

# **FERMENTATION**

## **IN FOOD PROCESSING**

**By: WIN and Friends**

# Introduction

- ◆ **Ethanol Fermentation**
- ◆ **Lactic Acid Fermentation**
- ◆ **Acetic Acid Fermentation**
- ◆ **Carbohydrate → Alcohol, CO<sub>2</sub> , organic acid**
- ◆ **Yeast and Bacteria**
- ◆ **Anaerobic condition**

# Ethanol Fermentation

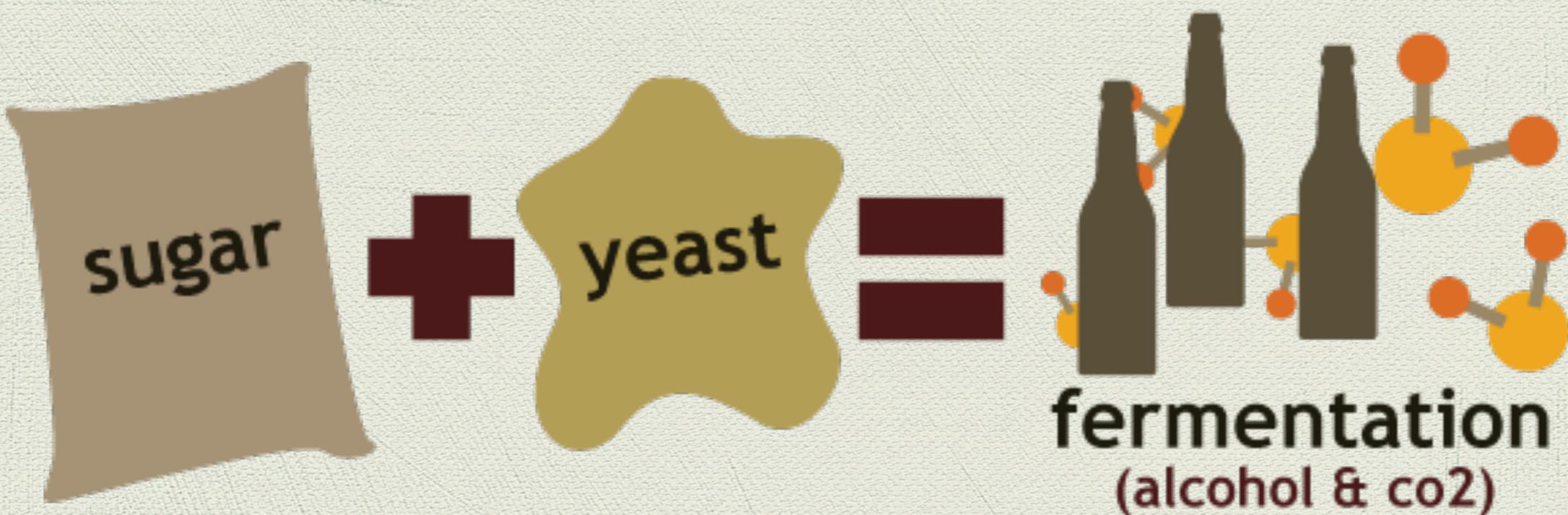
- ◆ Use **Yeast** for fermentation
- ◆ Anaerobic process.
- ◆ Occur in the absence of oxygen
- ◆ **Alcoholic beverages**
- ◆ **Bread baking:** CO<sub>2</sub> helps bread puffy



## Microbes

- Yeast
- Zymomonas mobilis
- Schizosaccharomyces

# Ethanol Fermentation



# Ethanol Fermentation



**Wine**

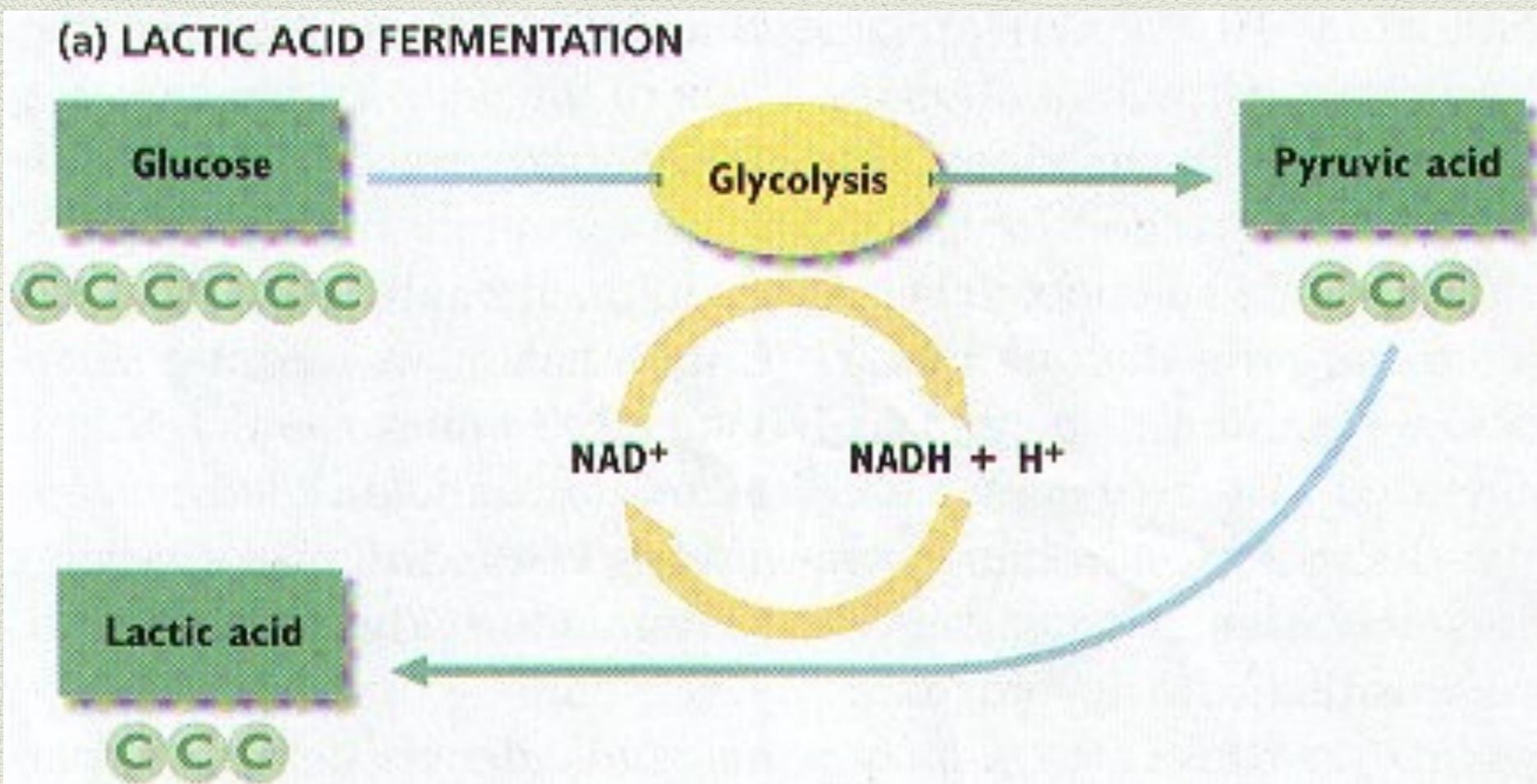
**Beer**



**Bread**

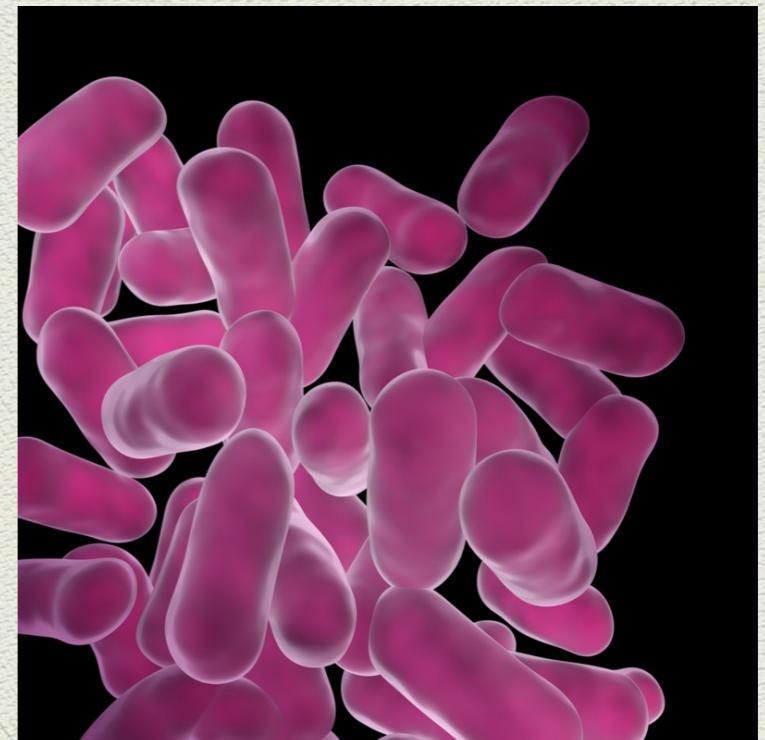
# Lactic Acid Fermentation

• Convert  $\text{C}_6\text{H}_{12}\text{O}_6$  →  $2\text{CH}_3\text{CH(OH)COOH}$   
glucose Lactic Acid



# Lactic Acid Fermentation

- Use **Bacteria** for fermentation
- **Lactobacillus** \*\*\* most important \*\*
- **leuconostoc mesenteroides**
- **pediococcus cerevisiae**
- **treptococcus lactis**
- **bifidobacterium bifidus**



# Lactic Acid Fermentation

- Daily Products:
  - Cheese, yoghurt and fermented milk drinks
  - produce acid from the milk sugar lactose

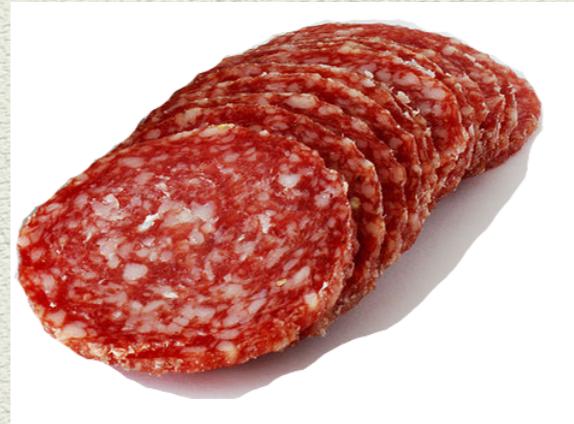


- Fermented vegetables:
  - Sauerkraut, KimChi



# Lactic Acid Fermentation

- Fermented meats:
  - Nham, Salami



- Fermented doughs:
  - works with yeast
  - improve structure, flavour and storage
  - French bread



# Acetic Acid

- organic compound in vinegar
- produced industrially both synthetically and bacterial fermentation



# Acetic Acid Fermentation



alcohol + oxygen —(acetobacter)→ acetic acid + water

**Acetobacter = name of bacteria**

Commonly used feeds include  
apple cider, wine



# Acetic Acid Fermentation (Distillation)

- Fermentation of distilled alcohol
  - A diluted alcohol solution ferment with Acetobacter
  - Kept in a warm, airy place
- 
- The alcohol is diluted to produce a colourless solution of acetic acid in water.
  - Accelerate this process by improving the supply of oxygen to the bacteria.





# Fake Vinegar



# Fake Vinegar

Used in Industry



# Fake Vinegar

## 1. Flat thin leaves test



## 3. Smell test



## 2. Chili test



## 4. Gentian violet test



# Fake Vinegar

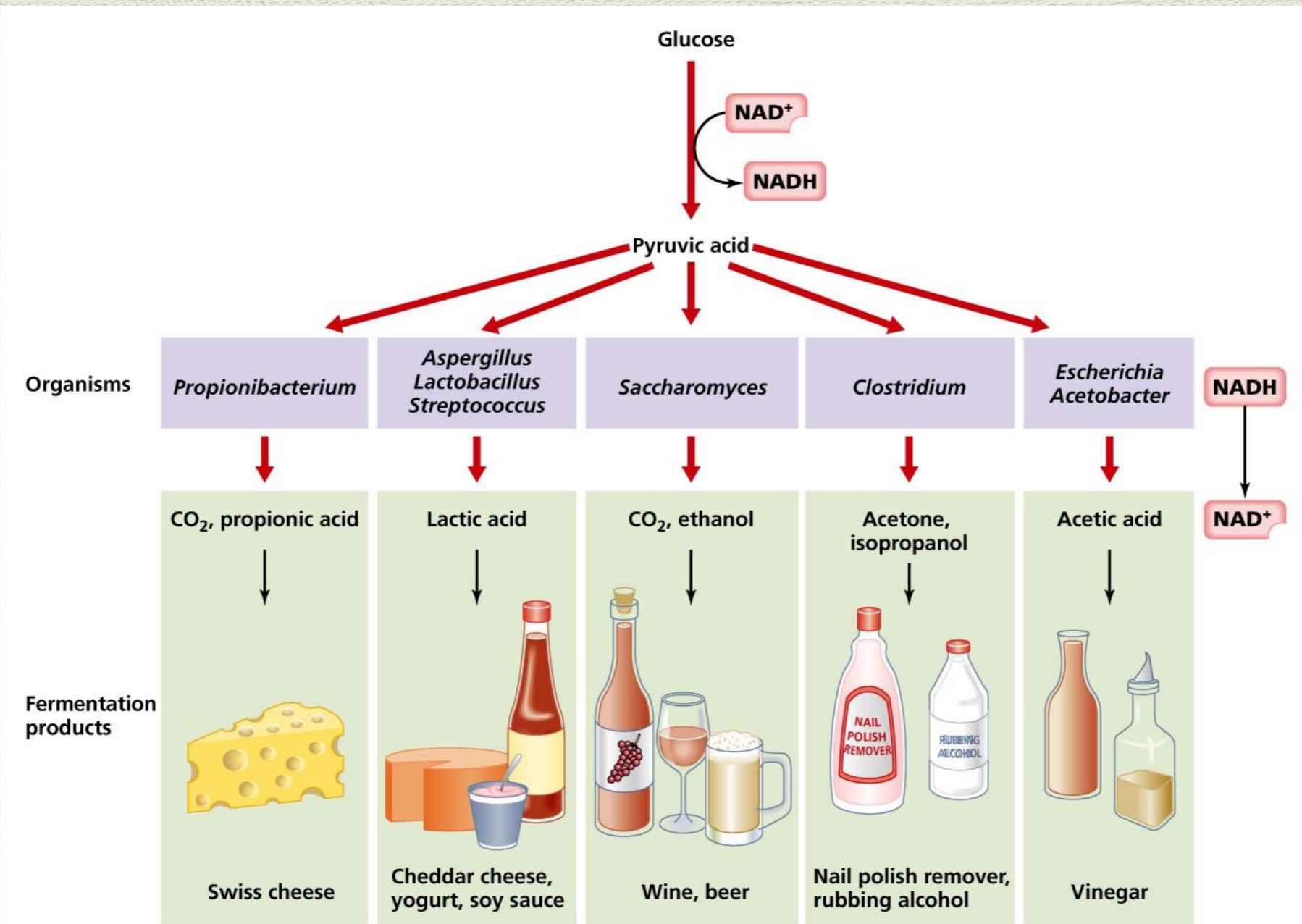
For Safety



คุ้มครอง ห่วงใย ใส่ใจคุณภาพ

สำนักงานคณะกรรมการอาหารและยา  
Food and Drug Administration

# Conclusion



# Question?