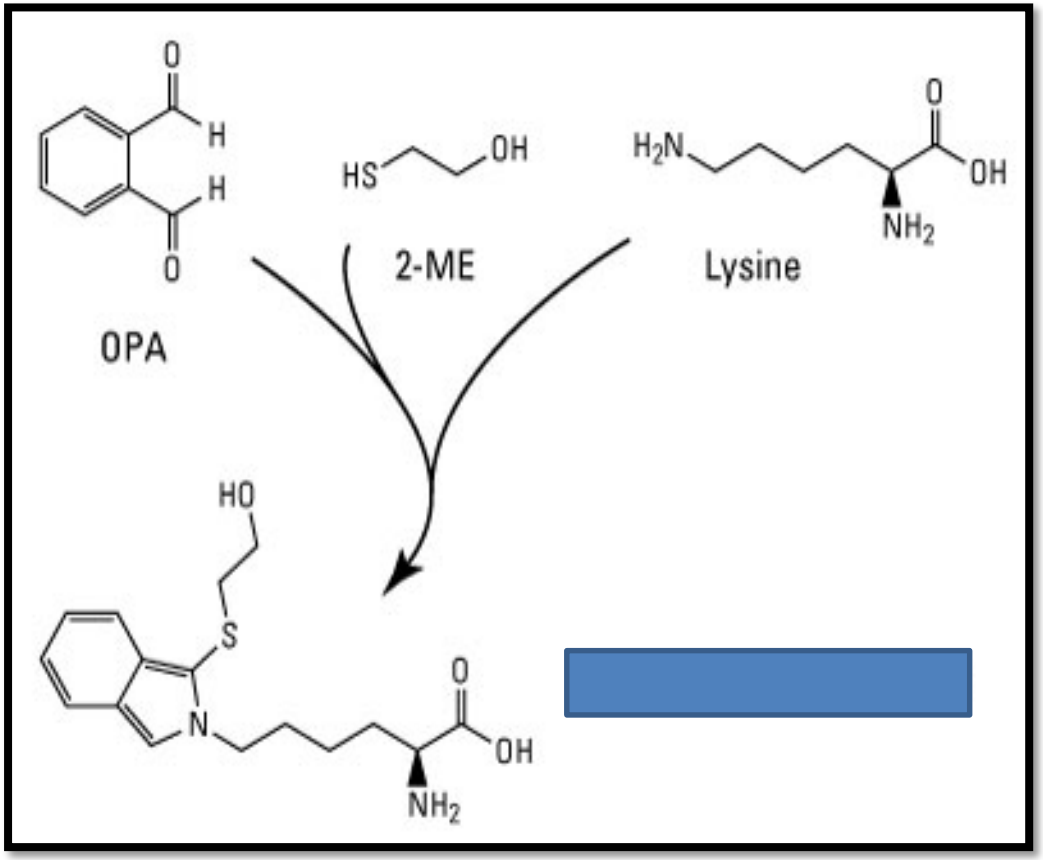
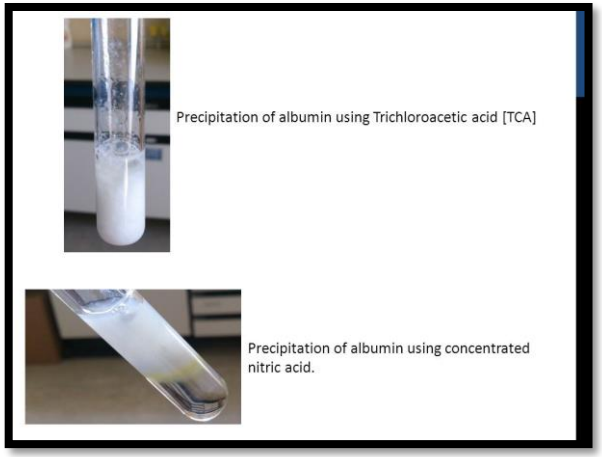

Gram-Positive
Gram-Negative
cytoplasm
cytoplasm
Plasma membrane
Thick peptidoglycan
Plasma membrane
Peptidoglycan
Periplasmic space
Outer membrane

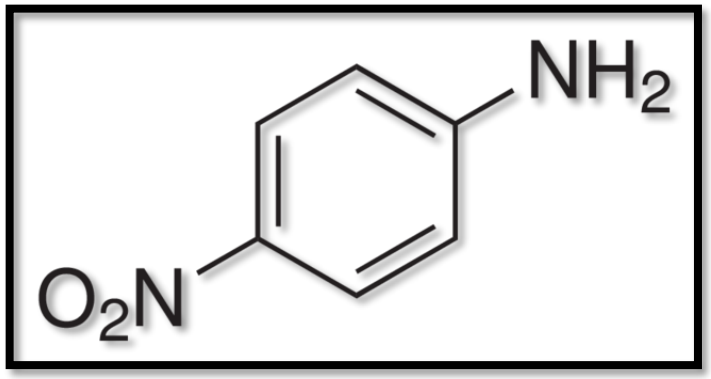

Lysozyme + EDTA
25% Sucrose
TritonX-100
Centrifuge
Plasmids
Bacterial chromosome
Intact cell membrane
Disrupted cell wall
(a) Bacterial cell
(b) Formation of Sphaeroplast
(c) Cell extract
Cleared lysate
Plasmids
Large DNA fragments
Cell debris
(d) Cleared lysate with plasmid DNA



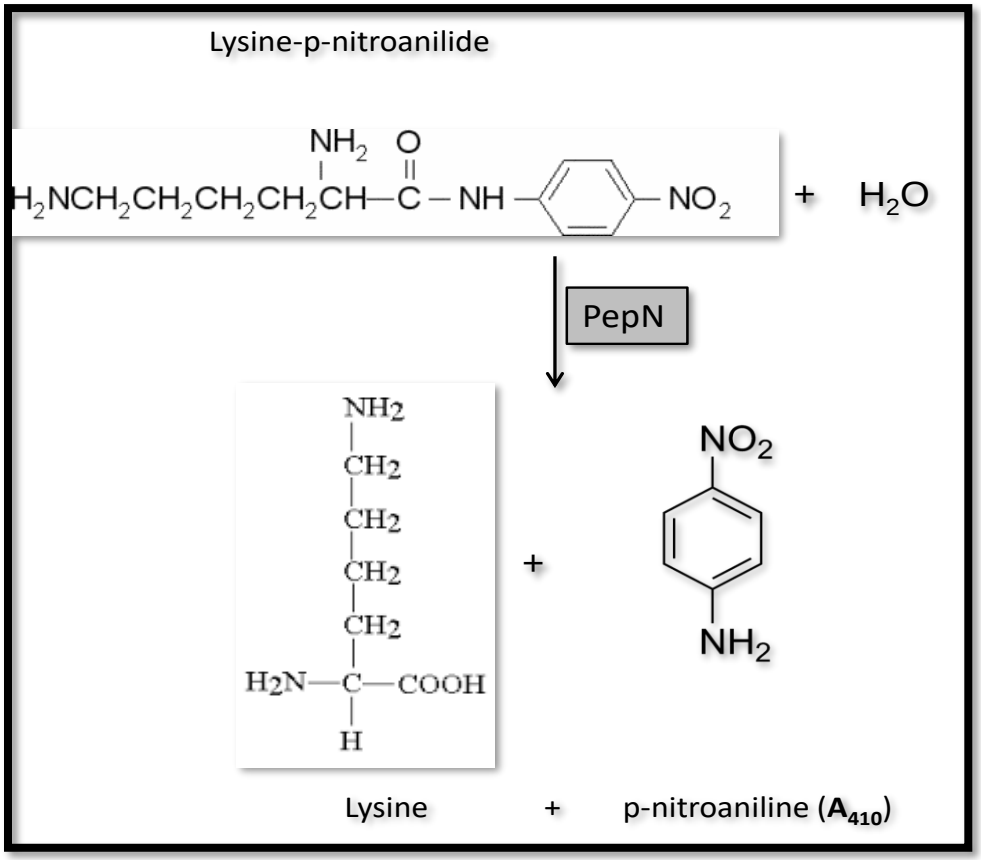
Proteolytic activity



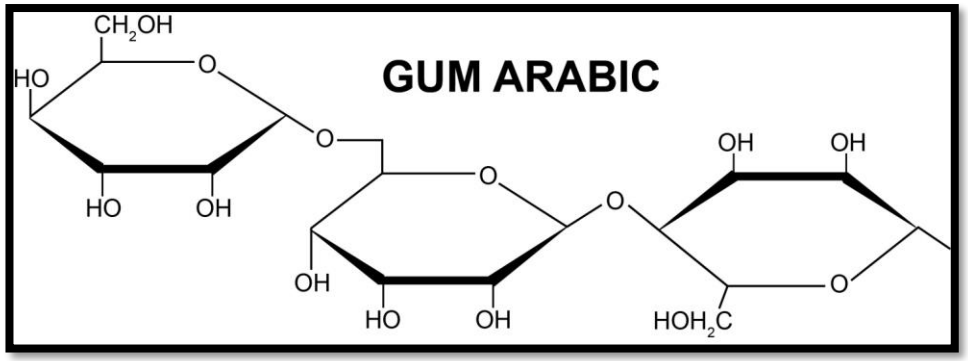


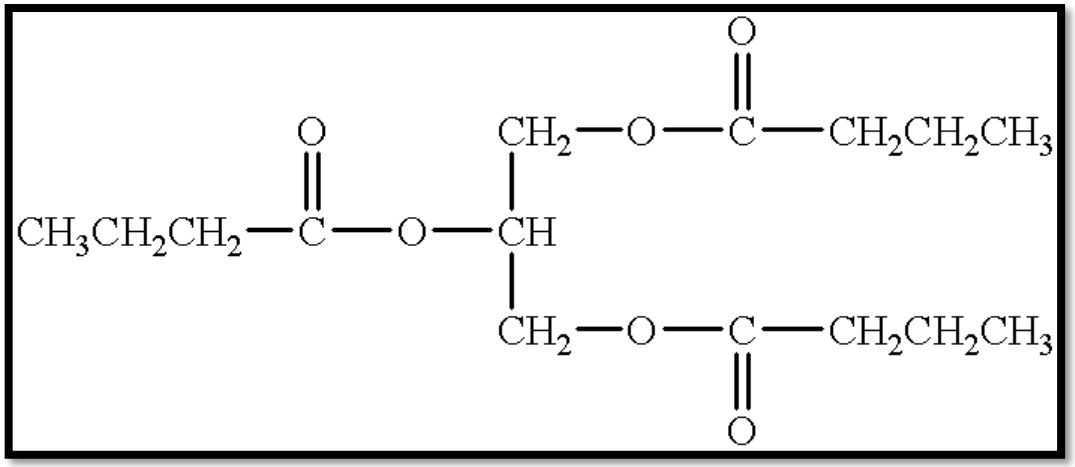


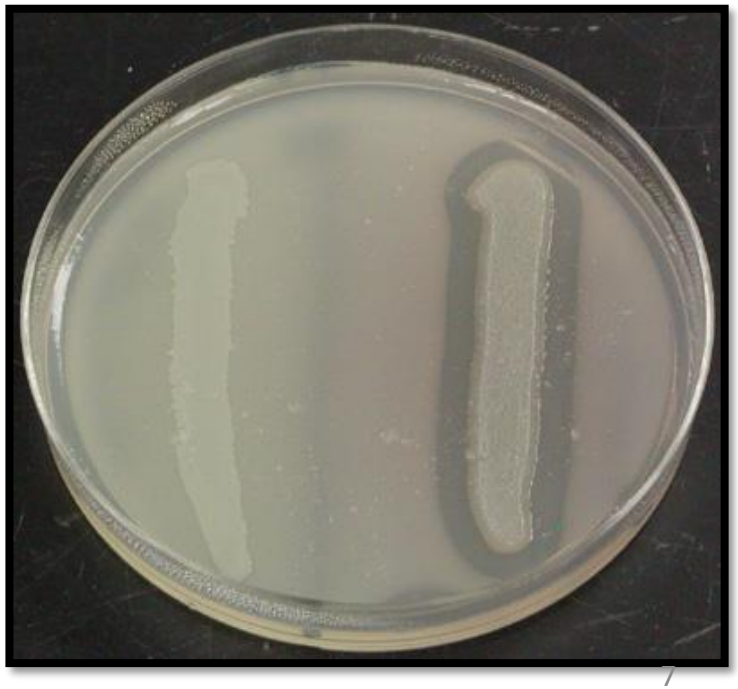
Peptidolytic activity



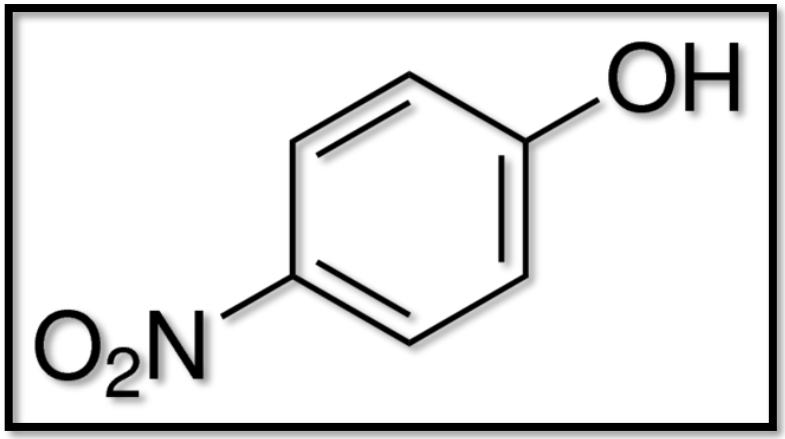
Lipolytic activity

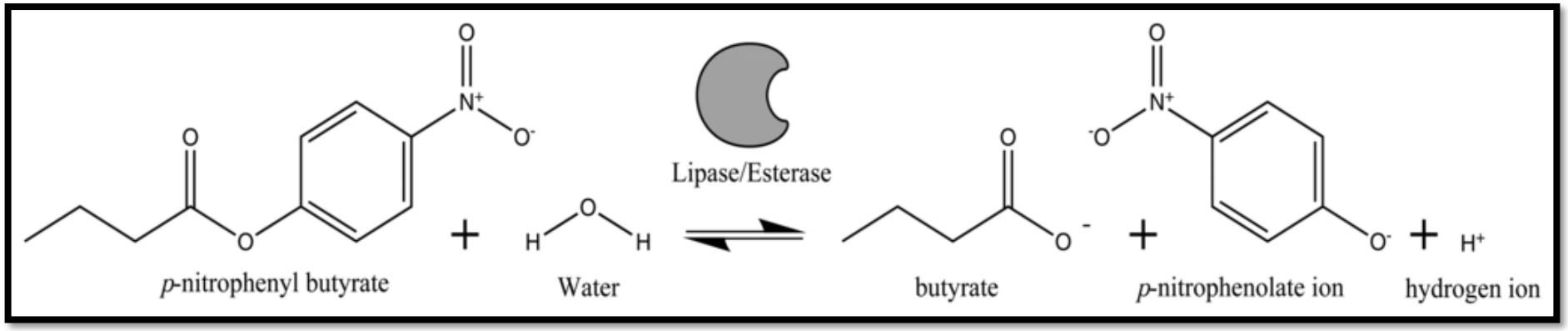


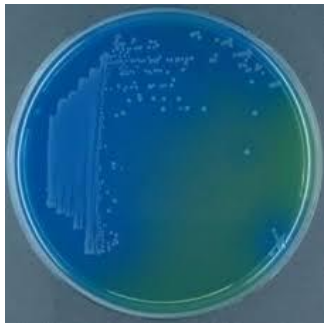




Esterolytic activity

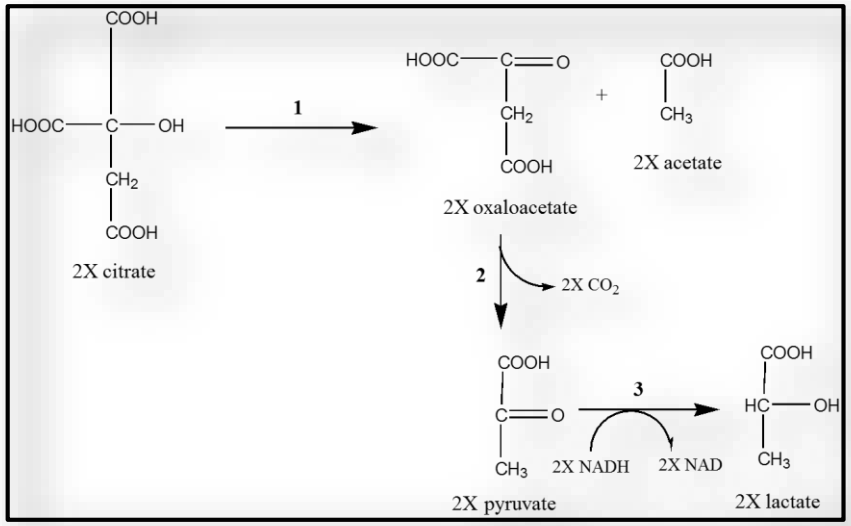


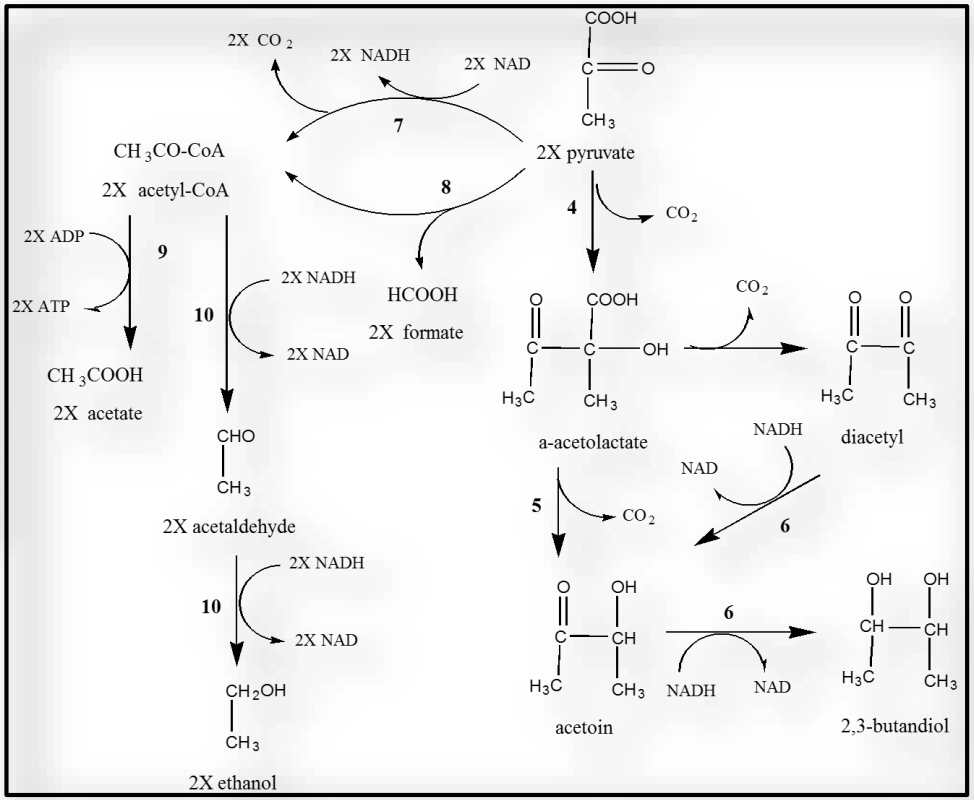




Citrate catabolism
(Simmons Citrate Agar)

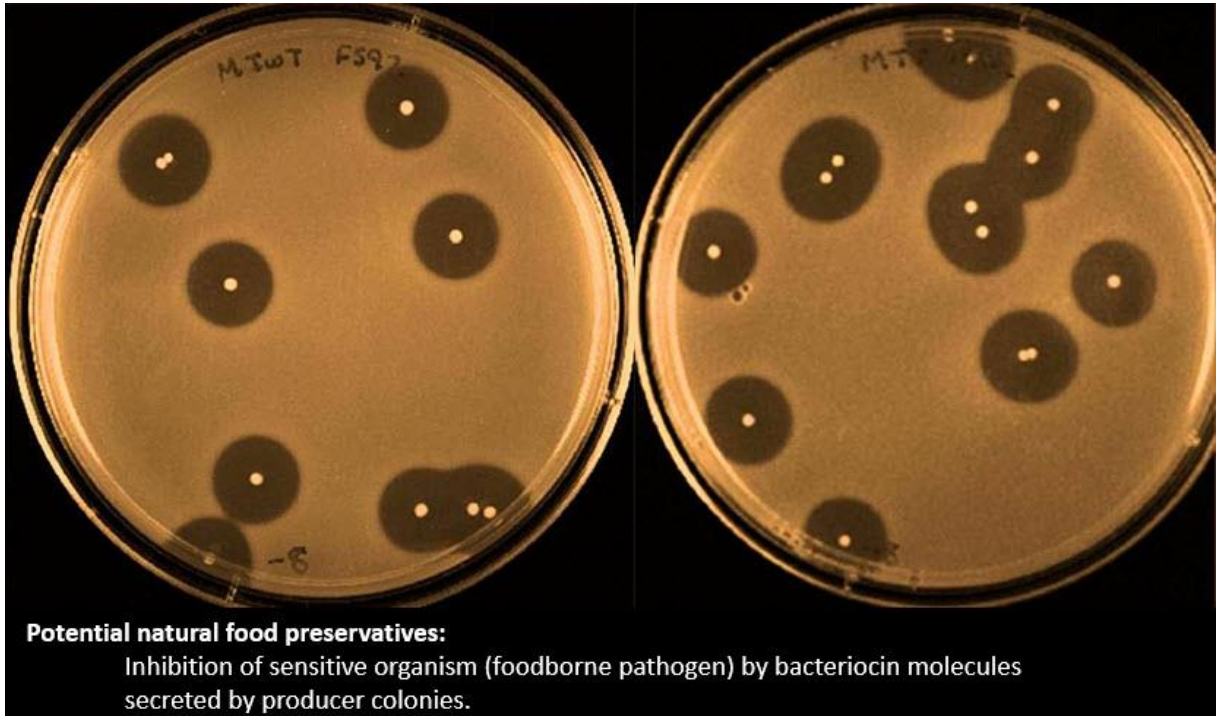
Indicator	Acid	Neutral	Alkali
Bromthymol blue	yellow	green	blue





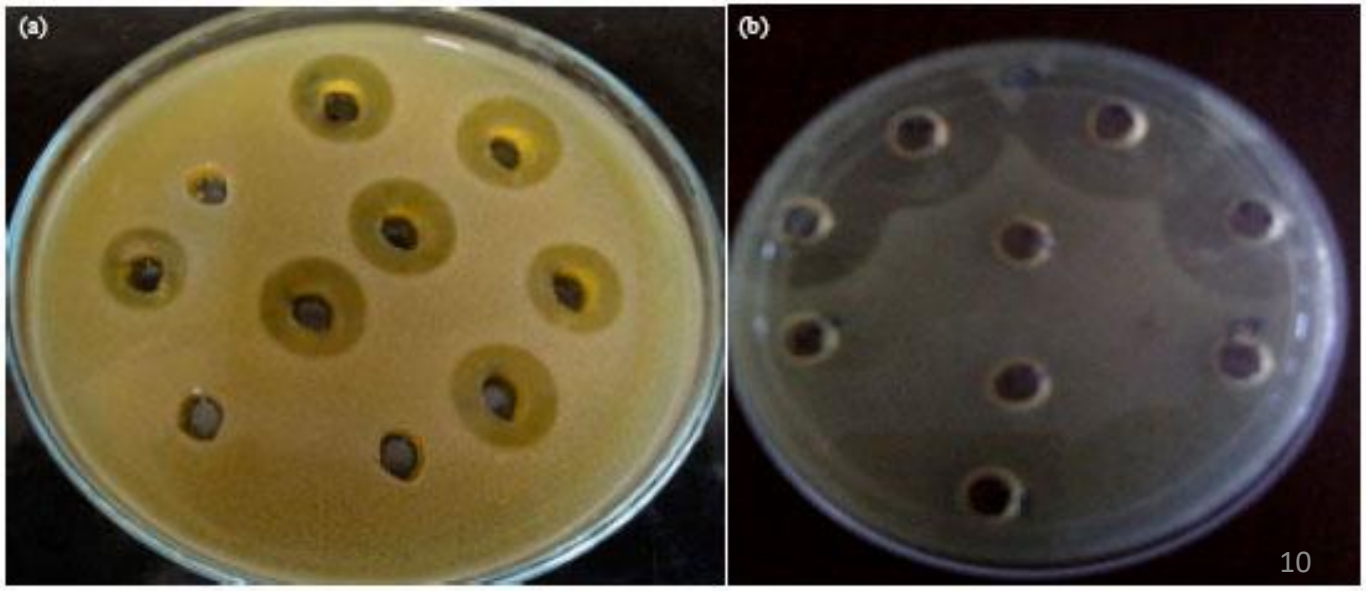
Acid	pKα
Citrate	3.1, 4.7, and 6.4
Acetate	4.54
Formate	4.27

Bacteriocins

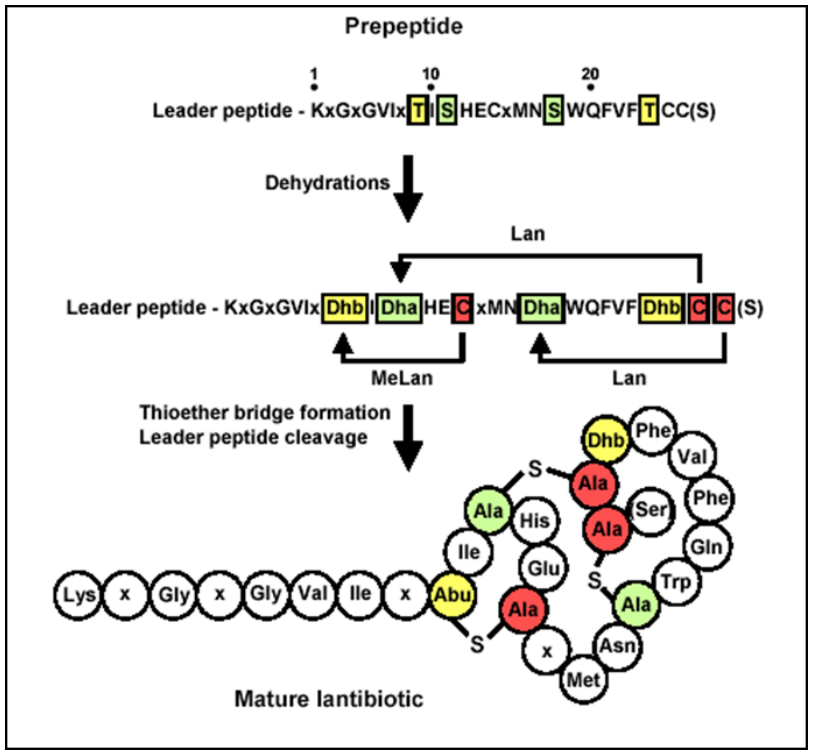


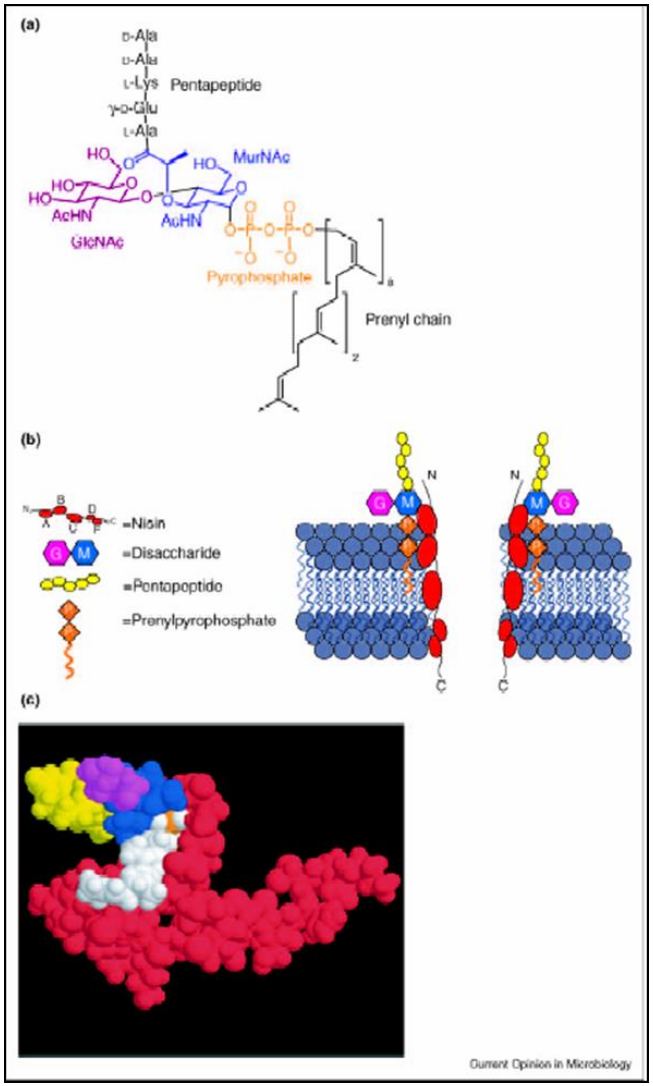
Potential natural food preservatives:

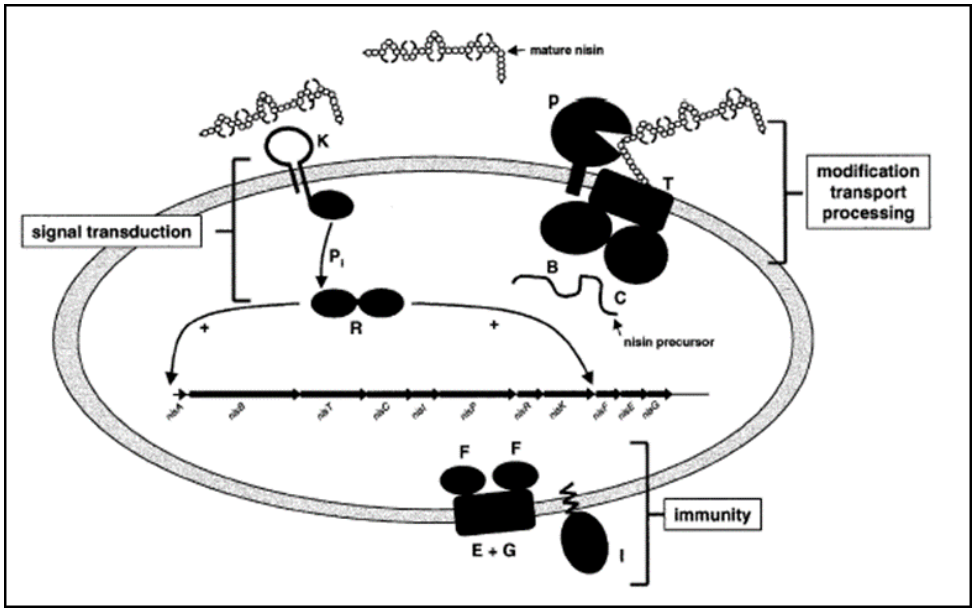
Inhibition of sensitive organism (foodborne pathogen) by bacteriocin molecules secreted by producer colonies.



Bacteriocins

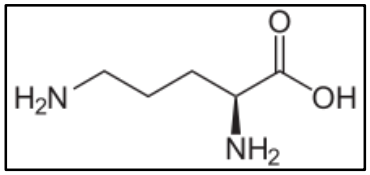


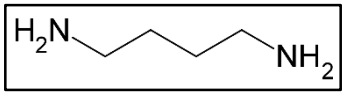




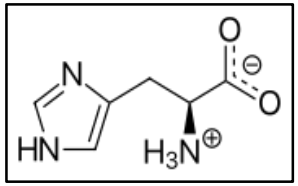
Biogenic amines

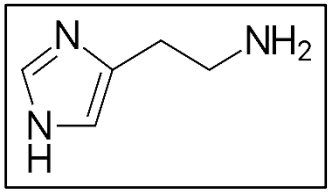
Indicator	Bromocresol purple
pH	5.2 – 6.8
Acid	Yellow
Alkali	Purple



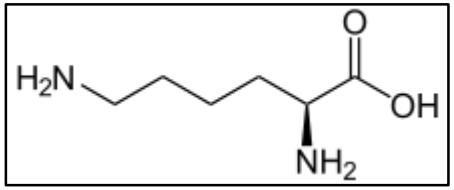


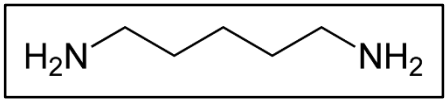
Ornithine to Putrescin



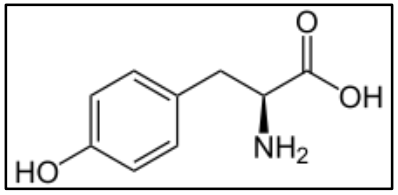


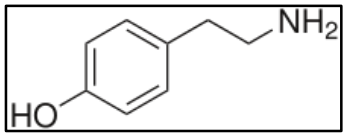
Histidine to Histamine





Lysine to Cadaverine





Tyrosine to Tyramine