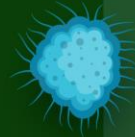


# ***MICROBES IN HUMAN WELFARE - L 1***



**BOTANY**

**PANKHURI MA'AM**

**FREE FOR 14 DAYS!**





**ANOOP SIR**  
CHEMISTRY

**PUSHPENDU SIR**  
ZOOLOGY

**MRINAL SIR**  
PHYSICS

**PANKHURI MA'AM**  
BOTANY

**AKASH SIR**  
PHYSICS

**SACHIN SIR**  
ZOOLOGY

**MISSION  
MBBS**

**BIO की  
रण NEETi**

**CHEMISTRY  
SUPER 30**

**PHY की  
रण NEETi**

**MON - SAT | 12 PM - 8 PM**



Aakash **Live** Webinars



# 6 Months NEET Strategy till May 2023



**20<sup>th</sup> November, 2022**



**12:30 pm**



**Dr. Sachin Kapur**  
Biology Expert - NEET

# ANTHE

AAKASH NATIONAL TALENT HUNT EXAM

— **Your Gateway To Success** —

**For Class VII to XII**

Current Students & Passouts



**FREE**

# SMART PLAYLIST

---

## FREE NEET RESOURCES

### MISSION MBBS 2023 & 2024



ALL YOUTUBE LECTURES



ANNOTATED SESSION NOTES



DAILY PRACTICE QUESTION & ANSWERS



**LINK IN  
DESCRIPTION**



**NEET**

**STUDENTS'  
SURVEY**

 **LINK IN  
DESCRIPTION**





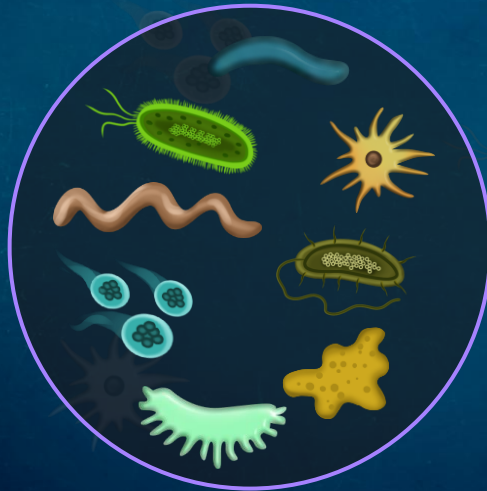
<https://t.me/neetaakashdigital>





# Microbes

**Microbes** are tiny living organisms that cannot be seen with the naked eye



# Microbes



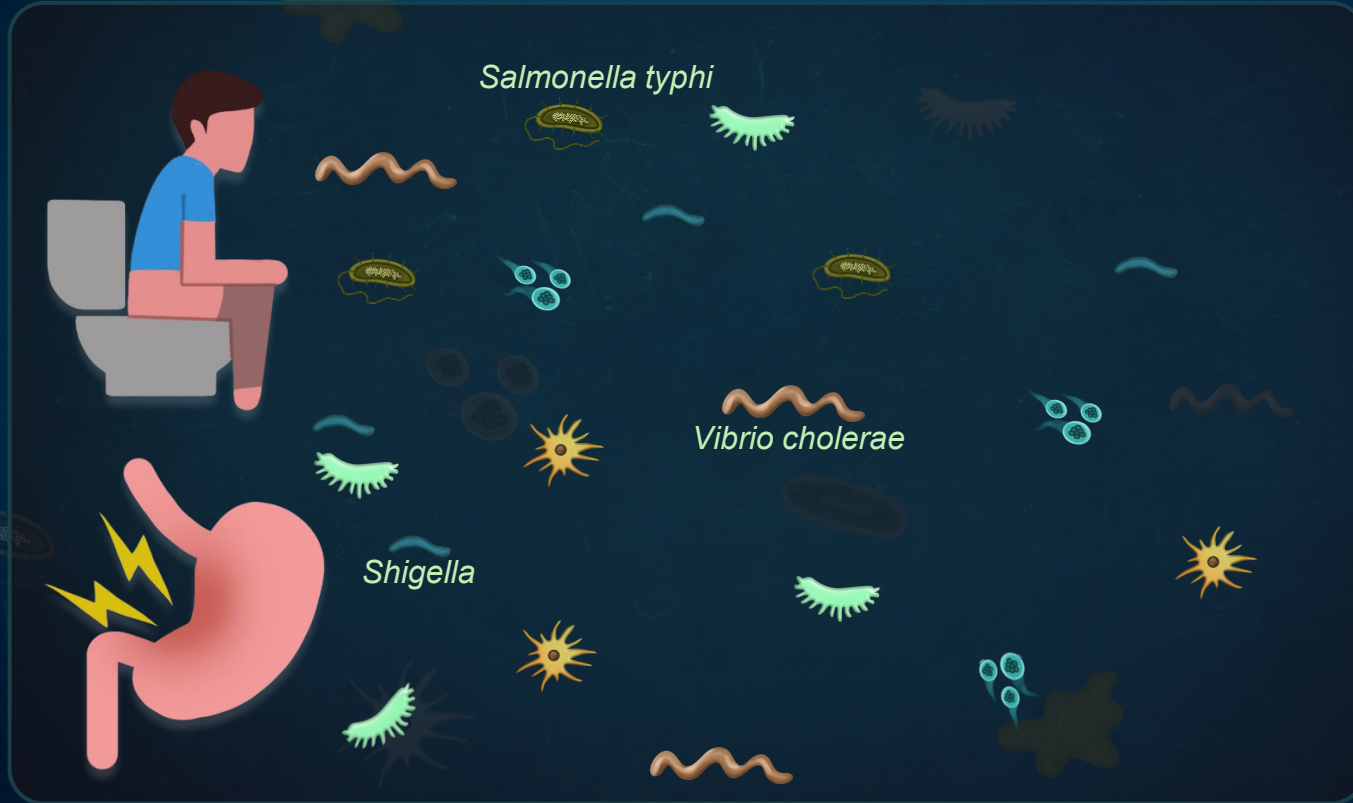
Microscope

10X

100X



# Do all microbes make us sick?



# Microbes In Human Welfare

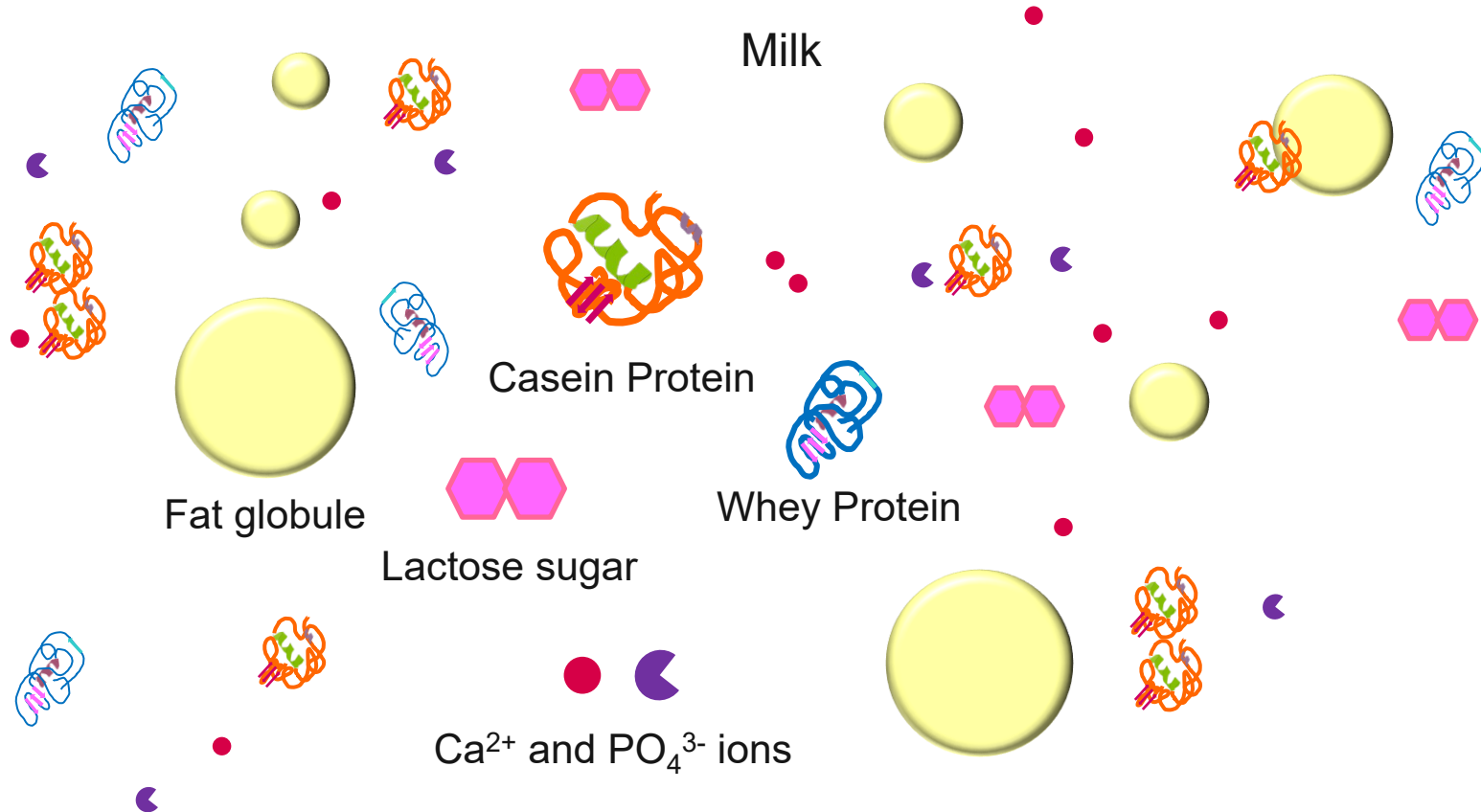
# Curd



*Lactobacillus bacteria*

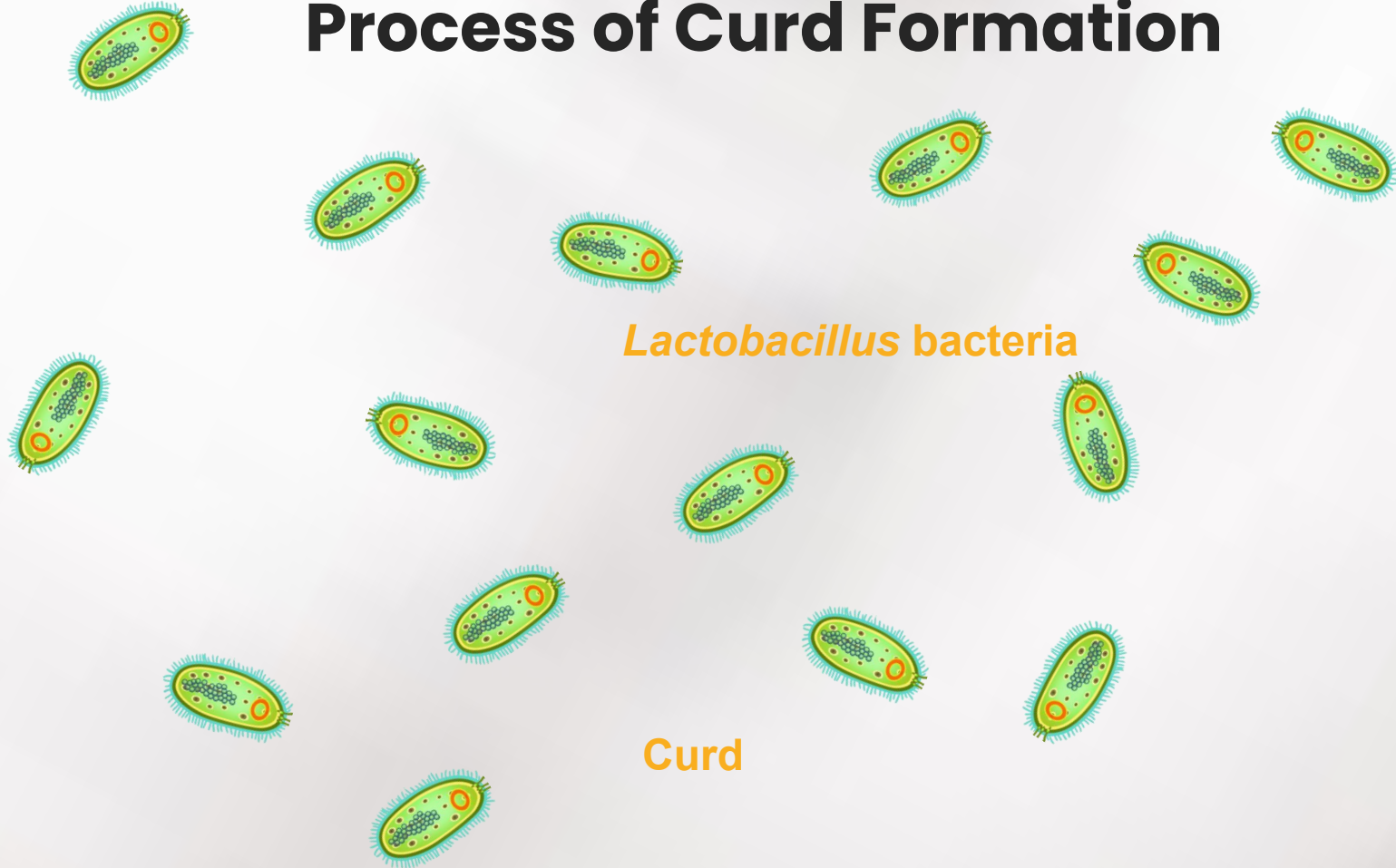


# Process of Curd Formation





# Process of Curd Formation



# Lactic Acid Fermentation Products



**Flavored  
yogurt**



**Dhokla**



**Pickles**



**Dosa/Idli**



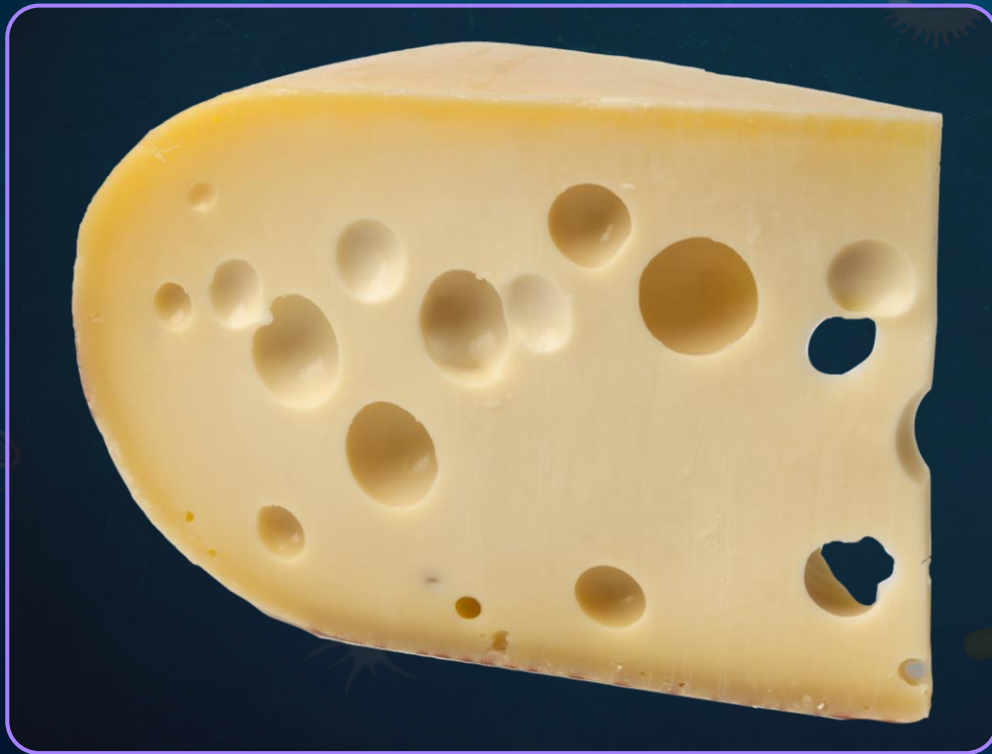
**Buttermilk/  
Lassi**



**Cheese**



# Swiss Cheese



# Swiss Cheese



Lactose

*Lactobacillus*



Lactic acid

*Propionibacterium  
sharmanii*



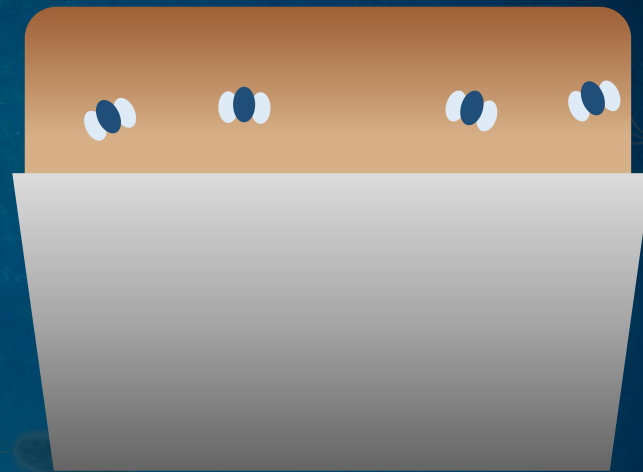
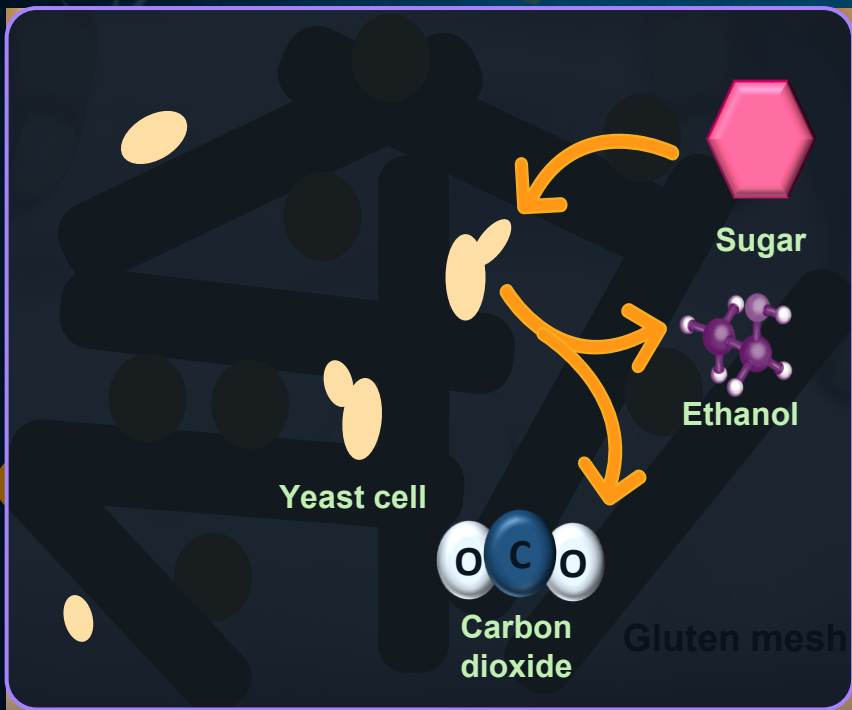
Propionic  
acid



Carbon  
Dioxide



# Bread Making



# Yeast in Delicious Goodies



Donuts



Croissant



Bread



# Food Preservation



Grapes



Crushing



Storing of wine

# Food Preservation



# Toddy

Sugar palm tree

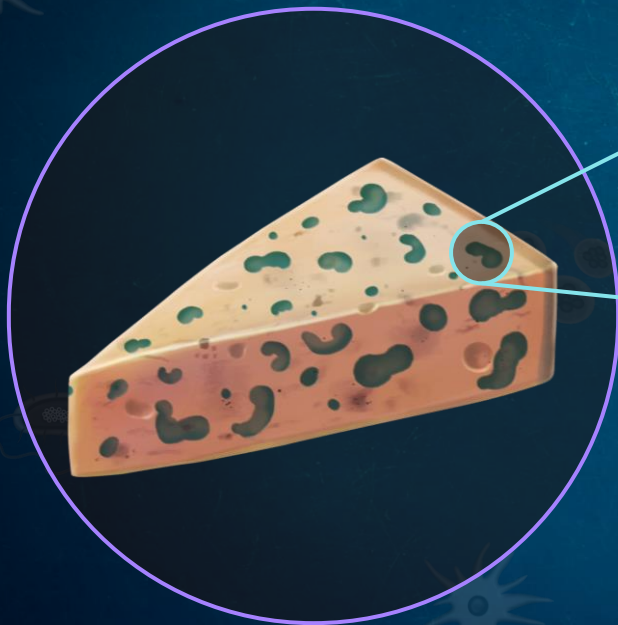
Leaf base is cut

Sap is collected





# Blue Cheese



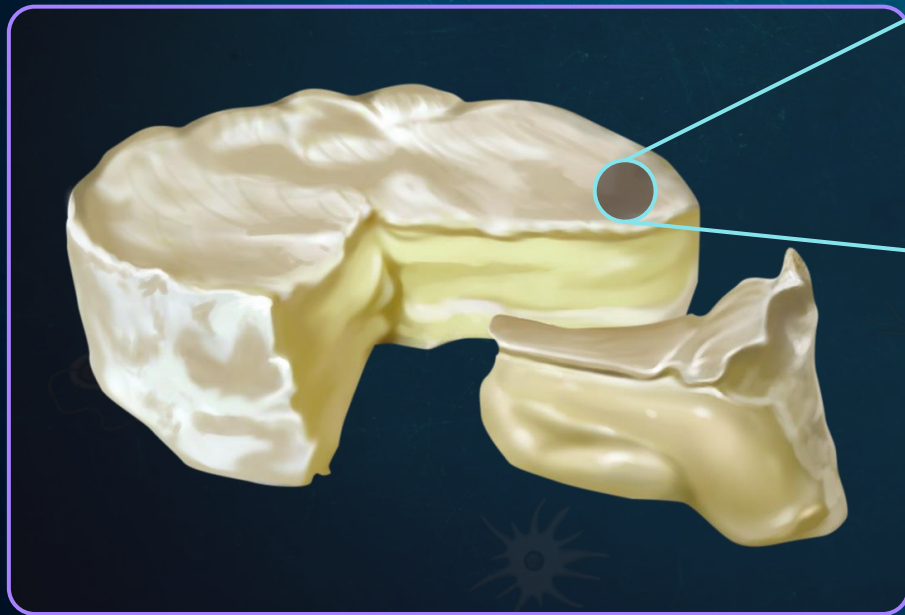
Roquefort cheese



*Penicillium roqueforti*




# Camembert Cheese



*Penicillium  
camemberti*

Camembert Cheese

# Microbes in Industry Products

The background is a vibrant, stylized illustration of an industrial facility. The walls are made of light blue bricks. A network of orange pipes runs throughout the scene, connecting various pieces of machinery. In the center, two large, orange, cylindrical tanks sit on a grey platform. Each tank has a circular window showing a pink liquid with a blue wavy line on top, and a control panel with three buttons (pink, yellow, green) and a small display. To the left of these tanks is a large blue machine with a control panel featuring a grid of colored buttons (red, yellow, green, blue) and a gauge. To the right is another blue machine with a transparent window showing internal stirrers and a green logo. Above the tanks, two blue conical funnels hang from orange pipes. The overall aesthetic is clean and modern, with a focus on industrial design.

# Microbes in Industry Products

**Fermentors** – Large vessels to grow microbes for industrial use

**Fermentation Plant** – Many fermentors form fermentation plant



**Fermentors**



**Fermentation Plant**



# Microbes in Industry Products



Fermented Beverages



Antibiotics

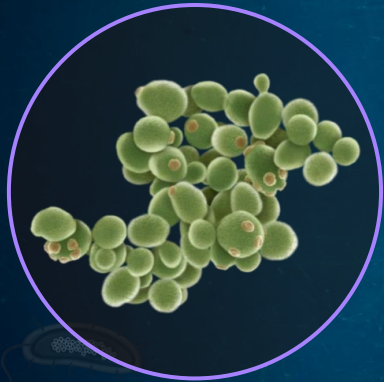


Chemicals

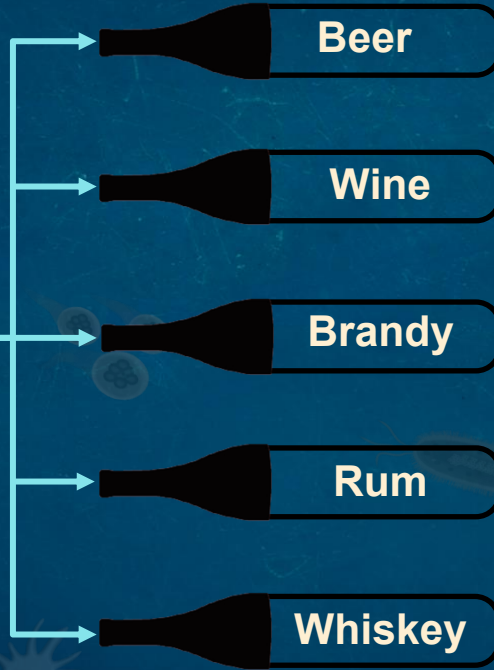




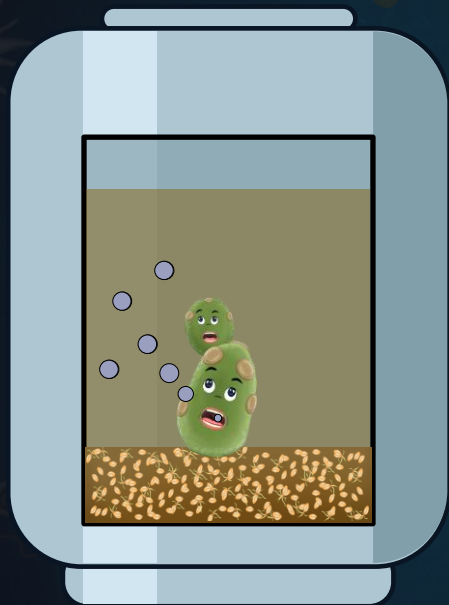
# Fermented Beverages



*Saccharomyces  
Cerevisiae*  
(Brewer's Yeast)



# Fermented Beverages



Fermentor

Fermentation



Alcohol

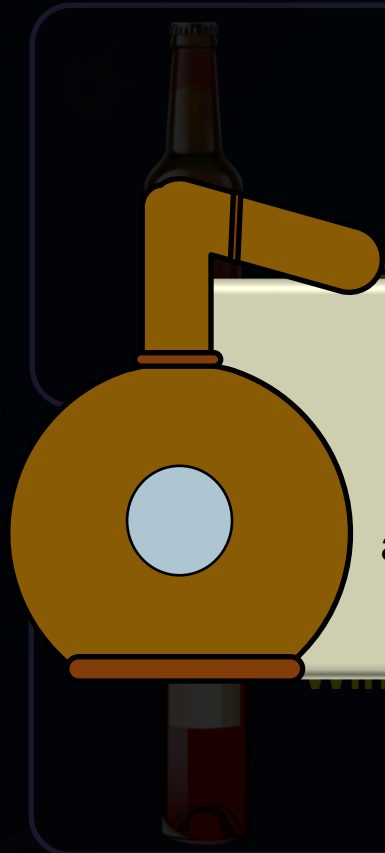


# Fermented Beverages





# Fermented Beverages



## Distillation

**Separation and removal** of alcohol from other components from alcoholic beverages



Whiskey

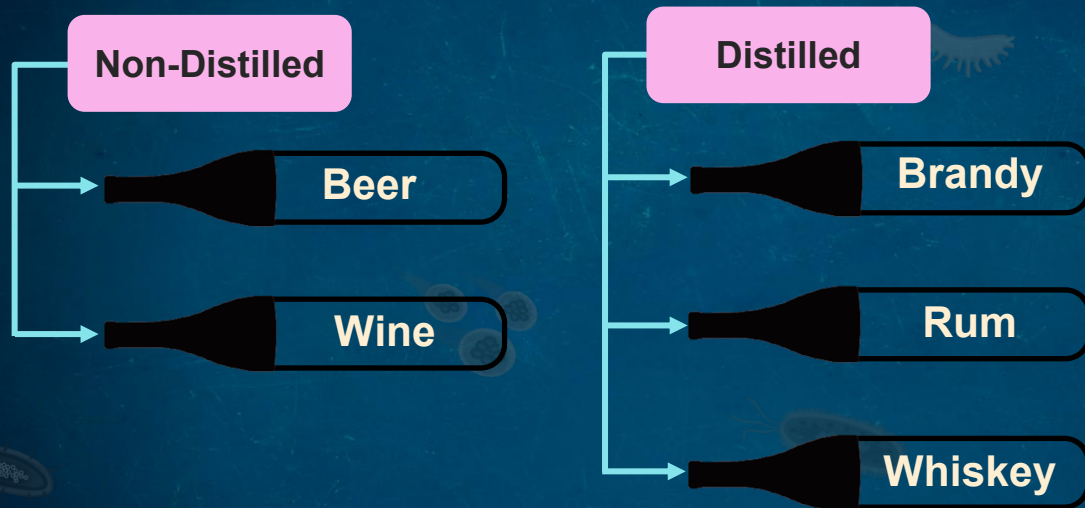


Rum



Vodka

# Fermented Beverages





# Antibiotics

*Anti*  
against

*bio*  
life

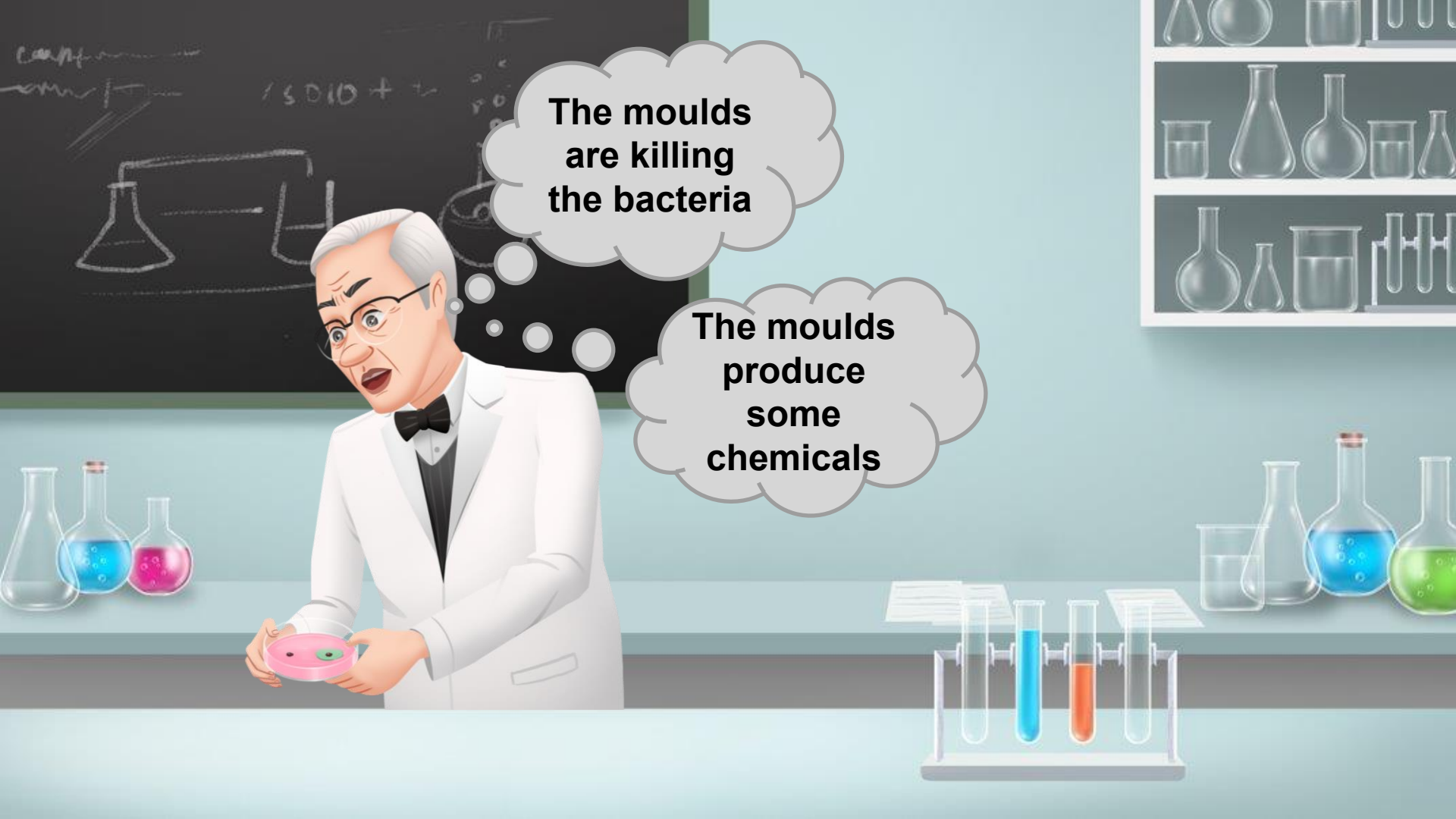


# Antibiotics



**Chemical substances**, which are produced by some **microbes** and can **kill** or **retard** the growth of other (disease-causing) microbes.

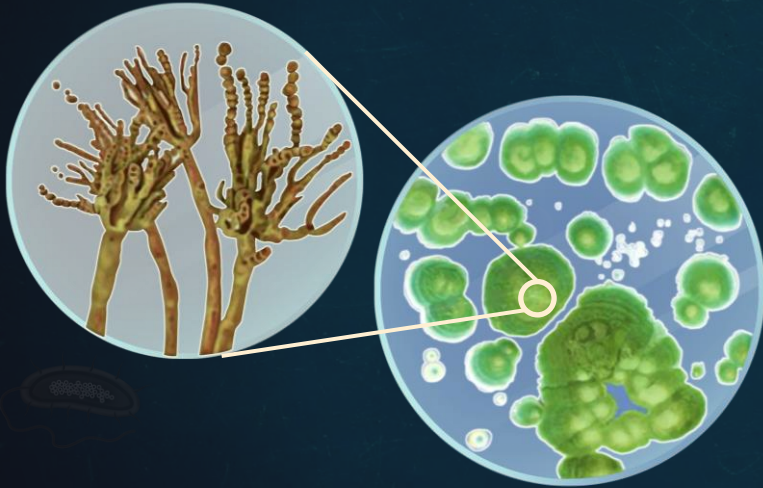
# The Discovery of Penicillin



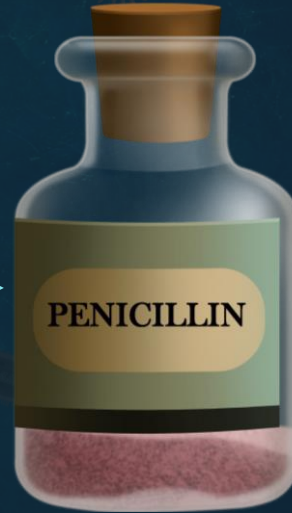
**The moulds  
are killing  
the bacteria**

**The moulds  
produce  
some  
chemicals**

# Antibiotics



*Penicillium notatum*



Penicillium



# Antibiotics



Ernst Boris Chain



Sir Howard Walter  
Florey

**PENICILLIN**

THE NEW  
WONDER DRUG



# Antibiotics

Won Nobel Prize in 1945

NOBEL  
PRIZE  
WINNER



Sir Alexander Fleming  
(1881-1955)



Ernst Boris Chain  
(1906-1979)



Sir Howard Walter Florey  
(1898-1968)

# Antibiotics



*Cephalosporium  
acremonium*



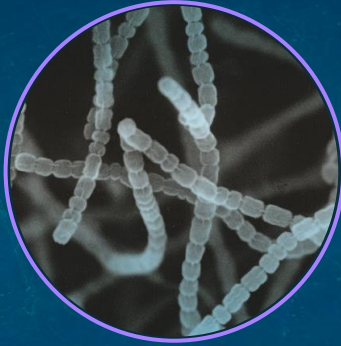
Cephalosporin



*Bacillus  
subtilis*



Bacitracin



*Streptomyces  
griseus*



Streptomycin



*Micromonospora  
purpurea*



Gentamicin



# Antibiotics

**Plague**

**Whooping cough**  
*(kali khansi)*

**Diphtheria**  
*(gal ghotu)*

**Leprosy**  
*(kusht rog)*



# Chemicals, Enzymes and Bioactive Molecules



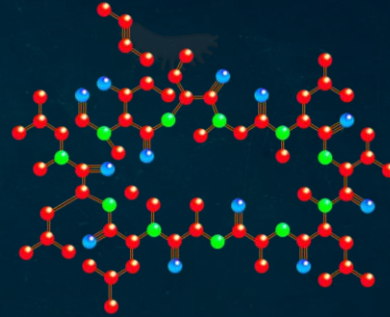
## Chemicals

Any material  
with a definite  
chemical  
composition



## Enzymes

Substances  
which act as  
biological  
catalysts



## Bioactive molecules

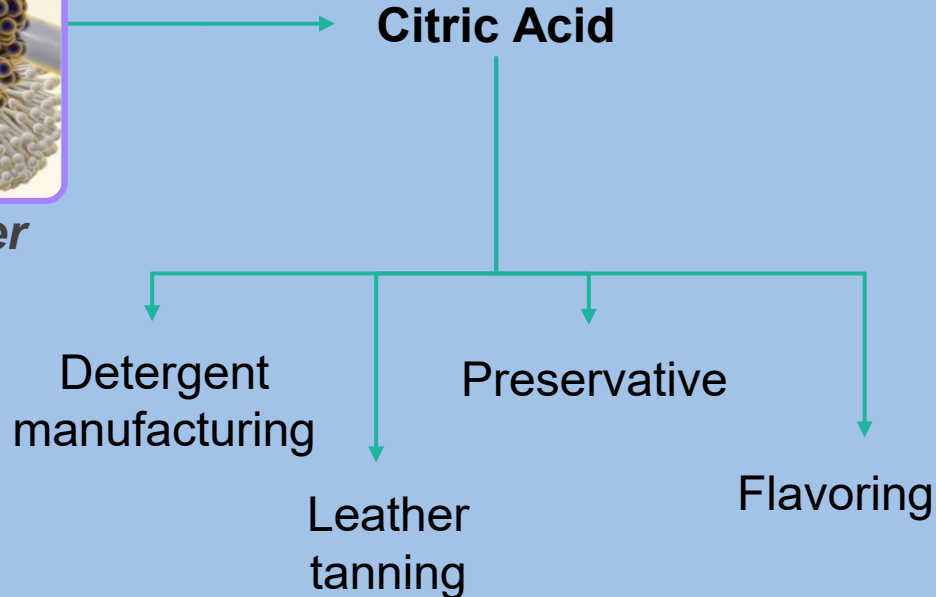
Molecules are  
which are  
produced as a  
result of microbial  
activities

# Chemicals, Enzymes and Bioactive Molecules

## Organic Acids



*Aspergillus niger*  
(fungus)





# Chemicals, Enzymes and Bioactive Molecules

## Organic Acids



*Acetobacter aceti*  
(a bacterium)

Acetic Acid

Industrial  
solvent

Cancer  
treatment

Foods

# Chemicals, Enzymes and Bioactive Molecules

## Organic Acids



*Clostridium butylicum*  
(a bacterium)

→ **Butyric Acid**

↓  
Food and  
flavoring

↓  
Pharmaceuticals

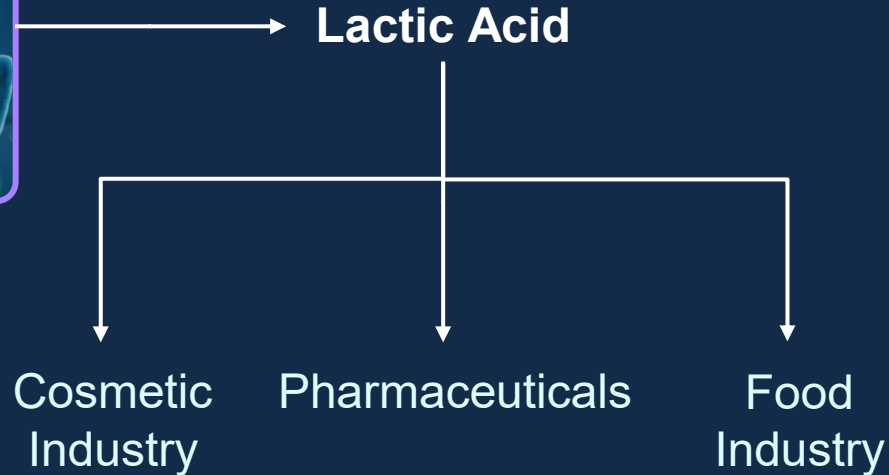
↓  
Perfume

# Chemicals, Enzymes and Bioactive Molecules

## Organic Acids

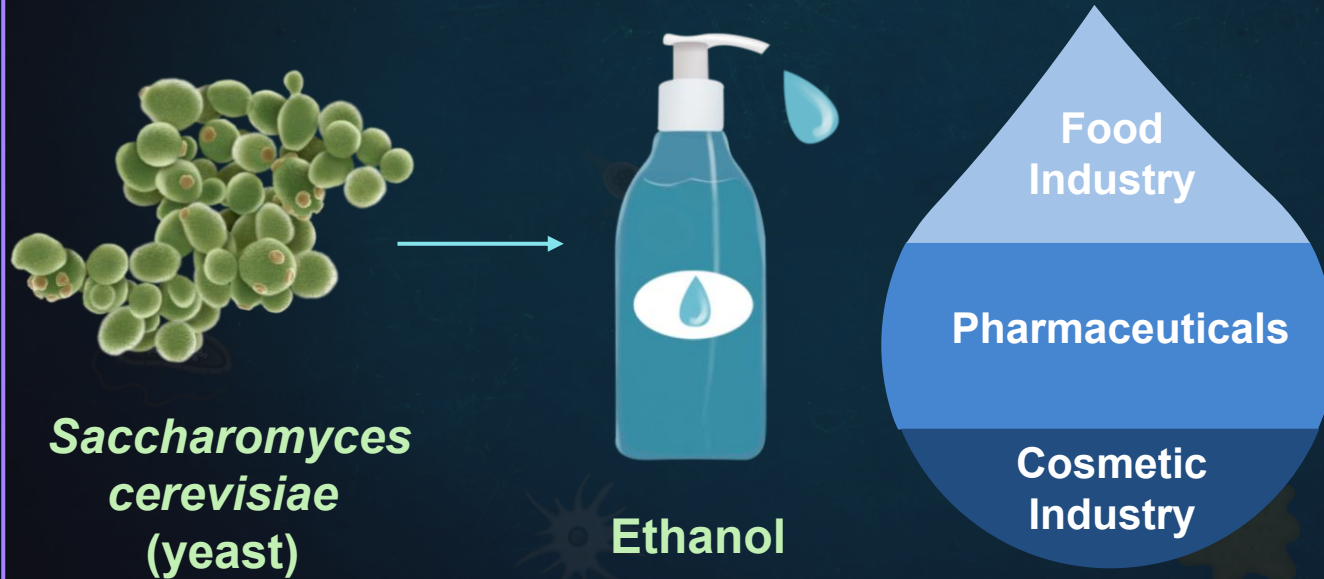


***Lactobacillus***  
**(a bacterium)**



# Chemicals, Enzymes and Bioactive Molecules

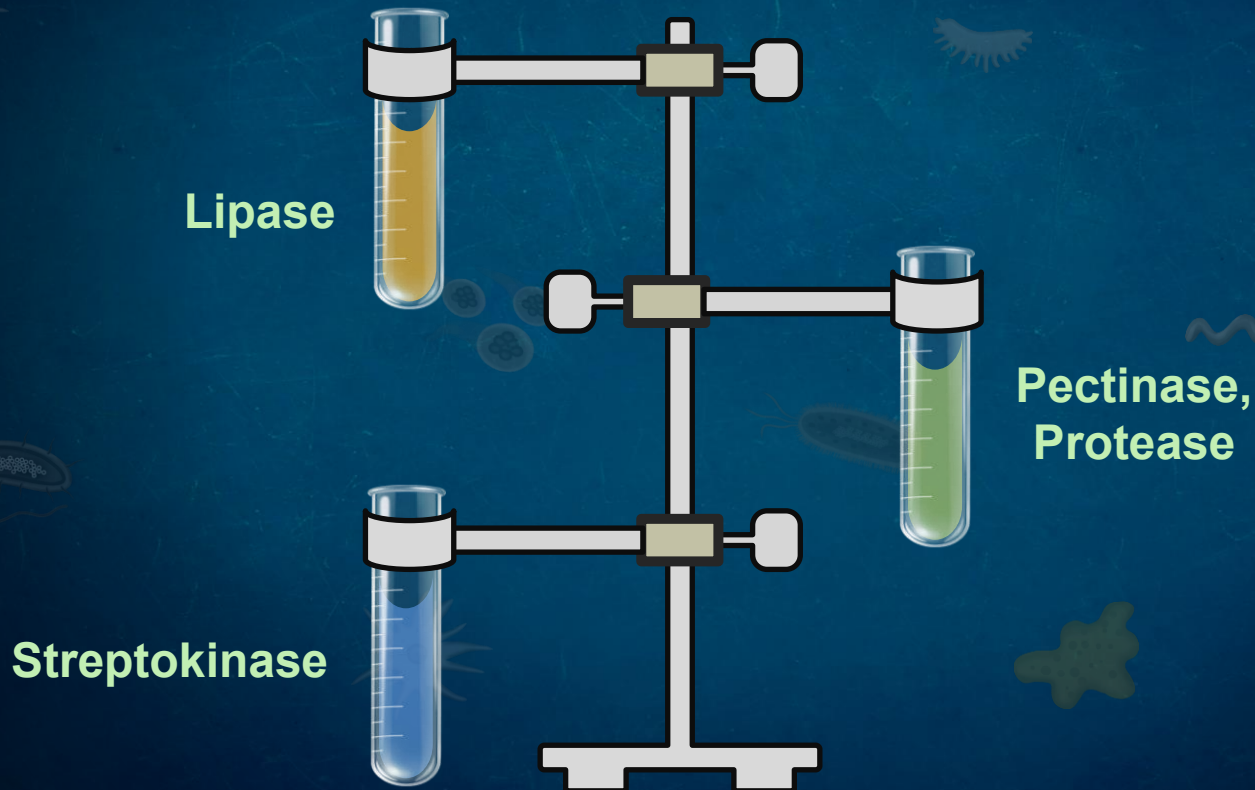
## Alcohol





# Chemicals, Enzymes and Bioactive Molecules

## Enzymes

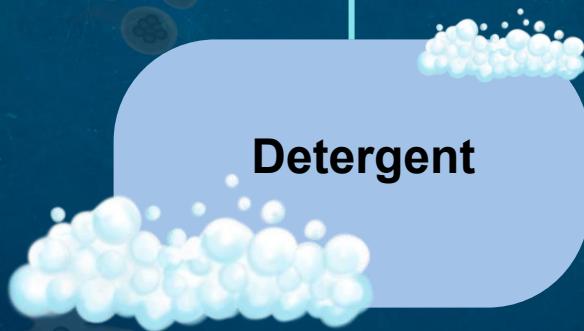


# Chemicals, Enzymes and Bioactive Molecules

## Enzymes

**Lipase**

**Detergent**



# Chemicals, Enzymes and Bioactive Molecules

## Enzymes



# Chemicals, Enzymes and Bioactive Molecules

## Enzymes

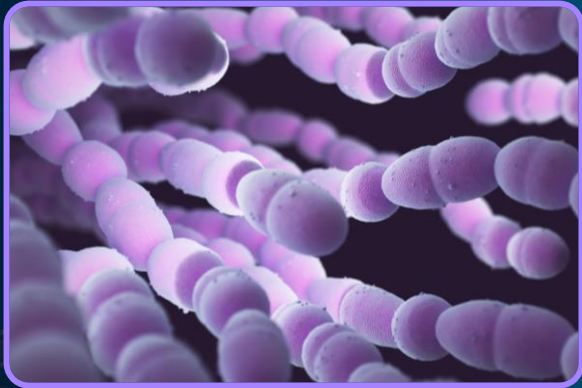
**Pectinase, Protease** – Enzyme which cleaves pectin and peptide bonds respectively, clarifying the juice

Clarified Bottled Juice



# Chemicals, Enzymes and Bioactive Molecules

## Enzymes



*Streptococcus*

Streptokinase

“Clot buster”



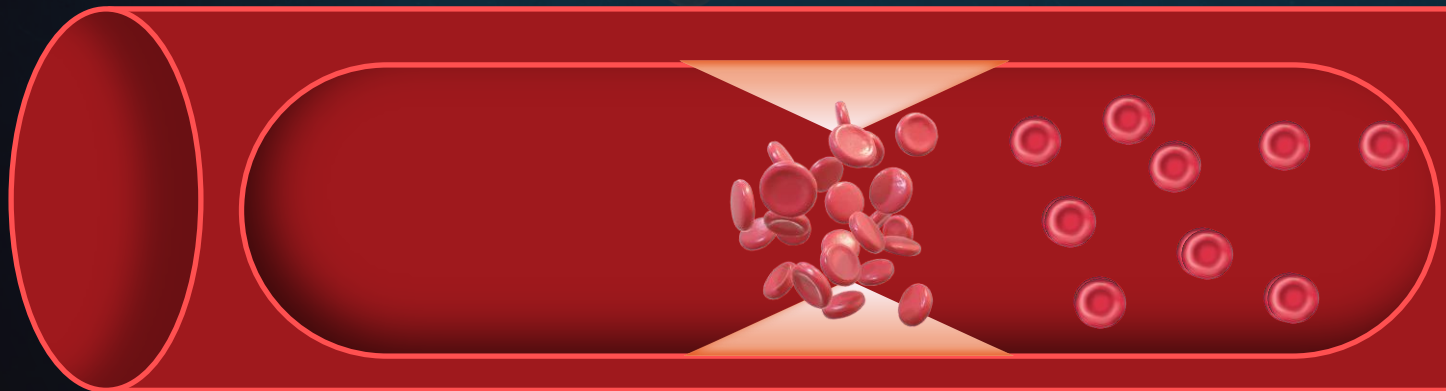
# Chemicals, Enzymes and Bioactive Molecules

## Enzymes

Removes blood clots from patients who have undergone myocardial infarction



**Streptokinase**



# Chemicals, Enzymes and Bioactive Molecules

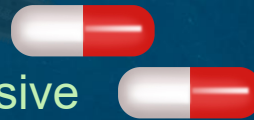
## Bioactive molecules



*Trichoderma  
polysporum*  
(fungus)

cyclosporin A

Immunosuppressive  
agent



# Chemicals, Enzymes and Bioactive Molecules

## Bioactive molecules



*Monascus  
purpureus* (fungus)

Statins

Blood cholesterol  
lowering agents





A top-down view of a petri dish containing a bacterial culture. The culture is arranged in a hand-like shape, with the fingers and palm formed by various colonies of different sizes and colors, including white, yellow, and orange. The background is a dark blue gradient with faint, stylized illustrations of various microorganisms like bacteria, viruses, and fungi.

# Keep Learning