International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor (2018): 7.426

Preparation and Nutritional Composition of Noodles and Papads using Ragi Flour

Shweta Verma[1], Sunita Mishra[2]

[1]M.Sc. Student, Department of Food Science and Technology, School of Home Science, Babasaheb Bhimrao Ambedkar University, Lucknow- 220 625, India

[2]Professor and Dean, Department of Food Science and Technology, School of Home Science, Babasaheb Bhimrao Ambedkar University, Lucknow- 220 625, India

Abstract: ***The finger millet popularly known as Ragi in India is the important millet grown widely in various part of India, Asia, and Africa. In India, Karnataka, Tamil Nadu, Andhra Pradesh, Orissa, Jharkhand, Maharashtra, and Uttarakhand are the leading Ragi growing states. However, finger millet has approx. (6-8) mg/100mg of protein, (70-74) mg/100mg carbohydrate, (300-320) mg/100mg of calcium, (3.6-5.4) mg/100mg and (1-2) mg/100mg of fat [1]. Therefore, finger millet is the richest source of the calcium and iron. Deficiency of the calcium leads to bone and teeth disorder, and deficiency of the iron leads to Anaemia in the body. It can be controlled by using finger millet in our daily diet. Thus, Ragi is a leading source of good diet for children, old age peoples, and patients. It is also an ideal food for diabetic persons due to its low content of sugar and slow release of glucose in the body [2]. Additionally, Ragi has massive health benefits and also a good source of valuable micro-nutrients along with major food components. In this research, the study was conducted to determine the chemical composition, texture, flavor, and color appearance of the noodles and papads respectively. However, it was observed that noodles and papads prepared with 30% finger millet (Ragi) were nutritionally enriched and highly acceptable.***

Keywords: Finger millet (Ragi), Chemical composition, Noodles, Papads, Calcium and iron deficiency

1. Introduction

Finger millet (**Eleusine coracana**), known as Ragi, originally belongs to the Ethiopian highlands and was cultivated in India time long ago. Finger millet is an enriched source of nutrients especially of calcium (about ten times that of paddy rice or wheat) and iron [3]. To function properly, calcium and iron play an important role in the human body. Calcium deficiency can lead to osteopenia, osteoporosis, cramping of the muscles, and increase the risk of fractures. Iron deficiency can lead to Anaemia. Ragi decreases the cholesterol content in the body and reverts skin aging. Therefore, Ragi acts as a natural treatment for multiple diseases such as Anaemia, diabetes, brittle bones, osteoporosis and also increase bone strength. That is why, finger millet is used to make papads, noodles, soups, pasta, Indian sweet, and bakery products. Nowadays, the papads and noodles industries in India are growing rapidly [4]. The papads and noodles have high acceptance and are important to delivering nutrient in humans. Taking into consideration the need and demand of nutritionally enriched food products the studies have been carried out to formulate the papads and noodles enriched with Ragi flour to satisfy the calcium and iron requirement growing population [5].

Objective

1) To study the nutritional properties of Ragi flour.
2) To know the benefit of Ragi Flour used in Noodles and Papads.

2. Material and Method

Finger millet (Ragi Flour), refined wheat flour, Tapioca pearls (Sabudana) and other ingredients were procured from Spencer store, Lucknow of Uttar Pradesh, India. Finger millet (Ragi) flour and refine wheat flour were mixed and passed through multiplesieves to obtain a fine powder for noodles and same process repeated with finger millet (Ragi) and sabudana for papads. Then kneaded the mixer by the hands followed by addition of water in a proper amount. Four flour blends were prepared by incorporating finger millet flour with refining wheat flour and sabudana at 25, 30, 40, 50% level for noodles and papads as shown in table 1 and 2 respectively. Therefore, these levels were evaluated for different nutritional quality parameters.

Table 1: Ratio of Ingredients for Noodles

Treatment	*Sample Ingredients*	*Ratio (%)*
T_1	Ragi Flour + Refined Wheat Flour	25: 75
T_2	Ragi Flour + Refined Wheat Flour	30: 70
T_3	Ragi Flour + Refined Wheat Flour	40: 60
T_4	Ragi Flour + Refined Wheat Flour	50: 50

Table 2: Ratio of Ingredients for Papads

Treatment	*Sample Ingredients*	*Ratio (%)*
T_1	Ragi Flour + Tapioca Pearls (sabudana)	25: 75
T_2	Ragi Flour + Tapioca Pearls (sabudana)	30: 70
T_3	Ragi Flour + Tapioca Pearls (sabudana)	40: 60
T_4	Ragi Flour + Tapioca Pearls (sabudana)	50: 50

Source: The following tests were determined at the RFRAC center (regional food analysis center) Lucknow.

3. Result and Discussion

Sensory Evaluation

Finger millet noodles and papads were evaluated for sensory quality characteristics. The 'Nine Point Hedonic Scale' was used to test the liking or disliking for noodles and papads while the 'Score Card Method' was used to test which contribute to the acceptability of the product [6, 7]. Sensory evaluation has been done by a trained panel of two members for different parameters.

Parameter-1: Flavour and Taste

Table 3: Marking by the panel member to flavor and taste

Member	T_1	T_2	T_3	T_4
M_1	7	9	7	6
M_2	8	8	7	6
Total	15	17	14	12

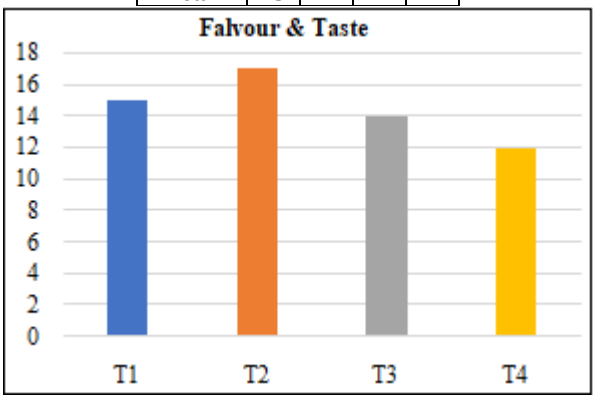

Figure 1: Graphical representation for **'Flavour & Taste'**

Parameter 2: Body and Texture

Table 4: Marking by the panel member to body and texture

Member	T_1	T_2	T_3	T_4
M_1	6	9	6	7
M_2	6	9	6	7
Total	12	18	12	14

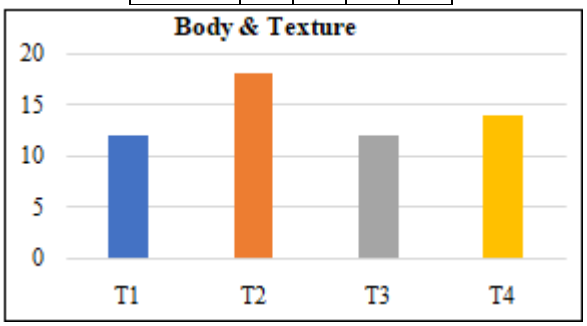

Figure 2: Graphical representation for **'Body & Texture'**

Parameter 3: Colour and Appearance

Table 5: Marking by the panel member to color and appearance

Member	T_1	T_2	T_3	T_4
M_1	7	9	5	5
M_2	6	9	6	5
Total	13	18	11	10

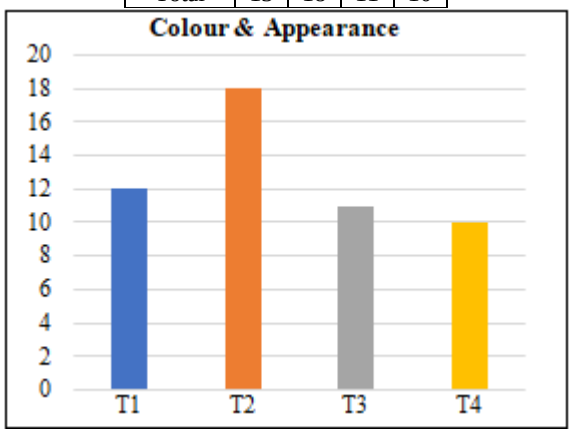

Figure 3: Graphical representation for **'Colour & appearance**

Parameter 4: Overall Acceptability

Table 6: Marking by the panel member to overall acceptability

Member	T_1	T_2	T_3	T_4
M_1	7	9	7	6
M_2	8	9	6	7
Total	15	18	13	13

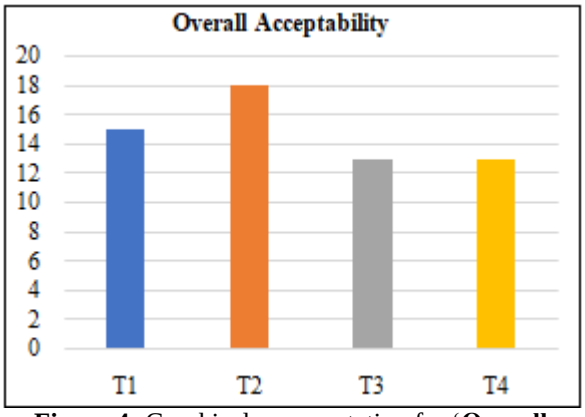

Figure 4: Graphical representation for **'Overall Acceptability'**

Table 7: Overall Calculation

Parameters	T_1	T_2	T_3	T_4
1	15	17	14	12
2	12	18	12	14
3	13	18	11	10
4	15	18	13	13
Total	55	71	50	49
Average	13.75	17.75	12.5	12.25
Standard Deviation	1.3	0.433	1.12	1.48

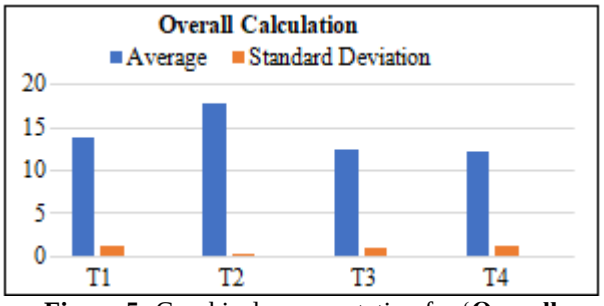

Figure 5: Graphical representation for **'Overall calculation'**

Sensory evaluation of noodles and papads by scorecard revealed that noodles and papads with 30% finer millet (Ragi) were obtaineda significantly higher score for color, taste, appearance, flavor, and texture after taste among all samples. Noodles and papads with 30% finger millet were liked very much and obtained a higher average value and lowest standard deviation among all samples.

4. Conclusion

From the above result, it is concludedthat noodles and papads prepared with 30% finger millet (Ragi Flour) were nutritionally enriched and highly acceptable. Noodles and papads with 30% Ragi Flour showed higher nutrition value.

Nutritional composition of Ragi Noodles

Ragi Noodles contain 152calcium%, 10.08 protein, 71.36 carbohydrate%, 384 (Kcal/100g) energy, 1.65 total ash%, 6.6 Fat%.

Nutritional composition of Ragi Papads

Ragi papads contain 6.64 protein%, 80.76 carbohydrate%, 368(Kcal/100g) energy, 1.27 Total ash%, 3.45 Fat%.

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