

# Determination of Calcium Content in Rare Fruits *Eugenia jambolina* and *Cordia Sebestina*

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**ABSTRACT:** The calcium content of rare fruits grown in Latur Dist. was determined by gravimetric estimation. The random samples of rare fruits selected are weighted and analyzed. The resulting oxalate precipitate is digested, filtered, washed, dried and ignited to definite temperature to constant weight. The present work is carried out for *Eugenia Jambolina* and *Cordia sebastina* rare fruits seasonally grown in Latur Dist.

**KEYWORDS:** Calcium, fruits, gravimetric, precipitate,  $\text{KMnO}_4$ , Ash, *Eugenia jambolina* and *Cordia sebastina*.

## I. INTRODUCTION

The fruits with one or the other vitamin content exert a tonic effect in body when eaten in the fresh raw and ripe state instead of in processed form. The mineral calcium is essential for strong bone and teeth. It is present in sufficient quantity in carrot, bitter melon, onion and tomato. All the three nutrients fats, proteins and carbohydrates contribute to energy requirements thereby undergo oxidation by combining with oxygen to produce energy, 36 KJ per gram in case of fats, 16-20 KJ per gram in case of proteins and 16 KJ per gram in case of carbohydrates upon complete combustion. On the other hand (sugar) carbohydrates which are readily soluble in water are the best sources of energy as their energy may be rapidly transported by the blood. The foods included under sugars are jaggery, honey, cane sugar, invert sugar etc. are the concentrated sources of carbohydrates particularly sucrose, glucose and fructose.

The fruits are an excellent source of vitamins and enzymes and are easily digested causing a cleansing effect on the blood and digestive tract. The intake of fruits or fruit juice cures dehydration<sup>1</sup>. The minerals potassium, magnesium and sodium content of fruits are responsible for the diuretic effect of these foods. The fruits alkalize the fluids, promote intestinal elimination and keep the body free from toxic waste creeping in the blood from overloaded and sluggish intestinal tract.

The important function of calcium is ossification of bones. Nearly 99% of calcium in the body is present in the skeleton. About 850-950 gms of calcium is present in an average healthy man<sup>2</sup>. Calcium and vitamin D deficiency results in rickets and osteomalacia among children and adults respectively<sup>15</sup>. In osteoporosis serum calcium level is normal but body store is reduced. Osteoporosis occurs because of calcium deficiency. In this condition nervous changes occur and impairment of memory takes place. Depression, irritation, loss of hair and nails, roughness of the skin etc. are the symptoms of these conditions.

Calcium is absorbed maximum from milk and milk products because of the presence of lysine and lactose in it. Ragi is the cheapest source of calcium, therefore it is known as 'poor man's milk'.

## II. EXPERIMENTAL TECHNIQUE

**Procedure:** 100 gm of ammonium oxalate was dissolved in a 200 mL of glass distilled water and stirred, such that the undissolved ammonium oxalate is deposited at the bottom of ammonium oxalate solution in a beaker. 0.5 gm of methyl red was dissolved in 100 mL of 95% alcohol. 50 mL of concentrated acetic acid was mixed with 200 mL of glass

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 6, June 2017

distilled water. 10 mL concentrated ammonia solution was mixed with 40 mL distilled water. 100 mL concentrated Sulphuric acid was added slowly with constant stirring to 400 mL of glass distilled water and cooled. An accurately weighted 0.36 gm of potassium permanganate was dissolved in a small portion of glass distilled water in a beaker then diluted up to a mark of 100 mL using glass distilled water 100 mL standard flask. A 0.01 N potassium permanganate solution was then prepared by diluting 100 mL of 0.1 N Potassium permanganate solutions to one liter in a standard flask.

A 25 ml aliquot of the obtained ash solution was taken in a 250 mL beaker to which around 25 to 50 mL distilled water and two drops of methyl orange were added. The solution was then made slightly alkaline by the addition of dilute ammonia and then slightly acidic with the help of few drops of acetic acid until the colour is faint pink. (pH 5.0) The solution was then boiled for few minutes and precipitate of calcium oxalate ( $\text{CaC}_2\text{O}_4$ ) was digested by just allowing to stand at room temperature for 5 hrs. The precipitate was then filtered through a Whatman filter paper No. 42 and subsequently washed with small portions of distilled water till the filtrate is free from oxalate ion which is tested by use of very dilute acidic  $\text{KMnO}_4/\text{CaCl}_2$  solution. The filtrate was also made free from chloride ion which is tested by  $\text{AgNO}_3$  solution.<sup>6</sup> The larger part of the precipitate in the filter funnel was taken into a 500 mL beaker through the hole made at the bottom of the filter funnel by glass rod using hot dilute  $\text{H}_2\text{SO}_4$  (1:4). The filter was washed 2-3 times with small portion of hot water and washing were collected in the same beaker thereby the residual precipitate was collected together.

The contents of the beaker containing filtrate with oxalic acid was then heated to 70-80 °C and then titrated in hot condition against 0.01 M  $\text{KMnO}_4$  solution till permanent pink colour is obtained. The filter paper in the filter funnel was then transfer to the beaker and titration was continued to obtain the same permanent pink coloured end point.

The amount of calcium (mg/100g) in the fruit was then calculated by applying the formula given below.

## 1. Formula:

$$\text{Calcium (mg/100g)} = \frac{\text{titre} \times 0.2 \times \text{Total volume of Ash solution} \times 100}{\text{Volume taken for Estimation} \times \text{Weight of Sample Taken for Ashing}}$$

## III. RESULTS AND DISCUSSION

Calcium is lacking in many Indian diet. Its deficiency causes rickettes ,pigeon chest, irritability , retarded growth and calcemalaria . It also works as a coordinator among the mineral elements and helps to correct portion of other elements if calcium is present in abundance much iron is not needed.

The analysis data for calcium content for rare fruits under study is given in table 1. The ash content of Jamun (Eugenia Jambolina) observed in the present study (1.63%) was found to be higher as compared to literature value of common fruits like fig (0.6%) Mango (0.4%) Banana (0.8%), Grapes (0.2%) and Indian Gooseberry (0.5%) except the ash content of data (2.1%) which is relatively high. The observed value of ash (1.63%) for Jamun was found to be high as compared to its literature value (0.4%) but lower with respect to value reported by other workers 22.32%.

The calcium content in Eugenia jambolina and cordia sebastina rare fruits was found to be 15.12 and 16.80 mg/100g respectively.

The unique fruit rarely found in this region having property similar to berries and only familiar in the rural areas of Latur know as Shelwat used in the present study exhibits high nutritional value. The ash content of shalwat (cordial sebastina) rare fruit observed in the present study (3.15%) is extremely high as compared to range of ash content of common fruit like date, fig, Apple, Mango, Banana, Grapes and Indian gooseberry (0.2 to 2.1%).

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Vol. 6, Issue 6, June 2017

**Table 1: Analytical data for calcium content of rare fruits**

| Sr. No. | Names of fruits (Local) | Botanical Names   | Weight of rare fruit taken for ashing (g) | Weight of ash obtained (g) | Weight of ash taken for analyses (g) | Total volume of ash solution (mL) | Volume of ash solution taken for analyses (mL) | Volume of 0.01 N KMnO <sub>4</sub> Consumed | Amount of calcium (mg/100g) |
|---------|-------------------------|-------------------|---|----------------------------|--------------------------------------|-----------------------------------|--|---|-----------------------------|
| 1       | <b>Jambhul</b>          | Eugenia jambolina | 198.34                                    | 3.25                       | 1.0                                  | 100                               | 25   | 37.5  | 15.12                       |
| 2       | <b>Shelwat</b>          | Cordia sebestina  | 142.85                                    | 4.5                        | 1.0                                  | 100                               | 25   | 30  | 16.8                        |

## IV. CONCLUSION

The observed calcium content of Jamun (15.12 mg/100g) is relatively almost same as that of calcium content of common fruits mango (14mg/100mg) and banana (17 mg/100g). The observed value of calcium content of Jamun (15.12mg/100g) is also found to be same as that of literature value of Jamun (15.0mg/100g).

The calcium content of cordial sebastina rare fruit observed in present study (16.8mg/100mg) is comparable with that of calcium content of Mango (14.0mg/100g).

From the above conclusion it is also observed that the rare fruit cordial sebastina has very high nutritional value with respect to total minerals and is found to be equally rich in calcium as compared to common fruit.

Therefore force on the basis of conclusions drawn from the results of present investigation it may be suggest that the rare fruit Cordial sebastina are best recommendations as nutrient rich fruit source for treatment mineral deficiency disease also for good health.

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