



## RESEARCH ARTICLE

### ALLEVIATING MALNUTRITION AMONG RURAL CHILDREN BY USING MORINGA LEAVES

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#### ABSTRACT

Moringa leaves shows great promise as a tool to help overcome some of the most severe problems in rural children- Malnutrition. The main objective of this study was to standardise and develop the product from Moringa leaves to alleviate malnutrition in rural children. This study was carried out to use moringa leaves with maize flour and wheat flour for production of Moringa Nachos and to use moringa leaves with gram flour and wheat flour for production of Moringa Khakhra. For packaging of both products, aluminium wrapper was used which protects the product against physical, chemical, biological and environmental factors. These food products were prepared from Moringa leaf and are evaluated for the chemical and sensory properties. In sensory evaluation sample T2 Moringa Khakhra are most acceptable.

**Key words:** Moringa leaves, Moringa Nachos, Moringa Khakhra, Alleviating Malnutrition

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#### INTRODUCTION

Moringa oleifera tree grows abundantly in developing countries including India especially in the rural areas, where prevalence of malnutrition is high. For children the daily requirements of calcium, 75% iron requirements and half of protein can be obtained in 100grams of fresh Moringa leaves. Moringa is especially promising as a food source in the tropics because the tree is in full leaf at the end of the dry season when other foods are typically scarce. (Kushwaha *et al.*, 2015). Moringa Nachos and Moringa khakhra are the products by which the problem of malnutrition can be reduced from this country. Aside from moringa, these products include maize flour, wheat flour, gram flour. Malnutrition or malnourishment is a condition that results from eating a diet in which nutrients are either not enough or are too much such that the diet causes health problems. All Moringa oleifera food products have a very high nutritional value. Every part of the tree can be eaten especially the leaves, young shoots, young pods, flowers, roots and the bark (Adeyemi *et al.*, 2012). Moringa has long been considered a panacea for improving the nutrition of poor communities in the tropics and sub tropics (Agbogidi and Ilondu, 2012).

#### Objective

- To standardise and develop the product from moringa leaves.
- To study the packaging and Sensory acceptability of the developed product.

#### METHODOLOGY

##### Preparation of Moringa products

**Tools:** Dehydrator, Mixer, weighing machine, measuring spoon, flat circular rolling board (chakra) and rolling pin (belan), Gas stove, flat pan, oven.

**Collection of Ingredients:** Moringa leaf collected from tree located in Aliganj, Lucknow. wheat flour, maize flour, gram flour, turmeric, cumin seeds and ajwain are purchased from Spencer of Kapoorthala, Lucknow.

**Preparation of Moringa leaf powder:** Collect fresh Moringa leaves, processed to remove dirt and another field damaged portion. The clean and fresh leaves dried in dehydrator at 35°C for 8 hours. collect all dried leaves were ground into powder in a grinder.

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**Preparation of Moringa Nachos:** Collect all ingredient (Moringa leaf powder, maize flour, wheat flour, turmeric powder, ajwain, cumin, garlic, oil, salt, water) and mixed together. Add water and make a dough. Take some dough and roll into a thin sheet on rolling board then make some pores into the sheet. Cut into triangle shape then put them into pre-heated oven and bake at 170 °C for 15 minutes and let them cool.

**Preparation of Moringa khakhra:** Collect all the ingredients (Moringa leaf powder, gram flour, wheat flour, turmeric, ajwain, cumin seed, red chilli powder, oil, salt, milk), mixed it. Add milk and knead into a soft dough. divide the dough into equal portion and roll out each portion into a very thin round, using a little whole wheat flour for rolling. Heat a non-stick flat pan (tawa) and cook each khakhra on a slow flame till pink spots appear on both sides. Continue cooking the khakhra on a slow flame, while pressing with a folded muslin cloth, till it turns crisp and brown from both the sides.

**Packaging:** Food packaging is the most reliable method food containment. This is the best way to safely control and protect the food against physical, chemical, biological and environmental factors. It would be our duty as consumers to check the goods or food that we purchase in the market whether they are well packaged or sealed.

**Tools:** Aluminium wrapper, Sealing Machine

**Procedure:** Nachos and Khakhra fill in the aluminium wrapper with clean and dry hand. Seal the wrapper with sealing machine.

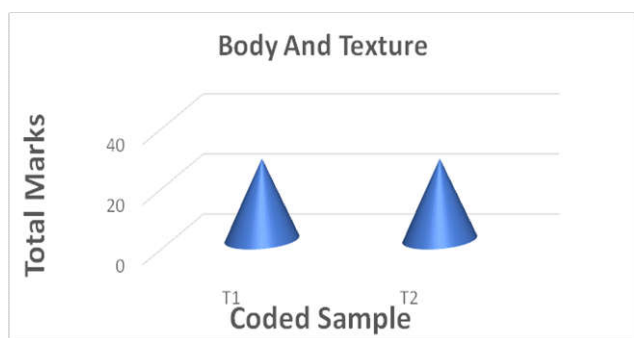
**RESULT AND DISCUSSION**

The result and discussion chapter are based on the Sensory acceptability of Moringa Nachos Moringa khakhra. 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 Hedonic scale.

Distribution of sample T1: Moringa Nachos  
T2: Moringa Khakhra

**Table 1. Individual Markings for Body and Textur**

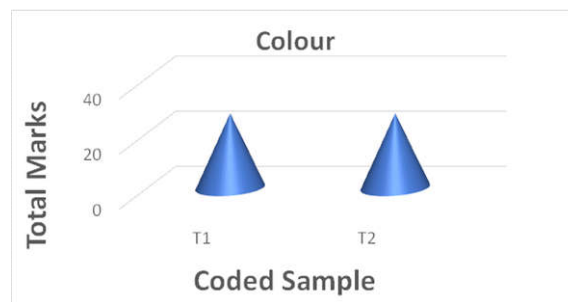
	T1	T2
Member 1	9	9
Member 2	9	9
Member 3	9	9
Total	27	27



**Fig. 1. Graphical presentation of body and texture**

**Table 2. Individual Markings for Colour**

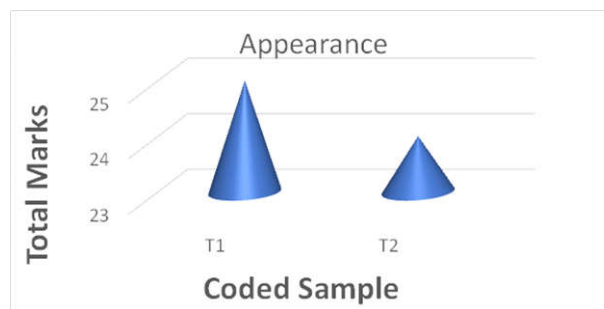
	T1	T2
Member1	9	9
Member2	8	9
Member3	9	9
Total	26	27



**Fig.2. Graphical presentation of colour**

**Table 3. Individual Markings for Appearance**

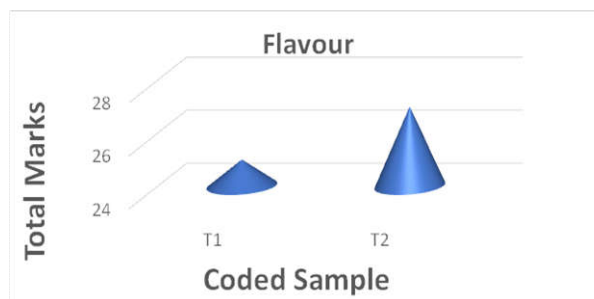
	T1	T2
Member 1	9	8
Member 2	9	8
Member 3	9	8
Total	27	24



**Fig. 3. Graphical presentation of Appearance**

**Table 4. Individual Markings for Flavour**

	T1	T2
Member 1	9	9
Member 2	8	9
Member 3	8	9
Total	25	27



**Fig. 4. Graphical presentation of Flavour**

**Table 5. Individual Markings for Taste**

	T1	T2
Member 1	9	9
Member 2	8	9
Member 3	8	9
Total	25	27

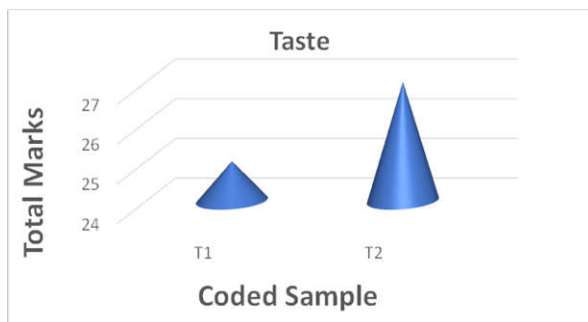


Fig. 5. Graphical presentation of Taste

Table 6. Individual Marking for overall Acceptability

	T1	T2
Member 1	9	9
Member 2	8	9
Member 3	8	9
Total	25	27

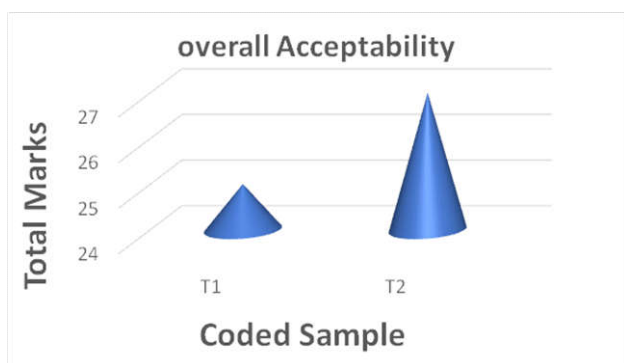


Fig. 6. Graphical presentation of Overall Acceptability

Table 7. Overall calculation

PERAMETERS	T1	T2
1	27	27
2	26	27
3	27	24
4	25	27
5	25	27
6	25	27
Total	155	159
Average	22.14	26.5
Standard deviation	13.28	1.22

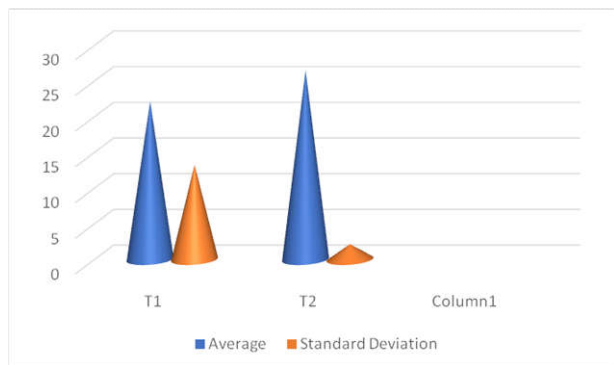


Fig.7. Graphical presentation of overall calculation

**Conclusion**

Moringa leaves play a great roll in alleviating Malnutrition among rural children at little or no cost, malnourished children treated with it tend to recover more rapidly than those whose mothers are obliged to follow the modern approach which

involves purchasing expensive milk powder, cooking oil and sugar. The major advantage of using Moringa leaves in this study is the fact that it is a local resource, two sample products are developed by using Moringa leaves, wheat flour, gram flour and maize flour – Moringa Nachos and Moringa Khakhra. In terms of quality by sensory evaluation scoring given by the panellist mambers on texture, colour, appearance, flavour and taste are calculated in the table, by this we get do statistical analysis and obtained the average of T1, T2 are 22.14, 26.5 respectively, standard deviation are 13.28 and 1.22 respectively. Sample T2 with highest average and lowest standard deviation is most acceptable statistically, hence sample T2 is most acceptable then T1.

**Recommendation**

- This product could not only be used by malnourished children but also by patients with diabetes, cardiovascular disease anaemia, cancer and hypertension.
- The moringa khakhra and Nachos are cheap in cost and can be used daily to overcome deficiency of nutrients.
- These Nachos and khakhra are not only for children but also for all age group.

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