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Product Development from Tender Green Coconut and Its Organoleptic Testing and Sensory Evaluation

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Abstract: Water is essential for life. There are a variety of trace elements present in virtually all potable water, some of which play a role in metabolism. For example, sodium, potassium, and chloride are common chemicals found in small quantities in most waters. Tender green coconut water is a pure and nutritious beverage in the natural state. Green Coconut water refers to the liquid endosperm of a tender coconut at an age of approximately 9 months from time of pollination, the period before the solid endosperm or white meat forms. Green coconut husk is an excellent package for the water which contains sugars, minerals, amino acids, electrolytes, and vitamins. Different products prepared by using tender green coconut and its organoleptic testing and sensory evaluation by using a hedonic scale. It is an excellent tonic for the old and sick and cures malnourishment. So that, these products available everywhere and in every season for the people and fulfil their nutritive value and helpful for preventing diseases.

Keywords: Antimicrobial Activity, Antithrombotic Activity, Antioxidant Activity.

I. INTRODUCTION

Tender coconut plays an important role in maintaining the sodium, potassium, and maintaining and balancing the body. The term coconut refers to the seed or the fruit of coconut palm (*Cocos nucifera*). *Cocos* is a monotypic genus of the family Arecaceae. The ideal growing conditions for coconut palms include free-draining aerated soil often found on sandy beaches, a supply of fresh groundwater, humid atmosphere, and temperatures between 27°C and 30°C.

Green Coconut water refers to the liquid endosperm of a tender coconut at an age of approximately 9 months from time of pollination, the period before the solid endosperm or white meat forms. Green coconut husk is an excellent package for the water which contains sugars, minerals, amino acids, electrolytes, and vitamins.

- a) The electrolyte and mineral balance makes tender coconut water suitable for a sports drink. However, it is very sensitive to deterioration and the water is unsuitable for drinking after a day or so due to external contamination by microorganisms and oxidation because of which it loses most of its sensory and nutritional characteristics.

b) COMPOSITION

Chemical analysis reveals that in every 100 grams of the kernel there are 4.5 grams of protein, 41.6 grams of fat, and 13 grams of glucose, besides several kinds of minerals like calcium, phosphorus and so on.

Green Coconut contains enzymes, such as invertase, oxidase, and catalase that reduce hydrogen peroxide. The fresh kernel contains nitrogenous substances, fat, lignin, ash, palm sugar (glucose and cane sugar) and inorganic substances. The coconut milk contains

sugar (mannitol), gum, albumen, tartaric acid and mineral water. The ashes from the leaves contain a high proportion of potash. Coconut oil comprises a free caprylic acid, and also such glycerides like luric, myristic, palmitic and stearic acids.

SPECIFIC CURES

- 1) **Urinary Disorders:** Difficult urination, bleeding of the nose and Obstructed urination. Raktaprameha (urinary disorders with blood discharge), Urinary stones.
- 2) Tri-dosha relief and Acidity, Cataract, Loss of consciousness and mental confusion, Gastrointestinal diseases, Cough and Headaches, Pregnancy, Pain in the chest, Skin problems, Affliction of luvu or hot wind, Mal-absorption, Injuries, Wounds and Burns, Breathlessness, Piles, Throat inflammations, Oral diseases, Ear Problems, Massage.

II. MATERIALS AND METHODS

Collection of TCW: Fresh Tender green coconut were collected from local market of Lucknow, Uttar Pradesh for the study.

PREPARATION OF CLASSIFIED SAMPLES: The required sample for the product development are tender coconut, preservatives (citric acid, ascorbic acid, cysteine, and potassium metabisulphate), patli jaggery, rice and pulses for idli making.

Products are:

- i) Mocktail
- ii) Tender coconut chutney
- iii) Idli: Staffing with tender coconut, patli jaggery.

Preparation of idli with stuffed coconut and patli jaggery (Khjur Gur)

Tools- Mixer grinder, Grater, Fry pan, Idli cooker, Idli stand, spatula, Knife,

Collection of ingredients: Crushed coconut, Urad pulse, rice, salt, oil for frying, tray, water.

Preparation of Coconut chutney

Tools: Mixer grinder, Frying pan, Knife, Grater

Collection of Ingredients: Oil, Groundnut, Patli jaggery (Gur), Salt, Green chilli, Garlic, Cardamom, Coconut white

Preparation of Coconut water Mocktail

Ingredients: Fully matured, ripened Coconut water, Coconut meat, Limca, Soda, Mint leaves, Lemon for garnishing was procured from the local market of the Lucknow.

Sensory Evaluation

Sensory evaluation is a scientific discipline that analyses and measures human responses to the composition of food and drink, e.g. appearance, touch, odour, texture, temperature, and taste. In schools, it provides an ideal opportunity for students to evaluate and give feedback on their dishes, test products, and experimental designs.

Sensory evaluation can be used to:

- compare similarities/differences in a range of dishes/products;
- evaluate a range of existing dishes/food products;
- analyse food samples for improvements;
- gauge responses to a dish/product, e.g. acceptable v unacceptable;
- explore specific characteristics of an ingredient or dish/food product;

In this study, the sensory evaluation is done in our Department of Food Science and Technology by trained and expert nutrition staff member, and the technique of sensory evaluation was 9- point Hedonic Scale.

III. RESULT AND DISCUSSION

The experimental coconut water products were sensory evaluated by a panel of five members on a 9 point hedonic scale and marking was done on the basis of six parameter-

- Body and Texture
- Colour
- Appearance
- Flavour
- Taste
- Overall Acceptability

Treatments

Table 1: Distribution of Sample

Treatments	Sample Preparations
T1	Coconut Mocktail
T2	Idli with stuffed coconut
T3	Tender Green Coconut chutney

1) Parameter 1: Flavour

Table1 – Individual Marking for Flavour

	T1	T2	T3
Member 1	7	8	7
Member 2	8	8	8
Member 3	8	8	8
Member 4	7	8	8
Total	30	32	31

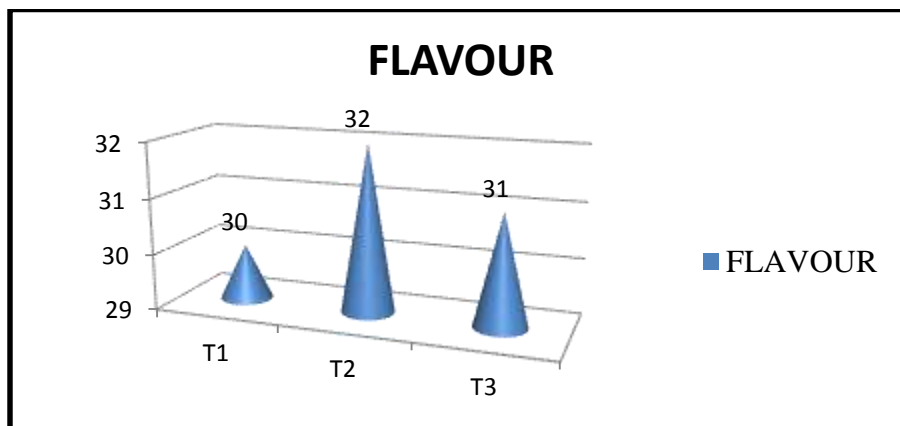


Fig1: Graphical Representation of Scores for Flavour

- The above mentioned score represents individual marking by members on the basis of flavour, the minimum average score is 30 by A1 while the maximum is of A2 with an average of 32.

2) Parameter 2: Appearance

Table 2: Individual Marking for Appearance

	T1	T2	T3
Member 1	9	8	7
Member 2	8	7	6
Member 3	6	8	8
Member 4	7	7	8
Total	30	30	29

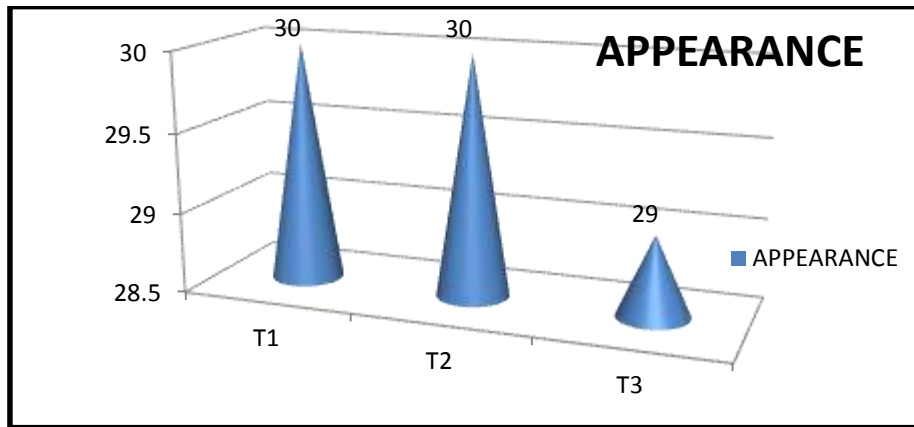


Fig. 2 Graphical Representation of Scores for Appearance

- The above mentioned score represents individual marking by members on the basis of appearances, the minimum average score is 29 by A3 while the maximum is of A1 and A2 with an average of 30.

3) Parameter 3: Colour

Table 3: Individual Marking for Colour

	T1	T2	T3
Member 1	8	7	8
Member 2	7	7	7
Member 3	7	8	8
Member 4	8	7	7
Total	30	29	30

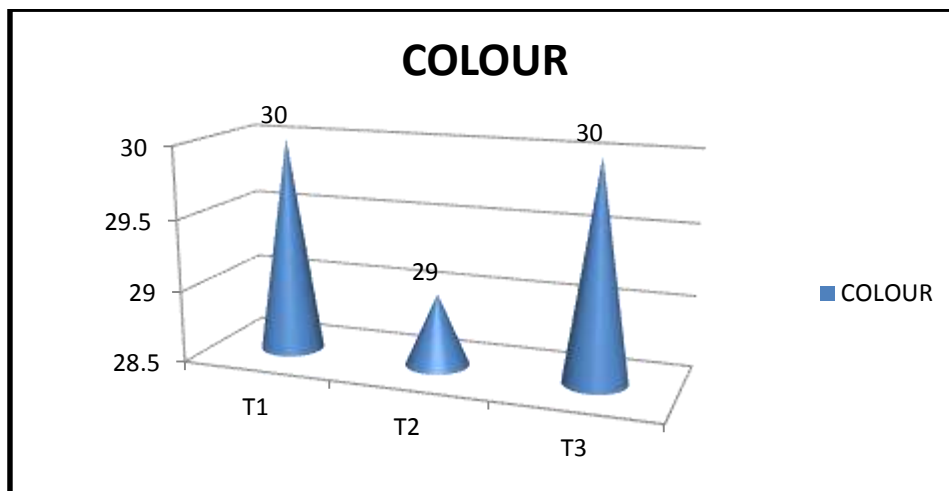


Fig. 3: Graphical Representation of Scores for Colour

- The above mentioned score represents individual marking by members on the basis of appearances, the minimum average score is 29 by A2 while the maximum is of A1 and A3 with an average of 30.

4) Parameter 4: TASTE

Table 4: Individual Marking for Taste

	T1	T2	T3
Member 1	8	8	7
Member 2	8	8	8
Member 3	8	8	8
Member 4	8	7	8
Total	32	31	31

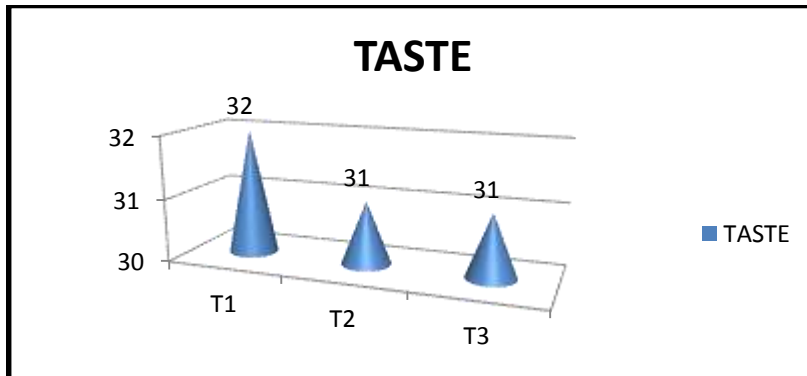


Fig. 4: Graphical Representation of Scores for Taste

- The above mentioned score represents individual marking by members on the basis of Taste, the minimum average score is 30 by A2 and A3 while the maximum is of A1 with an average of 31.

5) Parameter 5: TEXTURE FEEL

Table 5: Individual Marking for Texture Feel

	T1	T2	T3
Member 1	8	7	7
Member 2	7	7	7
Member 3	8	7	8
Member 4	8	8	8
Total	31	29	30

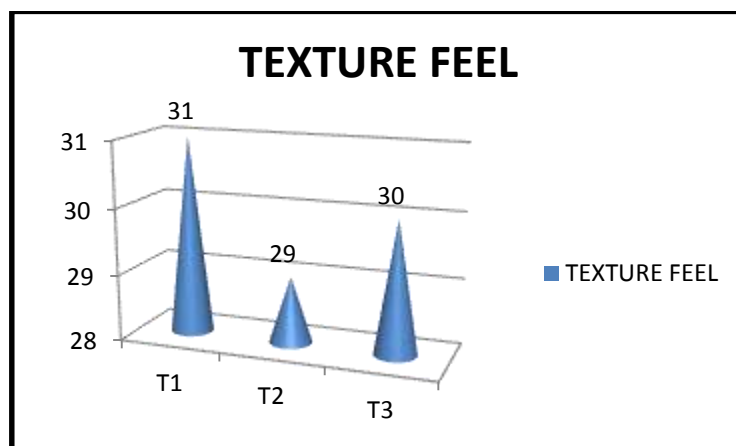


Fig. 5: Graphical Representation of Scores for Texture Feel

- The above mentioned score represents individual marking by members on the basis of appearances, the minimum average score is 29 by A2 while the maximum is of A1 with an average of 31.

6) Parameter 6: OVERALL ACCEPTABILITY

Table 6: Individual Marking for Overall Acceptability

	T1	T2	T3
Member 1	7	8	7
Member 2	8	7	7
Member 3	8	8	8
Member 4	8	7	8
Total	31	30	30

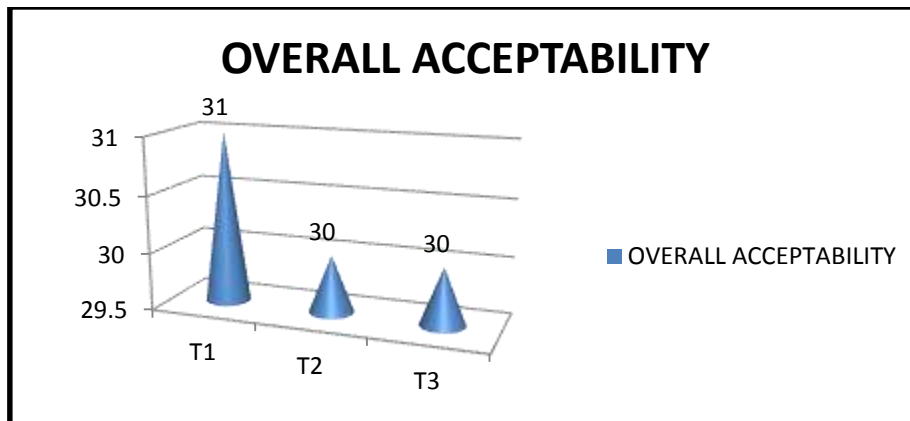


Fig.6: Graphical Representation of Scores for Overall Acceptability

- The above mentioned score represents individual marking by members on the basis of overall acceptability, the minimum average score is 29 by A3 while the maximum is of A1 and A2 with an average of 31.

Table 7: Overall Calculation

PARAMETERS	T1	T2	T3
1	30	32	31
2	30	30	29
3	30	29	30
4	32	31	31
5	31	29	30
6	31	30	30
TOTAL	184	181	181
AVERAGE	30.66	30.16	30.16
STANDARD DEVIATION	0.816497	1.169045	0.752773

Table7: Overall Calculation

- In this above table, it was found out that the overall calculation the average value is 30.66, 30.16 and 30.16.
- Standard deviations are 0.8164, 1.1690 and 0.7527 of T1, T2 and T3 respectively.
- Sample2 (T1) with the highest average and low standard deviation is most accepted statically, hence T1 is most accepted.
- A sample of Idli stuffed with coconut and pattlijaggery (T1) with Average 30.66 and standard deviation 0.8164 is most accepted among all.

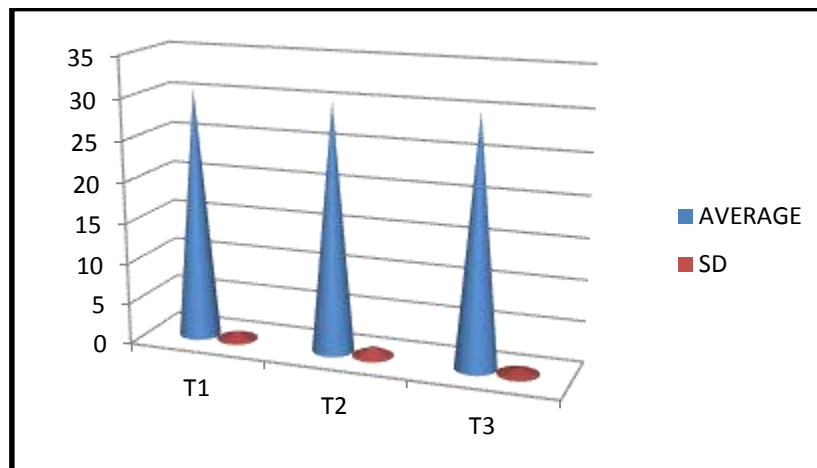


Fig 7: Graphical Representation of Average Score and Standard Deviation for Overall Calculation

Where T2= Coconut Mocktail, T2= Sample Idli with stuffed coconut and pattlijaggery, T3= Coconut Chutney, P= Parameter (P1= Body and Texture, P2=Colour, P3=Appearance, P4=Flavour, P5=Taste, P6=Overall Acceptability), Average(Mean) = T1, T2 and T3 as 30.66, 30.16 and 30.16 respectively, S.D.= Standard Deviation (SD reflex the fluctuation in the marks given by different Members and for different parameter)

SUMMARY AND CONCLUSION

Result & discussion chapter in any research work must be compiled with summarization & conclusion section.

Characterisation of Nutritional Profile of Tender Green Coconut Water and Coconut White: The protein content is higher in coconut meat is 2g than the coconut water (0.7g) per 100 g of the sample weight. The total energy of coconut meat is 467.0 cal and coconut water 19 cal in the whole coconut. Mainly, Good Potassium and Sodium content present in coconut water as an electrolyte. It is rich in antimicrobial and antioxidant properties. Also, have antithrombotic activity in tender coconut water. Calcium, Iron, Magnesium minerals are rich in pattli jaggery which enhances the nutritive value of the products prepares by coconut.

Product Development-Three samples were prepared by using Tender Green Coconut Water and Coconut Cream.

Sensory Quality of Coconut Products: The Sensory Evaluation of the Idli with stuffed Coconut and Pattli Jaggery, Coconut Chutney, Mocktail was done by using 9- point hedonic scale by a panel of 5 members. The scoring for each of the samples of coconut by various parameter i.e. flavour, taste, texture, colour, appearance and overall acceptability.

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