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ORIGINAL ARTICLE

Studies On Physico-chemical Properties Of Custard Apple Fruit

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Abstract:

The physico chemical analysis of custard apple was studied .The chemical composition of custard apple pulp was carried out and it is found that pulp is source of carbohydrates 23.9% and good source of protein 1.6%.

KEYWORDS:

Custard apple, pulp, Physico-chemical properties.

INTRODUCTION:

The custard apple (Annona squamosa) is one of the important dry land fruit grown in waste xz land on rain water cultivated throughout the country. A relatively less moist soil and temperate environment will yield the custard apple fruit with good nutritional constituent.

The fruit is not indigenous, but it first originated from Caribbean region it spreads across the Central and South America as well as Africa and Asia. The fruit requires hot climate and fewer water supplies for their growth and hence considered as desert fruit.

The fruit has pleasant texture and flavor and is sweet with slight acidity. Food value lies mainly due to in sugar content which is about 12.4-18.15% and protein 1.6% .Calorific value of fruit is about 1054 kcal per 100gm of edible portion (Fezulkhan and Roat 1953), and custard apple contains 73.3%, Moisture 1.6%, protein 0.3% fat 0.7%, mineral matter 23.9%, carbohydrate. 0.2% calcium 0.04% phosphorous and 1.0 iron. The edible portion of fruit varies from 28-55%. The fruit has acidity ranging from 0.26-0.65%. The variation in composition I attributed to difference in growing conditions and sampling from the tree.

MATERIALS AND METHODS:

Physical analysis:-

Extracted custard apple pulp and final carbonated custard apple juice are two be analyzed for following physical parameters.

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Juice / Pulp yield :-

The Percent juice was calculated on the basis of total weight of fruits.

$$\text{Percent juice} = \frac{\text{Weight of juice}}{\text{Total Weight of fruits}} \times 100$$

Seeds percentage :-

These are calculated on the basis of total weight of fruits and expressed as percent.

Chemical analytical methods :-

Total Soluble Solids (TSS):-

Total Soluble Solids were determined by using Abbes Refractometer and expressed in degree brix (0Brix) .

pH:- It is determined by using pH meter.

ACIDITY :-

This procedure given by Ranganna S. (1986). 10 gm of sample was weighed, transferred to the volumetric flask and volume was made up to 100ml with distilled water, from this and aliquot of 10 ml was taken and 2-3 drops of phenolphthalein indicator was added in it. The sample was then titrated against standard sodium hydroxide solution till pink color was obtain. Titration reading was noted and (%) acidity was calculated using formula,

$$\text{Acidity (\%)} = \frac{64 \times \text{Normality of NaoH} \times \text{titrate reading} \times \text{Volume made up} \times 1000}{\text{Weight of Sample} \times \text{Volume of sample taken for estimation} \times 1000} \times 100$$

REDUCING SUGAR :-

Dinitrosalicylic acid method (DNSA Method),

Weight 100 mg of Sample and extract the sugar with hot 80% Ethanol twice. (5 ml. each time) Collect the supernant & evaporate in the water bath at 800C. add 10 ml of water and dissolve the sugar. Pipette out of 0.5 ml, 0.3 ml with tast tube and equalize the colume 2-3 ml with water in all the tube add 3 ml of DNSA Solution. Heat the contents in boiling water bath for 5 min. when contents of the tube are still warm add 1 ml of 40% Rachel salt solution. Cool and read the intensity of dark read color at bottom. Run a series of standards using glucose (0 to 50 micro grams). and plot a graph.

PROTEIN :-

Protein estimation was done by microkjaldal Method (A.O.A.C. 1984). The method is

divided into three parts.

DIGESTION :-

About 0.5 gm of sample was taken in digestion flask and 0.2-0.2 gm catalyst mixture is added into that. Poured 10 ml of conc. H_2SO_4 in flask and is taken in digestion flask. Continued digestion till it will become color less.

DISTILLATION :

Made up the volume of digested material to 50 ml and 5 ml sample is taken in that. Added 10ml 50% NaoH in distillation flask and 15 ml Boric acid, 4-5 drops of methyl red and bromocresol green indicator. Started distillation by keeping tip of tube bringing ammonia to the flask. Having acid and the 50 ml distillate was collected.

TITRATION:

The distillate was titrated against 0.1 N HCL till color change to pink. Simultaneously carried out the blank.

$$N\ (\%) = \frac{(S-B) \times \text{Normality of CHL} \times 14 \times \text{Volume made up of digest} \times 100}{\text{Aliquot taken for distillation} \times \text{Weight of sample} \times 1000}$$

Protein = N (%) X 6.25

CARBOHYDRATES :

Total sugar was estimated by phenol sulphuric acid method (wankhande nd Tharathan 1979) as follows: 0.4, 0.8, 1.2, 1.6 ml of standard glucose solution is taken in test tubes in that 5 ml . H_2SO_4 and 1 ml 7% phenol solution are added and total volume is made to 8 ml by adding distilled water. The whole mixture is cooled at room temperature for 15 min. and optical density is measured at 620 nm same procedure is followed for same sample. The graph of optical density Vs concentration is plotted and carbohydrates contents is calculated for given sample.

RESULT AND DISCUSSION:

Table No.1 Physical Characteristics of Custard Apple Fruit:

Sr. No.	Physical Parameter	Result
1	Colour of Fruit	Greenish Yellow
2	Weight of Fruit (gm)	168 gm
3	Weight of Peel (gm)	82.56 gm
4	Weight of Pulp (gm)	85.44 gm
5	Length of Fruit (cm)	5.4 cm
6	Breadth of Fruit (cm)	4.3 cm
7	No of Seeds	26
8	Waste Index (%)	58.42 %
9	Juice (%)	30.58 %

Chemical Characteristic of Custard Apple Fruit:

As custard apple contains above ingredients so that it increases nutritive value of custard apple bar. Acidity of custard apple increases on long storage with change in colour and appearance also

Table No.2 Chemical Composition of Custard Apple Fruit

Sr. No.	Chemical Parameter	Content %
1	Moisture	73.3
2	Protein	1.6
3	Fat	0.3
4	Minerals	0.7
5	Edible Portion	28-55
6	Carbohydrates	23.9
7	Acidity	0.26 - 0.65

SUMMARY AND CONCLUSION:

Data presented in above table indicates that the average weight of greenish yellow coloured custard apple fruit was about 168 gm , with the average length of 5.4 cm , and breadth of 4.3 cm respectively. The no of seeds were 26 , the weight of peel 82.44 gm , and weight of pulp 85.44 gm. The percent Juice was of 30.58% and the percent of waste index was 58.42% respectively.

Weight , length , breadth , of fruit may vary according to climatic conditions and from fruit to fruit. If less the percentage of peel then the percentage of pulp will be more and vice-versa.

REFERENCES:

Ranganna S. (1986) Hand Book of analysis and quality control for fruits & vegetables products 2nd edition Tata Mc Graw Hill Publishing Co. Ltd. New Delhi.