Studies on the Ascorbic Acid Content of the Ripe and Unripe Fruits of *Balanites aegyptica*

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Abstract
The ascorbic acid (vitamin C) content of the ripe and unripe fruits of Balanites aegyptiaca was determined by using2,6 dichlorophenolindophenol method. The pulp of the ripe and unripe fruits was scrapped and liquidized and then the dye 2,6 dichlorophenolindophenol was run into the juice to determine the end point of the reaction. Ascorbic acid was found to be higher in ripe fruits juice of the tree being o.55mg/100m1, compared with 0.156mg\100ml found to be present in the unripe fruit juice.

Key words: *Ascorbic acid content of ripe, unripe fruits*

Introduction

Balanites aegyptiaca is generally found in the drier areas of the w0rld and particularly in the salt-desert areas. In Africa, balanites aegyptiaca is one of the most widely distributed plants. It had been reported growing in Mauritania, Senegal, gambia. Mali, t.chad, guinea Bissau, niger, Nigeria, Cameroon, Egypt and Sudan shanks, 1991. Although it is widely distributed, *Balanites aegyptiaca* is more commonly found in some regions than others. It occurs abundantly in the Sahel savanna and Northern Nigeria, Niger and central Sudan.

Balanites aegyptiaca requires_ annual rainfall between 400 and 800 millimeters shanks, 1991. *Balanites aegyptiaca* fruits and leaves become a significant source of emergency food for livestock, and the tree serves as a source of shelter and food for livestock and farmers. The flesh of the fruits, the seeds, flowers, and the leaves of *Balanites aegyptiaca* are all edible. The flesh of both the ripe and unripe fruits is eaten straight from the tree or later when dried the plup is especially rich in carbohydrates including sugars which form up to 40% of the content, and vitamins vitamin in particular as reported by shanks, 1991.

Ascorbic acid vitamin which is among the vitamins contained in the pulp of the *Balanites* fruits is required for the formation of intercellular materials, and when deficient in humans, a disease known as scurvy results Roberts,2003.as a contribution towards the improvement of health status and welfare of the local community. and considering the importance of ascorbic acid, this study was carried out to determine the ascorbic acid, content of the ripe and unripe fruits of *Balanites aegyptiaca.*

Materials and Method

The ripe and unripe fruits of *Balanites aegyptiaca* were obtained from various trees around the usman Danfodiyo University Sokoto main campus. In the month of December 2015. The epicarp (outer cover) of the fruits was removed by using a sharp razor blade. The flesh of the fruits (pulp) was scrapped using the razor blade. The pulp of the ripe and unripe fruit

was then put into two separate beakers and each one weighed to 50mg. the pulp of the ripe fruit was first treated by pouring it into a liquidizer together with 50ml of distilled water to make it into liquid form. The unripe pulp was also treated thus and the volume of each was then measured . the volume of the ripe fruit juice was found to be 200ml and the volume of unripe fruit was also 200ml.

REAGENTS

1. Glacial acetic acid.
2. Solution of 2.6 dichlorophenolindophenol.
3. Standard ascorbic acid solution =40mg/ of pure dye ascorbic acid in 100ml of 10% acetic acid.
   Therefore concentration =40mg/100ml
   =2mg/5ml stock standard
   Dilute 5ml to 100ml with 70% acetic acid
   Therefore concentration =2mg/100ml
   =0.1mg/5ml

1ml of dye should be neutralized by 5ml of this solution. Then the experiment was carried out using the above stated materials and reagents by using the following methods.

TREATING THE JUICE OF THE RIPE and unripe FRUITS OF *Balanites aegyptiaca*
0.5ml of the dye was pipetted into a test tube and 1ml of glacial acetic acid was added. The fruit juice was then run slowly into the test tube with constant shaking until a red color had been discharged. The amount(v1/m1)of the ripe fruit juice required to discharge the red color was noted. Then the following calculation was carried out as described by Bender (1999).

CALCULATION

Volume of fruit juice =0.5ml of dye

=0.05mg of ascorbic acid

Therefore 100ml of fruit juice= $\frac{0.056 \times 100\text{mg of ascorbic acid.}}{V}$

V=the volume of ripe fruit juice *Balanites aegyptiaca* needed to discharge the red color of the dye.

RESULTS

The result of samples of the fruit juice used and ascorbic acid contents of each samples after calculation the volume of ascorbic acid of ripe and unripe fruit of *Balanites aegyptiaca.* Were presented in table 1and 2.

TABLE 1: The samples of the fruit juice used, weight of each fruit pulp, volume of each fruit pulp after liquidizing and volume used in determination of ascorbic acid.

Sample of fruits and juice	Number of fruits used	Weight of each pulp	Volume of each fruit pulp after liquidizing	V0lume used in determination of ascorbic acid
Ripe fruit juice of *Balanites aegptiaca*	150 fruits	50mg	200ml	9ml
Unripe fruit jucice of *Balanites aegptiaca*	100fruits	50mg	200ml	32ml

CALCULATION OF THE VOLUME OF ASCORBIC ACID IN THE RIPE FRIUT OF *Balanites aegyptiaca*

V/m of fruit juice = 0.5ml of dye
=0.05ml of ascorbic acid

100ml
of fruit juice $= \frac{0.05mg \times 100mg \text{ of ascorbic acid}}{V}$

Therefore, the volume of ascorbic acid in the juice of the ripe fruit of *Balanites aegyptiaca*

$= \frac{0.05mg \times 100 \text{ mg of ascorbic acid}}{9}$

$= 0.55mg/100ml.$

CALCULATION OF THE VOLUME OF ASCORBIC ACID IN THE UNRIPE FRIUT OF *Balanites aegyptiaca*

V/m of fruit juice = 0.5ml of dye
=0.05ml of ascorbic acid

100ml
of fruit juice $= \frac{0.05mg \times 100mg \text{ of ascorbic acid}}{V}$

Therefore, the volume of ascorbic acid in the juice of the ripe fruit of *Balanites aegyptiaca* $= \frac{0.05mg \ 100 \text{ mg of ascorbic acid}}{32}$

$= 0.156mg/100mg.$

Table 2: shown ascorbic acid contents of each samples after calculation the volume of ascorbic acid of ripe and unripe fruit of *Balanites aegyptiaca.*

Samples	Volume of fruit juice used in determining the end point	Ascorbic acid content in mg/100ml
Ripe fruit juice of *Balanites aegyptiaca*	9m1	0.55mg/100ml
Unripe fruit juice of *Balanites aegyptiaca*	32ml	0.156mg/100ml

RESULT AND DISCUSSION

The quantity was calculated in mg/ml for both the ripe and unripe fruit juice used, as indicated in the table 2 the results obtained were0.55mg/ml for the ripe and 0.156mg/100ml for the unripe fruit juice. Comparing the two results it indicated that the ripe fruit of *Balanites aegyptiaca* contained more ascorbic acid than the unripe one this is in line with plummer (2007) finding whose obtained higher ascorbic content in ripe fruit of lemon than the unripe one. The unripe fruits contain more moisture than the ripe ones becomes dehydrated. The higher moisture content the lower the ascorbic content. Plummer (2007) also reported that, the ascorbic acid content is higher in dehydrated fruit. The tree being abundant in Northern Sudan savanna of West Africa (which include Northern Nigeria) offers a great potential for exploiting the Vitamin C and other nutrients of the fruits especially the ripe one for the economic development of the region. The ANOVA was used to analysed the result it showed that there is significant difference between the ripe and unripe fruit of *Balanites aegyptiaca* $P<0.05$.

RECOMMENDATIONS

A more extensive research should be carried out to be able to explore the vast economic potential of the ascorbic acid content of the ripe fruits of *Balanites aegyptiaca.*

Government should introduce strict measures against harvesting the unripe fruits government should also encourage farmers to grow the tree.

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