

Tishk International University  
Faculty of Applied Science  
Nutrition and Dietetics Department



Principles of Food Science/ NUT 105  
1<sup>st</sup> Grade

Food pH and Acidity /2<sup>nd</sup> Lab

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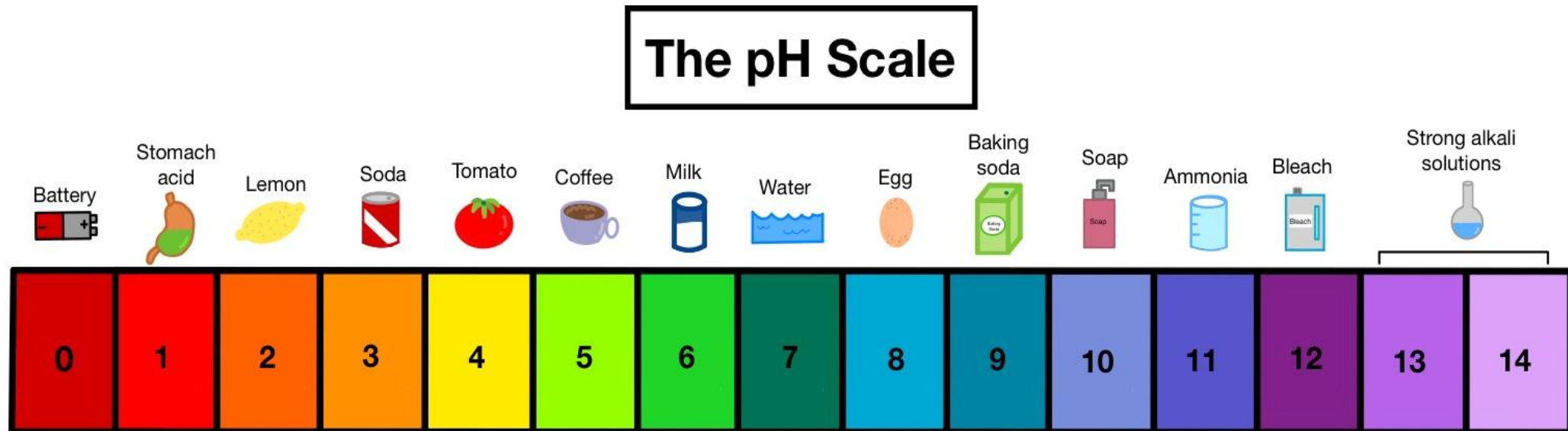
# *Objectives*

- **pH in Food**
- **pH Determination Methods**
- **Impact of pH on Food Preservation**
- **Acid-Base reactions in Food science**
- **Health Implications**



# Definition of pH and its measurement scale

- ✓ pH is a measure of how acidic or basic a solution is, on a scale of 0 to 14.
- ✓ A pH level of 7 is considered neutral, values below 7 indicate *acidity*, and values above 7 indicate *alkalinity*.



## *Acidity in Foods*

### **Types of acids commonly found in food (e.g., citric, acetic, lactic)**

Common food acids include citric acid in citrus fruits, acetic acid in vinegar, and lactic acid in fermented foods.

*These acids contribute to the overall flavor and preservation of food.*

### **Role of acidity in taste and flavor profiling**

Acidity enhances flavor and can balance sweetness in food products. It also plays a significant role in how we perceive taste, with different acids providing unique flavor notes.

### **Geographical and seasonal variations in acidity levels**

Acidity levels can vary based on the geographical origin of a food product and seasonal changes.

For example, tomatoes grown in different soils may have different acidity levels.



## *Methods of pH Determination*

**Common methods for measuring pH in food products:  
(e.g., pH meters, litmus tests)**

pH meters are popular for their accuracy, while litmus tests provide a quick indication of acidity through color changes.

Both methods have their specific applications in food testing.



## Factors affecting pH measurements

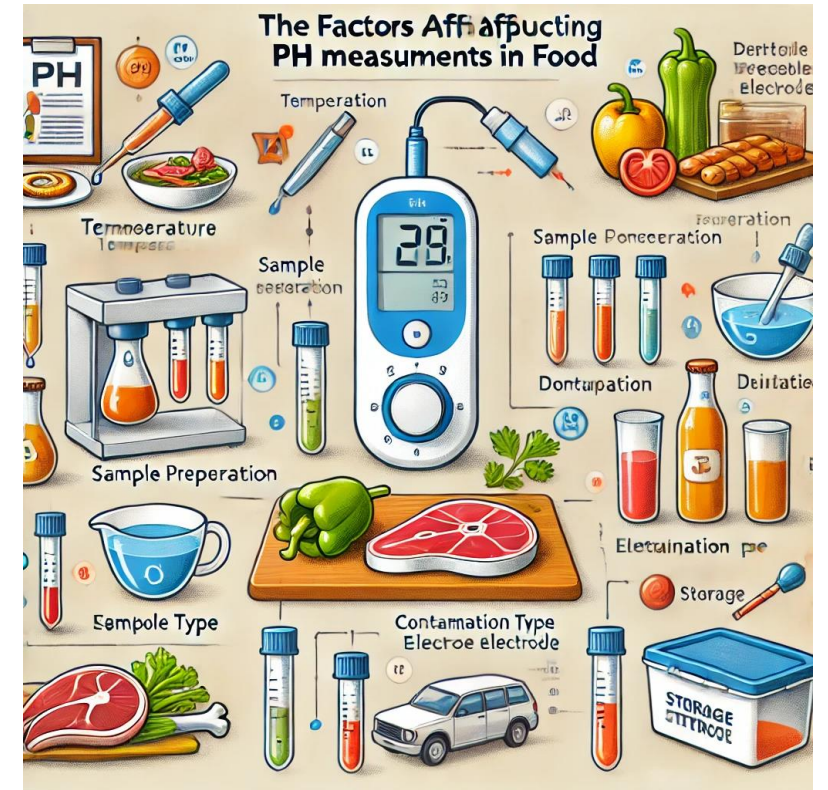
Factors such as temperature, the presence of dissolved salts, and the freshness of the sample can affect pH readings.

Ensuring consistent measurement conditions is vital for reliability.

## Laboratory versus field testing techniques

Laboratory methods generally provide more accurate results, while field tests are quicker and suitable for on-site assessments.

Choosing the appropriate method depends on the context of testing.



# *Impact of pH on Food Preservation*



Most bacteria prefer **neutral pH levels**. Lowering pH can inhibit microbial growth, thus enhancing the shelf life of food products.

## **Role of acidity in preservation methods (pickling, fermentation)**

Acidity in methods like pickling and fermentation plays a central role in food preservation by creating an environment that is unfavorable for spoilage organisms.

## **Examples of pH-sensitive foods and their shelf stability**

Foods like dairy products, meats, and certain fruits are pH-sensitive. For instance, high-acid foods typically have longer shelf stability compared to low-acid foods.

# pH in Different Food Products

**Comparison of pH levels in various foods (vegetables, fruits, dairy, meats)**

pH levels vary widely across food categories: fruits generally range from 2 to 4, vegetables typically range from 4 to 6, dairy products average around 6 to 7, and meats can range from 5.5 to 6.

**Specific case studies highlighting pH relevance in popular foods**

For example, the pH of yogurt (around 4.5) contributes to its tangy flavor and ensures safety from pathogenic bacteria during storage.

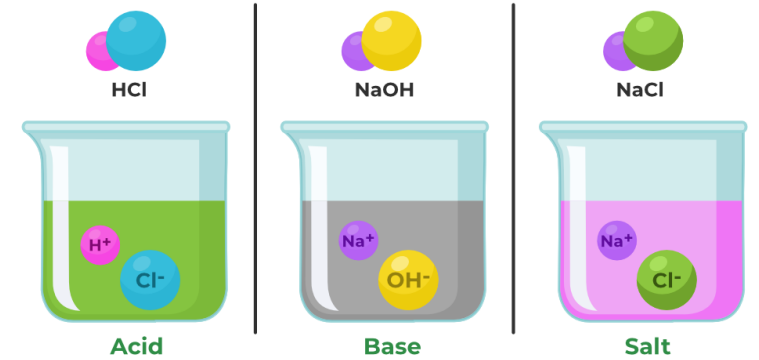
**Influence of processing techniques on food pH**

Processing techniques such as heat treatment, fermentation, and chemical additives can alter the pH of food, influencing its safety, taste, and shelf life.





## *Acid-Base reactions in Food science*



### **Understanding acid-base reactions in culinary applications**

Acid-base reactions are crucial in cooking. For example, the reaction between baking soda (a base) and vinegar (an acid) produces carbon dioxide, which helps leaven baked goods.

### **How pH influences texture and color in food preparation**

The pH can affect protein denaturation and pigment stability, influencing the texture of meats and the color of vegetables when cooked.

### **Examples: baking (baking soda and vinegar reactions)**

When baking soda is mixed with an acidic ingredient, such as vinegar, the resultant carbon dioxide gas causes dough to rise, showcasing a practical application of acid-base chemistry in cooking.

## *Health Implications*

### **Effects of dietary acids and bases on human health**

The consumption of acidic or basic foods can influence metabolic processes, potentially impacting overall health.

### **Role of balanced pH for digestive health**

A balanced dietary pH is essential for optimal digestion. Extremely acidic or alkaline diets can lead to digestive issues and affect nutrient absorption.

### **Link between acidic diets and certain health conditions**

High intake of acidic foods has been linked to conditions like acid reflux and gastrointestinal discomfort, emphasizing the need for pH balance in diet.

# ACID / ALKALINE FOOD COMPARISON CHART

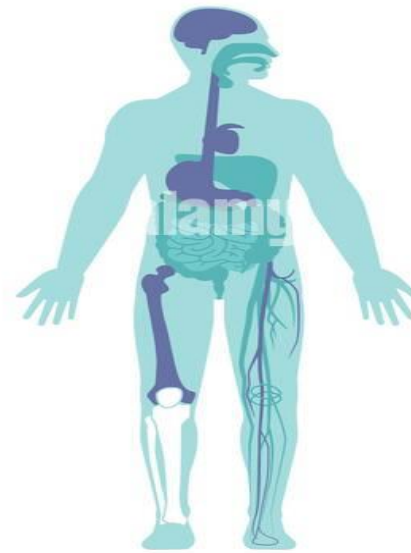


## THE ACID / ALKALINE BALANCED DIET



## HEALTH BENEFITS ON YOUR BODY

- IMPROVES MEMORY AND COGNITION
- PROMOTES CARDIOVASCULAR HEALTH
- BOOST IMMUNE SYSTEM
- BETTER DIGESTION
- PREVENTS CANCER
- KEEPS BONES AND MUSCLES HEALTHY



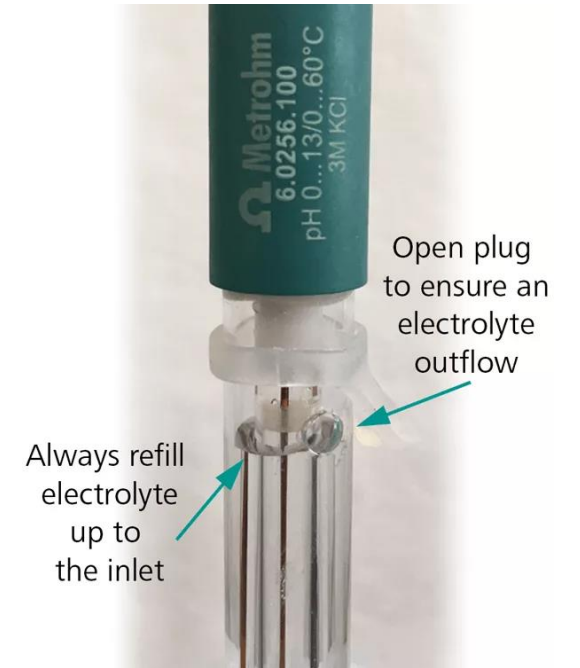
## *Procedure*

### *1. Prepare the Equipment*

#### *Clean and calibrate the pH meter:*

Steps:

- Rinse the electrode with distilled water.
- Calibrate the pH meter using standard buffer solutions (pH 4.0, 7.0, and/or 10.0).
- Follow the manufacturer's instructions.
- Ensure the temperature compensation feature (if available) is adjusted.



## *2. Prepare the Food Sample*

**Liquids:** Measure directly without dilution.

**Semi-solids:** Homogenize the sample (e.g., yogurt or sauces) to ensure consistency.

**Solids:**

Blend or crush the food into a slurry with a small amount of distilled water.

If the sample contains large particles or fibers, filter the mixture to obtain a smooth liquid.

Use a **clean container** for all sample preparations to avoid contamination.



### 3. Measure the pH

- Rinse the electrode with distilled water and gently blot it dry with tissue paper.
- Immerse the electrode in the prepared food sample:
  - For liquids, submerge the electrode directly.
  - For semi-solid or solid samples, insert the electrode into the homogenized mixture or slurry.
- Wait for the pH meter to stabilize. This may take a few seconds to minutes, depending on the device.
- Record the pH value.

#### *4. Rinse and Repeat*

- After each measurement, rinse the electrode with distilled water to avoid cross-contamination.
- If multiple samples are being tested, clean the electrode thoroughly between samples.

#### *5. Clean and Store the Equipment*

- Rinse the electrode with distilled water and place it in a storage solution or buffer solution, as recommended by the manufacturer.
- Clean all tools and containers used during the procedure.



# *Observation*

<b>Sample</b>	<b>pH Measure</b>

*Thank  
you*

Q & A

