Analysis of Vegetables and Fruit Juices

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AIM

To analyse some fruits & vegetables juice for the contents present in them.

INTRODUCTION

Fruits and vegetable are always a part of balanced diet. That means fruits vegetables provide our body the essential nutrients, i.e. Carbohydrates, proteins, vitamins and minerals. Again their presence in these is being indicated by some of our general observations, like -freshly cut apples become reddish black after some time. Explanation for it is that iron present in apple gets oxidixed to iron oxide. So, we can conclude that fruits and vegetables contain complex organic compounds, for e.g., anthocin, chlorophyll, esters(flavouring compounds), carbohydrates, vitamins and can be tested in any fruits or vegetable by extracting out its juice and then subtracting it to various tests which are for detection of different classes of organic compounds. Detection of minerals in vegetables or fruits means detection of elements other than carbon, hydrogen and oxygen.

COMPONENTS OF FOOD

1. Carbohydrates: Carbohydrates are poly-hydroxyalcohols, which have an aldehyde or ketones group. They have general formula $C_nH_{2n}O_n$. Carbohydrates are the main source of energy 1 gm. of carbohydrates yield 18 KJ of energy. The monosaccharides serve as building block. Glucose is also used in formation of fats & amino acids.

2. Minerals: Minerals from 1-3% of the cell contents. Any marked change in the concentration results in the malfunctioning of cell & finally death. Some mineral present in the diet are:

(i) Calcium: It is the major component of bone & teeth. Calcium is required for blood clotting, muscle contraction, nerve impulse transmission & heart functioning.

(ii) Iron: Haemoglobin in our body contains iron which is the universal carrier of O_2 & $C0_2$, efficiency of iron causes anaemia due to failure of haemoglobin synthesis.

THE FRUIT

Development of fruit: After fertilization the ovary also begin to grow and gradually it matures into the fruit. The fruit may, therefore, be regarded as a mature or ripened ovary. If, for some reason or other, fertilization fails, ovary simply withers and falls off. A fruit consists of two portions, viz. the per carp (peri, round: karpos, fruits) developed from the wall of the ovary, and the seed developed from the ovules, apples, pineapples and some other fruits the ovary may grow into the fruit without fertilization. Such a fruit is seedless or with immature seeds and is known as the parthenocarpic fruit. The pericarp may be thick or thin, when thick,it may consist of two or three parts: the outer cell epicarp, from the skin of the fruit; the middle, called meson carp, is pulpy in fruits like mango, peach, plum etc. and the inner catted endocarp, is often very think and membranous, as in orange, or it may be hard and stony as in many palms, mangoes, etc. In many cases, however, the pericarp is not differentiated into these three regions.

Function of the fruit: The fruit gives protection to the seed and, therefore, to the embryo. It stores food material. It also helps in dispersal of the seed. Normally it is only the ovary that grows into the fruit; such a fruit is known as the true fruit. Sometimes, however, other floral parts, particularly the thalamus or even the calyx, may grow and form a part of the fruit; such a fruit is known as the false fruit. Common examples of false fruits are apples, pear, cashew nut, marking not, rose, dillenia, etc. In dillenia, the calyx becomes thick and fleshy forming the only edible part of the fruit.

MATERIAL REQUIRED

- Test Tubes
- Burner
- Litmus paper
- Laboratory reagents
- Various fruits
- Vegetables juices

CHEMICAL REQUIREMENTS

- pH indicator
- Iodine solution
- Fehling solution A and Fehling solution B
- Ammonium chloride solution
- Ammonium hvdroxide
- Ammonium oxalate
- Potassium sulphocynaide solution

PROCEDURE

The juices are made dilute by adding distilled water to it, in order to remove colour and to make it colourless so that colour change can be easily watched and noted down. Now test for food components are taken down with the solution.

TEST, OBSERVATION & INFERENCE

Test	Observation	Inference
ORANGE TEST:		
Test for acidity:		
Take 5ml of orange juice in a test tube and dip a pH paper in it. If pH is less than 7 the juice is acidic else the juice is basic.	The pH comes out to be 6.	Orange juice is acidic.
Test for Startch:		
Take 2 ml of juice in a test tube and add few drops of iodine solution. It turns blue black in colour than the starch is present.	Absence of blue black in colour.	Orange juice is acidic.
Test for Carbohydrates (FEHLING'S TEST):		
Take 2 ml of juice and 1 ml of fehling solution A & B and	No red coloured	Carbohydrates absent.

boil it. Red precipitates indicates the presence of producing sugar like maltose, glucose , fructose & Lactose.	precipitates obtained.	
Test for Iron:		
Take 2 ml of juice add drop of conc. Nitric acid. Boil the solution cool and add 2-3 drops of potassium sulphocyanide solution .Blood red colours shows the presence of iron.	Absence of blood red colour.	Iron is absent.
Test for Calcium:		
Take 2 ml of juice add Ammonium chloride and ammonium hydroxide solution. Filter the solution and to the filterate add 2 ml of Ammonium Oxalate solution. white ppt or milkiness indicates the presence of calcium.	Yellow precipitate is obtained.	Calcium is present.
Test	Observation	Inference
TOMATO TEST:		
Test for acidity:		
Take 5 ml of orange juice in a test tube and dip pH paper in it. If pH is less than 7 the juice is acidic and if the pH is more than 7 the juice is basic.	The pH comes out to be 5.	Tomato juice is acidic.
Test for Startch:		

Take 2 ml of juice in a test tube and few drops of iodine solution. If blue black colour appears than starch is present.	Absence of blue black colour.	Starch is present.
Test for Carbohydrates (FEHLING'S TEST):		
Take 2 ml of juice and 1 ml of fehling solution A & B and boil it. Red precipitates indicates the presence of producing sugar like maltose, glucose , fructose & Lactose.	Absence of red colour precipitates.	Carbohydrates are not present in tomato.
Test for Iron:		
Take 2 ml of juice add drop of conc. Nitric acid boil the solution cool and add 2-3 drops of potassium sulphocyanide solution. Blood red colours shows the presence of iron.	Presence of blood red colour.	Iron is present.
Test for Calcium:		
Take 2 ml of juice add Ammonium chloride and ammonium hydroxide solution. Filter the solution and to the filterate add 2 ml of Ammonium Oxalate solution. White ppt or milkiness indicates the presence of calcium.	Yellow precipitates obtained.	Calcium is present.

CONCLUSION

From the table given behind it can be conducted that most of the fruits & vegetable contain carbohydrate & vegetable contain carbohydrate to a small extent. Proteins are present in small quantity. Therefore one must not only depend on fruits and vegetables for a balance diet.