

AIM

To analyse some fruits juices for the content present in them. fruits are always a part of balance diet. that means fruits provide our body the essential nutrients, I.e., starch, Carbohydrates, iron And calcium and test for acidity.

Components



➤ Test Tubes

➤ Burner

➤ Litmus Paper

➤ Various Fruit Juices

Chemicals Required

The background of the slide features a collection of fresh fruits and glasses of juice. There are several glasses filled with orange and yellow juices. Scattered around are various fruits including lemons, limes, oranges, and tomatoes. The overall scene is bright and colorful, suggesting a natural or health-related theme.

- pH indicator
- Iodine Solution
- Fehling Solution (A and B)
- Ammonium Chloride Solution
- Ammonium hydroxide Solution
- Ammonium Oxalate Solution
- Potassium Sulphocyanide Solution

FRUITS USED

ORANGE



APPLE



POMEGRANATE



GUAVA



An Experiment with Fruit Juices

Fruit Juices are generally consumed by most of the people in the world or we can say they are the most consumed drinking items all over the world. But Did we know about their effects on our body.

Lets Find out !



Different Tests Performed



- Test For Acidity
- Test For Starch
- Test For Carbohydrates
- Test For Iron
- Test For Calcium

Test For Acidity

Take 5 mL of juice in a test tube and dip a test tube and dip a pH paper in it. If pH is less than 7 , the juice is acidic .

Introduction

□ What is pH ?

pH stands for **“Potential or Power of H⁺ ion”**. It is the measurement of acidity or basicity of an aqueous solution.

Mathematically, pH is the negative logarithm of the activity of the hydronium ion, more often expressed as the measure of the hydronium ion concentration.

Mathematically, $\text{pH} = -\log[\text{H}^+]$ or $\log[1/\text{H}^+]$

□ pH Indicators

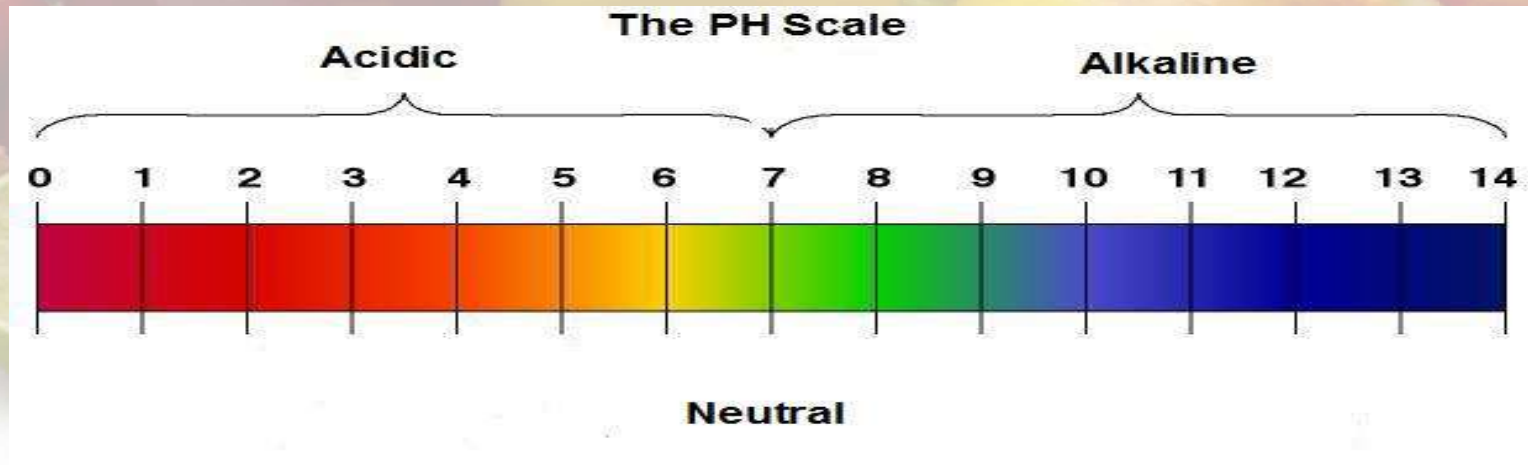
A **pH indicator** is a chemical compound that is added in small amounts to a solution so that the **pH of the solution can be determined visually**. Normally, the indicator causes the **colour** of the solution to change depending on the pH. Indicators can also show change in other physical properties, for e.g. olfactory indicators show change in their odour.

Some pH indicators are : **phenolphthalein, methyl orange and litmus, pH paper etc.**



□ The pH Scale

- The pH scale is a scale which measures how acidic or basic a substance is ?
- The pH scale ranges from 0 to 14 in which :
 - ✓ A pH of 7 is **neutral**. (Example is Pure Water).
 - ✓ A pH less than 7 is **acidic**. (Example is HCL).
 - ✓ A pH greater than 7 is **basic**. (Example is Baking Soda).



Observations

The table below shows the type and pH value of the most commonly used fruit Juices.

Most of the juices are acidic in nature

Name of Juice	pH Value
Orange Juice	2.8-4
Apple Juice	3-4.5
Pomegranate Juice	3.5-4
Guava Juice	3.4-4

Result

After conducting several tests, it was concluded that the different types of fruit juices namely, Lemon Juice, Orange Juice Apple Juice, Guava Juice, Pomegranate Juice, **all are acidic in nature.**

Reason of acidity : Fruit Juices are generally acidic because of the presence of **citric acid** and **phosphoric acid**. pH values of juices of different types are different due to the variation in amount of acidic contents.

Test For Starch



Take 2mL of juice in a test tube and add few drops of iodine solution. It turns blue black in colour , then the starch is present.

STARCH

- **Starch** or **amylum** is a [polymeric carbohydrate](#) consisting of a large number of [glucose](#) units joined by [glycosidic bonds](#). This [polysaccharide](#) is produced by most green [plants](#) as an energy store. It is the most common carbohydrate in human diets and is contained in large amounts in [staple foods](#) such as [potatoes](#), [wheat](#), [maize](#) (corn), [rice](#), and [cassava](#).
- Pure starch is a white, tasteless and odorless powder that is insoluble in cold water or alcohol. It consists of two types of molecules: the linear and [helical amylose](#) and the branched [amylopectin](#). Depending on the plant, starch generally contains 20 to 25% amylose and 75 to 80% amylopectin by weight. [Glycogen](#), the glucose store of animals, is a more branched version of amylopectin.

Observations

Name of Juice	Observation	Inference
Orange Juice	No Blue Black Colour	Starch is Absent
Apple Juice	No Blue Black Colour	Starch is Absent
Pomegranate Juice	Blue Black Colour	Starch is Present
Guava Juice	Blue Black Colour	Starch is Present

Test For Carbohydrates

Take 2mL of juice and 1mL of Fehling Solution (A and B) and boil it. Red Precipitates indicates the presence of producing sugar like maltose , glucose , fructose and lactose.

CARBOHYDRATES

A **carbohydrate** is a biological molecule consisting of carbon (C), hydrogen (H) and oxygen (O) atoms, usually with a hydrogen–oxygen atom ratio of 2:1 (as in water); in other words, with the empirical formula $C_m(H_2O)_n$ (where m could be different from n). Some exceptions exist; for example, deoxyribose, a sugar component of DNA, has the empirical formula $C_5H_{10}O_4$. Carbohydrates are technically hydrates of carbon; structurally it is more accurate to view them as polyhydroxy aldehydes and ketones.

Observations

Name of Juice	Observation	Inference
Orange Juice	Red Precipitate	Carbohydrates is Present
Apple Juice	Red Precipitate	Carbohydrates is Present
Pomegranate Juice	Red Precipitate	Carbohydrates is Present
Guava Juice	No Red Precipitate	Carbohydrates is not Present

Test For Iron



Take 2mL of juice , add drop of conc. Nitric Acid.
Boil the solution . Cool and add 2-3 drops of
Potassium Sulphocyanide Solution . Blood Red
Colour shows the presence of iron.

IRON

- **Iron** is a [chemical element](#) with symbol **Fe** (from [Latin: ferrum](#)) and [atomic number](#) 26. It is a [metal](#) in the [first transition series](#). It is by mass the most common element on [Earth](#), forming much of Earth's [outer](#) and [inner core](#). It is the fourth most common [element in the Earth's crust](#). Its abundance in [rocky planets](#) like Earth is due to its abundant production by [fusion](#) in high-mass [stars](#), where it is the last element to be produced with release of energy before the violent collapse of a [supernova](#), which scatters the iron into space.
- Like the other [group 8 elements](#), [ruthenium](#) and [osmium](#), iron exists in a wide range of [oxidation states](#), -2 to +6, although +2 and +3 are the most common. Elemental iron occurs in [meteoroids](#) and other low [oxygen](#) environments, but is reactive to oxygen and [water](#). Fresh iron surfaces appear lustrous silvery-gray, but [oxidize](#) in normal air to give [hydrated iron oxides](#), commonly known as [rust](#).

Observations

Name of Juice	Observation	Inference
Orange Juice	Blood Red Colour	Iron is Present
Apple Juice	Blood Red Colour	Iron is Present
Pomegranate Juice	Blood Red Colour	Iron is Present
Guava Juice	Blood Red Colour	Iron is Present

Test for Calcium

Take 2mL of juice , add Ammonium chloride and Ammonium hydroxide solution. Filter the solution and to the filtrate add 2mL of Ammonium Oxalate Solution. White ppt or milkiness indicates the presence of calcium.

CALCIUM

- **Calcium** is a [chemical element](#) with symbol **Ca** and [atomic number](#) 20. Calcium is a soft gray Group 2 [alkaline earth metal](#), [fifth-most-abundant element by mass](#) in the [Earth's crust](#). The ion Ca^{2+} is also the fifth-most-abundant dissolved [ion](#) in [seawater](#) by both [molarity](#) and mass, after [sodium](#), [chloride](#), [magnesium](#), and [sulfate](#).^[4] Free calcium metal is too reactive to occur in nature. Calcium is produced in [supernova nucleosynthesis](#).
- Calcium is essential for living [organisms](#), particularly in [cell physiology](#) where movement of the calcium ion into and out of the [cytoplasm](#) functions as a signal for many cellular processes. As a major material used in mineralization of [bone](#), [teeth](#) and [shells](#), calcium is the most abundant [metal](#) by mass in many [animals](#).

Observations

Name of Juice	Observation	Inference
Orange Juice	White ppt	Calcium is Present
Apple Juice	White ppt	Calcium is Present
Pomegranate Juice	White ppt	Calcium is Present
Guava Juice	No White ppt	Calcium is Absent

HEALTH BENEFITS OF ORANGE JUICE

- Maintains the Blood Pressure Levels
- Promotes the Immune System
- Contains Healing Properties
- Prevents Cancer
- Benefits for Treating & Preventing Ulcers
- Prevents Kidney Stones
- Assists in Weight Loss
- Reduces Risks of Heart Attacks
- Treats Anaemia
- Makes the Skin beautiful & Young Looking

HEALTH BENEFITS OF APPLE JUICE

- Promotes Heart Health
- Prevents Asthma
- Cleanses Liver
- Reduces Cholesterol
- Makes The Bones Strong & Healthy
- Boosts The Immune System
- Prevents Cancer
- Offers A Solution For Constipation
- Beauty Benefits Of Apple Juice
- Improves Eye Health

HEALTH BENEFITS OF GUAVA JUICE



- Immunity Booster
- Lowers Risk of Cancer
- Diabetes-Friendly
- Treats Constipation
- Improves Eyesight
- Beats Toothache
- Stress-Buster
- Weight Loss
- Cough and Cold
- Improves Complexion

HEALTH BENEFITS OF POMEGRANATE JUICE

- Improves Your Heart Health
- Maintains Your Blood Sugar Levels
- Maintains Your Blood Pressure
- Reduces Risk Of Cancer
- Helps In Treating Diarrhoea And Dysentery
- Boosts Your Immunity
- Prevents Anaemia
- Helps With Digestion
- Helps In Healing Scars
- Excellent Anti-Aging Agent

Conclusion

All of us know that Fruits are the best source of all type of nutrients and vitamins that are necessary for proper growth of our body and mind. We should eats fruits regularly to make a balance of required nutrients in our body but we should not exceed the limits. We should drink fruit juices from good quality shops only which uses good quality of fruits otherwise they can lead to many harmful diseases.

We should eat raw fruits to make the most of them.