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Antioxidant potential of moringa oleifera leaf & utilization by different processing method

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Abstract
Drumstick (Moringa oleifera) is a multipurpose and exceptionally nutritious tree with a variety of potential uses. It is a sub-tropical species that is known by different regional names as benzolive, drumstick tree, kelor, marango, saijhan, and sajna. It has a very high nutritional property that is useful as a food supplement, especially in malnourished communities. Besides its nutritional and medicinal applications, Moringa has numerous applications in cooking throughout its Reginal distribution. The fruits or seed pods, known as drumstick, are a culinary vegetable commonly used in soups & curries. The leaves are also commonly eaten with manly culinary use, and the flowers are feature in some recipes as well. The present study was conducted to prepare the drumstick leaves papad (drumy potato papad) which is beneficial for iron, vitamin, fibre and calcium content. This papad is prepared by different method and with different ingredients like potato, cumin seed which is good source of vitamin and minerals and which is easily consumed by people for the preparation of drumy potato papad. Procedure has been followed. Shelf life of this papad nearly one year.

Keywords: dryad drumstick leaves, cumin seed and salt.

1. Introduction
Drumstick (Moringa oleifera) Lam (syn. M. ptreygosperma Gaertn.) is a tropical plant belonging to family Moringaceae, native of India which was introduced in Brazil around 1950. Moringaceae is a single genus family with 13 known species. Among these oleifera is most widely used and utilized species (Sengupta and Gupta, 1970; Morton, 1991). The tree originated from Agra and Qudh in the northern eastern region of India, particularly in India, Pakistan, Philippines, Hawaii and many parts of Africa. south of Himalayas (Mugal *et al.*, 1999). It is cultivated throughout the plain, It is a sub-tropical species that is known by different regional names as benzolive, Drumstick tree, kelor, marango, mulangay, saijhan, mooringai and sajna. Especially in hedges and in house yards, thrives best under the tropical insular climate, and is plentiful near the sandy beds of rivers and streams (Qaiser, 1973). The drumstick tree has been consumed by humans throughout the century in diverse culinary ways (Iqbal and Bhanger, 2006) [5]. It can grow well in the humid tropics or hot dry lands, can survive destitute soils, and is little affected by drought (Morton, 1991). Moringa grows best at altitudes up to 600 m but it will grow at altitudes of 1000 m. It tolerates a wide range of rainfall with minimum annual rainfall requirements estimated at 250 mm and maximum at over 3000 mm and a pH of 5.0-9.0 (Palada and Changl, 2003). It will survive in a temperature range of 25ºC to 40ºC but has been known to tolerate temperatures of 48ºC and light frosts.

Materials and methods
Area of study: The present study was conducted in conducted in the Laboratories of the Department of Human Development and Family Study (HDFS) program Food Science and Technology (FST) Baba Saheb Bhimrao Ambedkar University, Lucknow and in the Analysis Laboratory of Regional Food Analysis and Research Centre (RFRAC). Lucknow

Research design: Research design is a coherent plan in conducting research which deal with investigation so conceived to obtain Sample to research. Research design is used to conduct research with objectivity of accuracy the research design followed in the present study

Period of study: The present study conducted during the period of 2017-018 sessions in the whole work comprising period of july2017- May 2018.

Sample Size: The present has develop enrich vitamins and nutrient content of papad based on the ingredients potato, rice, sago palm, drumstick leaves, cumin seed, and added salt according to taste.

Table 1: Ingredients preparation for Drumstick leaves papad

Ingredients	Sample T_1	Sample T_2	Sample T_3
Sundry Drumstick leaves	75%	70	80%
Potato	25%	30%	20%
Total	100%	100%	100%

Sampling Techniques-

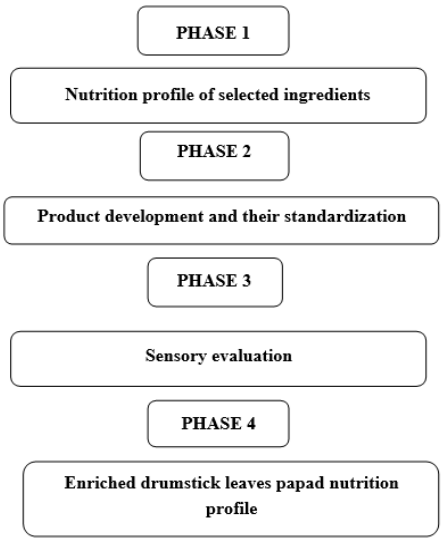

Fig 1: flow chart for manufacturing of drumstick leaves papad

Phase 1

Collections of ingredients

Fresh Drumstick leaves, (moringa oliefera) and potato, (Solanum tuberosum) Cumin seed, and salt was collected from local market with the Drumstick leaves and potato.

Development of drumstick leaves papad

The drumstick leaves papad was developed using difference concentration

75:25 present of drumstick leaves and potato.

Preparation of raw material

Dry Drumstick leaves and potato were taken for nutritional enrichment of papad. Drumstick leaves were separated from the plant, washed thoroughly and potato were washed. Removed all hazards and dust particle from leaves and potato and drained water so immediately food processor.

Phase 2

Product Development-

This phase involved the whole idea of development of nutritive by using different ration of drumstick leaves or potato cumin seed and value-added Product.

Product Development

Treatment for the preparation of drumstick leaves

T1-75% sundry drumstick leaves+25% potato

T2-70% % sundry drumstick leaves+30% potato

T3-80% sundry drumstick leaves+20% potato

Development of drumstick leaves papad

The recipe for papad was standardized using the, drumstick leaves, potatoes, cumin seed and salt were used. Drumstick leaves were collected from the agricultural farmhouse of BBA University. Potatoes, Cumin and Salt purchased from near shop. After collecting the drumstick leaves, preliminary preparation was done like cleaning and washing and let dry in a shade out of direct sunlight for two days. After drying, the leaves were crunched. Once the potatoes boiled completely for 30 minutes at 100^0 C and peeling the potatoes. Then we will break the potatoes well into small pieces and added the cumin seed and salt in that mixture also. Once the batter is ready, we will tack a papad machine and two small polythene sheets. Then on a dry and hot place we spread a polythene sheet greased with oil and take small dough of mixture. Then machine make a thin layer of papad. We spread the batter in the shape of pancakes and allowthe batter to get it dried. Once the papad is dried from one side, we changed the side. We kept the papads under sunlight for 2 days. Then after sun drying the papads, we roasted and fried them.

Amount of Ingredients

100g crunch drumstick leaves, 300g boiler potato 10g cumin seed (zeera)

and 1 tea spoon salt.

Result and Discussion

Characterization of developed product on various parameters

The experimental drumy potato papad (drumstick leaves papad) of spices were characterized as developed product in the present study. The various parameters were incorporated for product development to reach acceptability and edible for human population. For that sensory evaluation process was done by of panellist constitute 3 Members in the expertise field of nutrition. For evaluating a 4 point composite score test scale which is one of the sensory evaluation method acceptability of developed product these are below.

- Colour
- Body and texture
- Flavors
- Appearance
- Taste

Overall acceptability

Parameter 1: colour Quality

Member	T1	T2	T3
1	7	9	7
2	8	8	8
3	7	8	9
Total	22	25	24

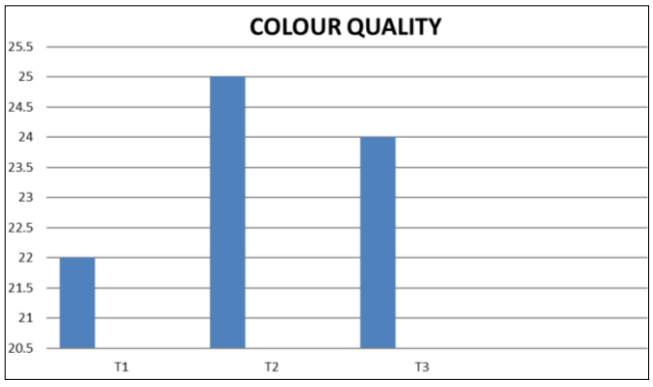

Fig 2: graphical Representation of Colour

Parameter 2: body and texture

Table 2: Individual marking for body and texture

Member	T1	T2	T3
1	7	8	8
2	8	8	8
3	7	7	8
Total	22	23	24

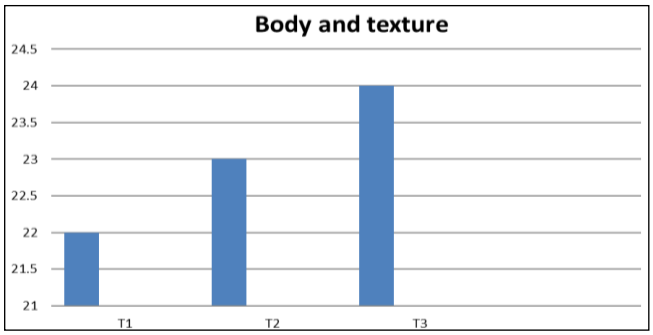

Fig 3: Graphical Representation of body and texture

Parameter 3: Flavour

Table 3: individual marking for Flavour

Members	T1	T2	T3
1	8	9	8
2	9	9	9
3	7	7	9
Total	24	25	26

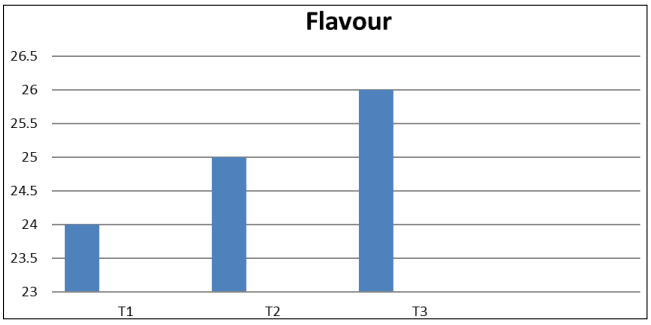

Fig 4: Graphical Representation of flavor

Parameter 4: appearance

Table 4: Individual marking for appearance

Members	T1	T2	T3
1	8	9	8
2	8	8	8
3	7	7	9
Total	23	24	25

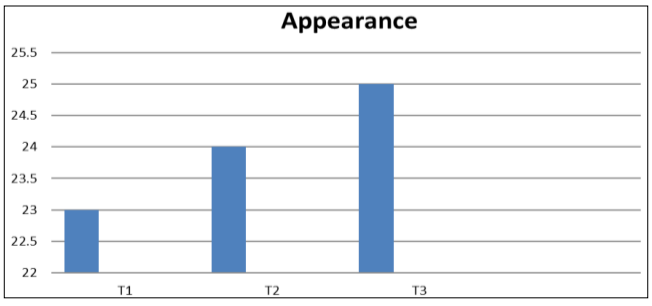

Fig 5: Graphical Representation of appearance

Parameter 5: taste

Table 5: individual marking for taste

Member	T1	T2	T3
1	7	9	9
2	9	9	9
3	7	8	8
Total	23	26	26

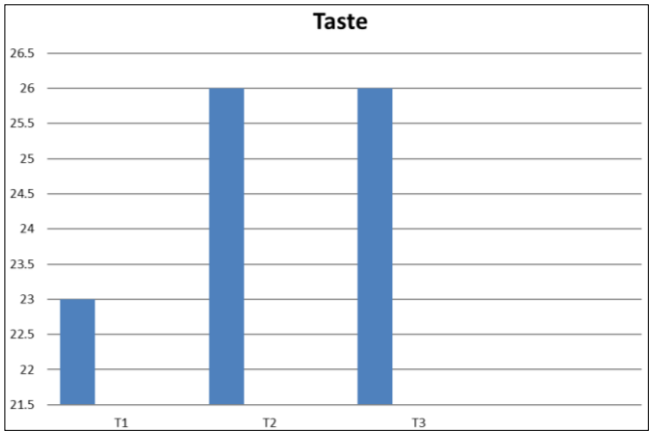

Fig 6: Graphical Representation of taste

Overall acceptability

Overall calculation are done to know most acceptability of the product in terms of quality by sensory evaluation scoring given by the panelist Members, in this all scoring of colour, flavour consistency and absence of defects are calculated in the table, by this get do statistical analysis and obtained standard deviation, average and other calculation.

Table 6: Overall acceptability

Member	T1	T2	T3
P1	22	25	23
P2	22	23	24
P3	24	25	26
P4	23	24	25
P5	23	26	26
Total	114	123	124
Average	22.8	24.6	24.8
S.D	.8367	1.140	1.30

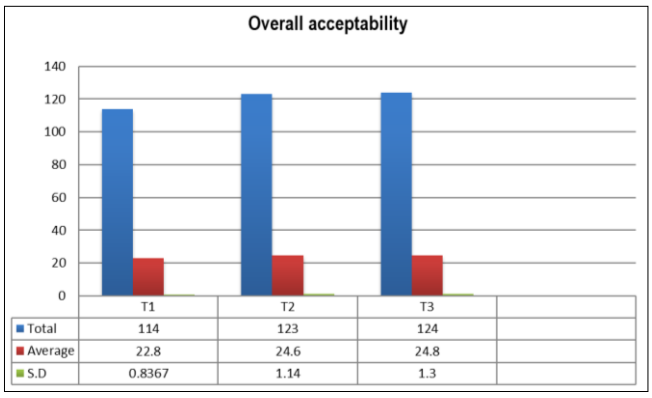

Fig 7: Graphical Representation of Average Score and Standard

Deviation for Overall Calculation

Where – T1, T2, T3 was coded samples prepared
P=parameter (colour, P2=Body and texture, P3= flavour, P4=appearance)
S.D.= Standard Deviation (SD reflex the fluctuation in the marks given by different parameter)
T3 Scored maximum with highest average and lest SD which indicate its highest acceptability among the three prepared experimental samples.

Conclusions

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. So the prepared drumstick leaves papad (drumy potato papad) product under gone sensory evaluation to find the most accepted product. For the sensory evaluation comparative test for colour, consistency, flavour and absence f defects parameter we done to find out most appropriate supplement. From the above panelist member and it gets highest scoring, then after sample T1 sample T2 and sample T3 respectively.

Recommendation

- Antioxidants are compounds that act against free radicals in your body.
- High levels of free radicals may cause oxidative stress, which is associated with chronic diseases like heart disease and type 2 diabetes
- Several antioxidant plants compounds have been found in the leaves of Moringa oleifera.
- High blood sugar can be a serious health problem. In fact, it's the main characteristic of diabetes.
- Over time, high blood sugar levels raise the risk of many serious health problems, including heart disease. For this reason, it's important to keep your blood sugar within healthy limits.

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