

Development and Sensory Properties of Pizza Base Fortified with Drumstick Leaves Powder (*Moringa oleifera*).

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Abstract

This study was undertaken to observe the sensory attributes of the pizza base enriched with different proportions of *Moringa oleifera* leaf powder (MOLP) and pearl millet flour. Two samples T1 and T2 were supplemented using pearl millet flour and refined flour (maida) in different proportions along with the control containing 100% refined flour (maida). Pizza is the most widely eaten junk food and can be prepared easily so, enhancing its nutritional properties can be useful to control lifestyle diseases and provide proper nutrition. *Moringa* or drumstick leaves are the great source of nutrients especially protein, fibre, calcium, vitamin A and C and can play a vital role in food fortification. *Moringa* leaf powder was been prepared for the fortification using solar dryer and then grinded into powder and sieved to get the fine powder. The experiment was been carried out in kitchen of Department of Food and Nutrition, School of Home science, BBAU, Lucknow. Two samples were prepared by supplementing 5g and 10g of MOLP of which the sample T2 supplemented with 5g of MOLP showed best acceptability (8.77) in the sensory evaluation when compared to control which had overall acceptability (8.86). So, the present study suggests that *Moringa* can be used to prepare food products due to its greater acceptability and medicinal and nutritional benefits.

Keywords: Pizza base, *Moringa oleifera*, Sensory Properties, Enrichment.

1. Introduction

Pizza is the most widely eaten junk food in the world wide. It is an Italian traditional food that is quite popular among Asian countries, especially the fast food chains. Owing to the excessive consumption of pizza in today's era had resulted in various lifestyle diseases like obesity and diabetes, etc.

The food fortification refers to the addition of nutrients at improved level than those found in the original food. Fortification is choice with improvement, fortified foods are also better in overcoming the risk of the multiple deficiencies, a vital advantage to growing and developing children who need an endured supply of micronutrients for development and growth and to women of reproductive age who need to enter the phase of pregnancy and lactation with enough nutrient store. Pizza is one of the most world famous Italian dishes due to its clarity, savour and nutritional value.

Pearl millet (*Pennisetum glaucum*) is a minor millet consisting of low glycaemic index, low glycaemic load and gluten free cholestermic, anti hypertensive properties which help in improving certain diseases like cancer,

gastrointestinal disorders, atherosclerosis, diabetes and obesity. now a day's modernization has made to increase the requirement for therapeutic bakery products with least changes in the composition and making, yet capable in the working conditions

Moringa oleifera (Family: Moringaceae) commonly known as drumstick or sahjan is known as 'miracle tree' as all the parts of the plant acquire nutritional and medicinal properties. It is the cheapest staple highly nutritive plant abundantly available in our country mostly in the southern states and now days cultivated by farmers due its medicinal properties. Moringa contains high concentrations of ascorbic acid, iron, calcium, phosphorus, copper, vitamin A, B, and C which has a good medicinal and nutritional effect. The leaves are rich in fibre which can help to overcome lifestyle diseases like obesity and diabetes and other nutritional deficiency diseases. Moringa is a good option for people who do not consume meat as it has a good amount of protein in its leaves, pods, flowers and seeds.

Observing all these details in view, an effort was made to develop nutrient rich pearl millet and Moringa leaf powder pizza base and determine its sensory attributes.

2. Materials and Method

2.1. Materials:

Fresh Moringa leaves were collected from Shaheed nagar colony nearby Baba Saheb Bhimrao Ambedkar University, Lucknow. Pearl millet flour and refined flour (maida) was purchased from the local market near by the University. Other ingredients for making pizza base were also purchased from the local market in a single slot.

Moringa leaves were collected and pruned carefully, leaves were washed thoroughly so that all the dust and other particles get discarded. The leaves were steam blanched for 7 minutes and then transferred to a tray and the tray was placed in a solar dryer for 2-4 days for dehydrating the leaves. After dehydrating, the leaves were transferred to mixer jar and grinded to powder and sieved to get fine powder.

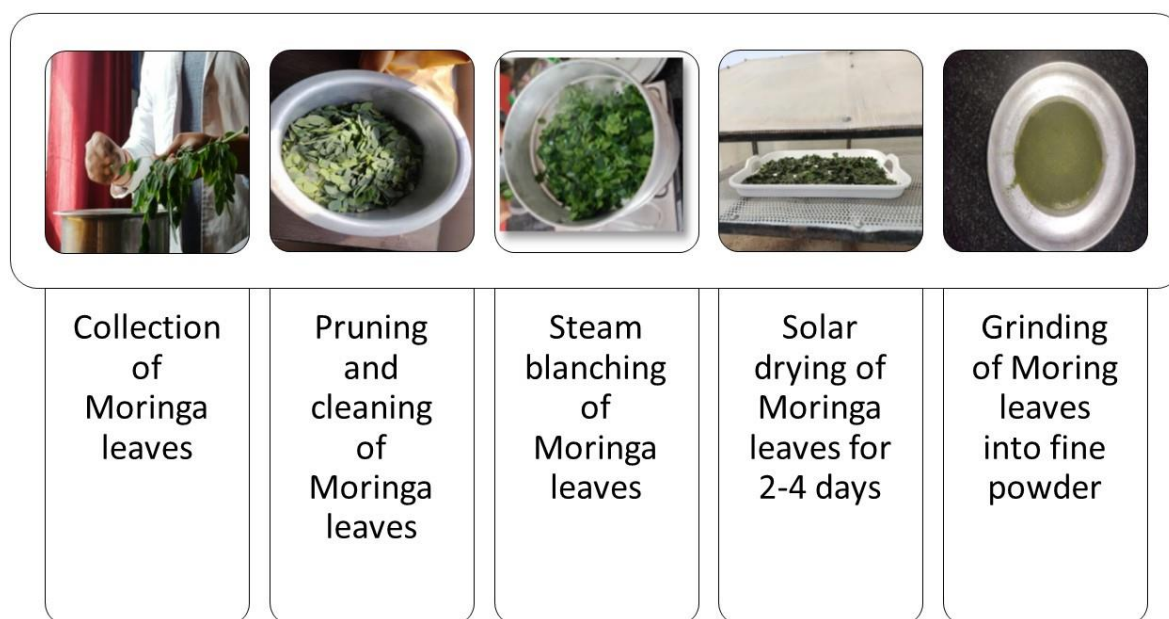


Fig: 2.1.1. Processing of Moringa leaves into powder.

2.2. preparation of pizza base enriched with *Moringa oleifera* leaf powder :

2.5g yeast, 50ml luke-warm water, and 2.5g sugar were mixed in a bowl and kept a side for 10 minutes for yeast activation. After the yeast activation pearl millet flour, refined flour and Moringa leaves powder was added it with 5ml refined oil and 5g of salt and was kneaded to a medium soft dough and the dough was covered using a cling wrap and was kept aside for 1^{1/2} hour. After the desired time the was risen up almost to its double due to yeast fermentation. The dough was kneaded again and was divided into equal parts and were rolled into flat pizza bases of 7inch in diameter and were poked using a fork and placed in baking tray greased with oil and kept at rest for

45 minutes covered with muslin cloth. After 45 minutes the flat pizza bases got risen, the oven was preheated for 10 minutes at 240° and the bases were placed in the oven for baking at 240° for 5 minutes. After baking the pizza bases were cooled at room temperature on a cooling rack. Different combinations of Moringa pizza bases were prepared and used for pizza recipe and were assessed for sensory qualities.



Fig: 2.2.1. Preparation of Moringa pizza base

2.3. Pizza base formulation:

Table: 2.3.1. Proportions for Moringa pizza base.

Ingredients	Control	T1	T2
Refined flour	100g	50g	60g
Pearl millet flour	-	40g	35g
MOLP	-	10g	5g
Yeast	2.5g	2.5g	2.5g
Sugar	2.5g	2.5g	2.5g
Salt	5g	5g	5g
Water	40ml	50ml	50ml
Oil	10ml	10ml	10ml

2.4. Sensory analysis of Moringa pizza base : A hedonic scale of 9 point was used for sensory evaluation. A semi-trained panel of 40 members of department of Food and Nutrition, School of Home Science, BBAU, Lucknow were assessed for the control and the developed product. The panelists scored on the basis of appearance and colour, texture and flavour, smell and odour, texture and mouth-feel and overall acceptability on a 9 - point hedonic scale.

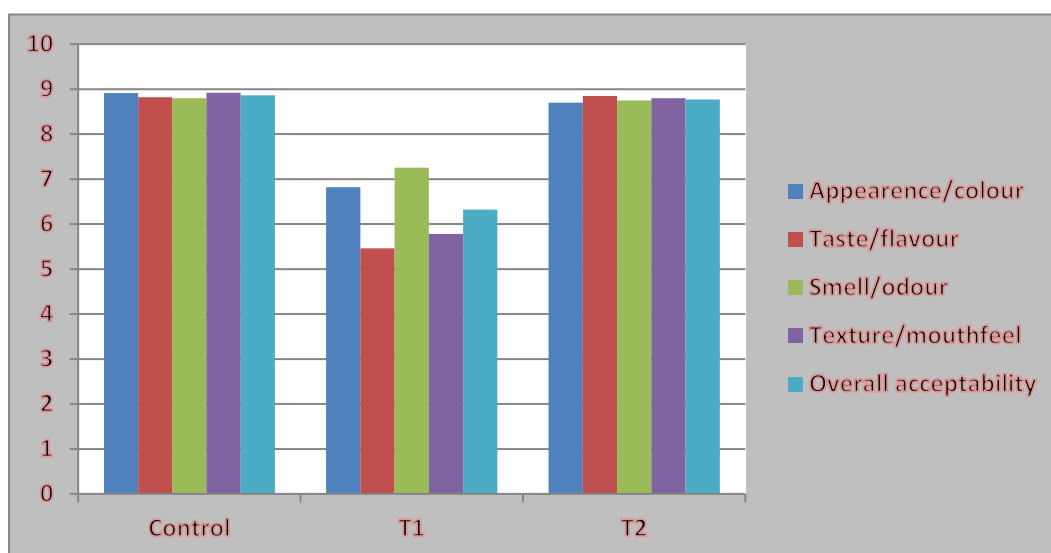
2.5. Statistical Analysis:

The results were statistically evaluated by resolving Mean deviation. The distinction in quality variables and acceptability scores of the developed product were assessed statistically using analysis of variance techniques in MS excel spreadsheet.

3. Result and Discussion:

Table: 3.1. Mean sensory scores of different variations of Moringa pizza base.

Sample	Appearance/Colour	Taste/Flavour	Smell/Odour	Texture/Mouth feel	Overall acceptability
Control	8.91	8.82	8.8	8.92	8.86
T1	6.82	5.46	7.25	5.78	6.32
T2	8.7	8.85	8.75	8.8	8.77

Fig: 3.2. Graph for sensory evaluation of Moringa pizza base

3.1. Sensory Quality:

The result for sensory evaluation of Moringa pizza base (Table.1) displayed that there was a significant distinction analysed for sensory parameters of MOLP enriched with 10g got the lowest scores in taste/flavour and texture/mouth feel parameters. Control had almost equal scores with the pizza base enriched with 5g MOLP in all the parameters except the appearance/colour and texture and /mouth feel. The overall acceptability of the pizza base incorporated with 10g MOLP and 40g pearl millet flour was significantly low as pt had bitter after taste as well as the base enriched with 5g MOLP and 35 g pearl millet flour had a good acceptability rate when compared with the control. The incorporation of MOLP and pearl millet flour led to muddy green colour of the pizza base and previous researches have prompted the colour and appearance as a main parameter or attribute to like or dislike any product. Pizza base enriched using 10g of MOLP and 40g pearl millet flour were disliked, which can be due to its dark muddied green colour. Among the two samples the sample with the formulation of 5g MOLP and 35g pearl millet flour pizza base were acceptable.

4. Conclusion:

MOLP enriched pizza base can be prepared in various proportions with addition of pearl millet flour to the refined flour (maida) with the ratio of 50:40:10g of refined flour, pearl millet flour and MOLP (T1) and 60:35:5g (T2) along with 100g of control of refined flour. Among the two samples the sample enriched with 5g MOLP and 35g pearl millet flour (T1) showed more acceptability when compared with control, whereas (T2) enriched with 10g MOLP and 40g pearl millet flour had low acceptability when compared to control as it had a bitter after taste which gives an awful mouth feel and due to greater proportions of MOLP acceptability. The difference between the overall acceptability of the control and T2 was(0.08) as T1 had the difference of (2.53) when calculated with the scores of control and T2. Further, MOLP and pearl millet flour increased the nutritional characteristics of the value added pizza base.

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