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Organoleptic study of green papaya, flaxseed and maize flour products

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Abstract
Traditional food may reportedly help to prevent constipation and colon cancer and reduce serum cholesterol, as well as possessing anti-stress effects. The study shed light on the evaluation of the quality of the green papaya, flaxseed and maize flour as an important food supplement to achieve some medicinal properties such as promote skin protection, promote lungs health, good for eye, promote kidney function increasing the flow of urine etc. and these food could be applied in various food system as an excellent functional food with highly antioxidant properties.
Objective: To study the organoleptic acceptability of prepared products from green papaya, flaxseed and maize flour.
Methodology: Traditional foods such as mix roti and khasta kachori were prepared using green papaya, flax seed and maize flour in different ratio of (50:45:5), (50:40:10), (50:35:15), (50:30:20) respectively. These products were determined by organoleptic evaluation.
Result: Analysis of variance revealed that II (50:40:10) incorporated sample of mix roti was liked much and III (50:35:15) incorporated sample of khasta kachori were liked extremely.
Conclusion: Hence if supplementary food is helpful in combating vitamin A deficiency disease and high blood pressure etc. Therefore such type of food should be introduced to infant, preschool and school going children for their proper physical and mental development.

Keywords: traditional fermented food, ameliorate, depression, osteoarthritis, organoleptic, functional etc.

Introduction
Traditional fermented foods and beverages, whether of plant or animal origin, play an important role in the diet of people in many parts of the world. Fermented foods not only provide important sources of nutrients but have also great potential in maintaining health and preventing diseases.
Papaya (*Carica papaya* L.) belongs to the family Caricaceae, one of the most important fruits cultivated throughout the tropical and subtropical regions of the world (Anonymous, 2000) [2].
Gopalan and Mohanram, (2004) [7] studied that Papaya is a "Power house" of nutrients and is available throughout the year. It is a rich source of three powerful antioxidant vitamin C vitamin A and vitamin E, the minerals, magnesium and potassium; the B- vitamins, pantothenic acid, folate and fiber.
Papaya is rich in iron and calcium; a good source of vitamins A, B and G and an excellent source of vitamin C (ascorbic acid). The extracts of unripe C. papaya contain terpenoids, alkaloids, flavonoids, carbohydrates, glycosides, saponins, and steroids (Aravind *et al*., 2013) [3]. The nutritional highlights of papaya are a proteolytic enzyme called papain, which is an excellent aid to digestion. This enzyme is so powerful that it can digest up to 200 times its own weight of protein. (Baker, 2008) [4].
Flax is considered a functional food or source of functional ingredients, because it contains alpha-linolenic acid (Boza and Temelli, 2008), lignans and polysaccharides (other than starch), all of which have positive effects in disease prevention. Although scientific evidence supports flaxseed consumption, many people are still unaware of the benefits provided by this product and its possible applications in the production of food stuffs (Udenigwe, *et al*., 2009).
Maize flour contains linolenic acid and vitamin E, can reduce the occurrence of atherosclerosis. Consumption of foods rich in beta-cryptoxanthin, an orange-red carotenoid found in highest amounts in corn, pumpkin, papaya, red bell peppers, tangerines, oranges and peaches, may significantly lower one's risk of developing lung cancer.
The present study was carried out in the Department of Food Science and Nutrition M.A.B. College of Home Science, C.S.A. University Kanpur.

Material and Methods

Product developed by mixing all ingredients in 4 different ratio i.e. mix roti and khasta kachaori as per standard protocol.

1. Preparation of mix roti

Mix roti was prepared by Green papaya, Flaxseed and Maize flour in which maize flour was constant and green papaya was replaced by flaxseed 5%, 10%, 15%, and 20% respectively.

Method

- Maize flour, grated green papaya paste and flaxseed flour mixed.
- Added ginger, garlic, green chilli paste and salt and kneaded well.
- Small balls of dough rolled and cooked over preheated tawa.
- Served with ghee.

2. Preparation of khasta kachaori

Khasta kachori was prepared by Green papaya, Flaxseed and Maize flour in which maize flour was constant and green papaya was replaced by flaxseed 5%, 10%, 15%, and 20% respectively.

Method

- Sieve the maize flour, refined flour, salt and soda bicarbonate together and add oil and mix well.
- Knead into soft dough using sufficient water and Cover with a moist cloth and set aside.
- Stuff material was prepared by flaxseed flour, grated green papaya, salt and lemon juice according to taste.
- A small ball of dough spread and 1 tsp stuffing material is placed inside.
- Deep fry kachories on low medium flame in refined oil until it become brown and crispy.
- Served with tamarind chutney.

Sensory evaluation

The organoleptic evaluations of developed food products were done by 9-point Hedonic scale for taste and flavour, body and texture, colour and appearance and overall acceptability.

Data analysis

After collecting all data, data entry was performed using Microsoft Excel. Data were organized and presented by applying principles of descriptive statistics. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp was used for analysis. Logistic Average mean and SD and CRD (Completely Randomized Design) were applied in the presence of considered data.

Results and Discussion

The sample was analysed periodically protein, fat, carbohydrate, fibre, ash, vitamin and minerals.

- **Mean score of organoleptic acceptability of mix roti**

The data of mean score were tabulated and analysed statistically; results have been presented in table.

Table 1: Mean Score of Organoleptic Acceptability of Mix Roti

S. No	Quality /sample	Level of incorporation				Mean
		50:45:5	50:40:10	50:35:15	50:30:20	
1.	Taste and flavour	7.0	8.8	7.0	6.4	6.3
2.	Body and Texture	7.8	8.4	7.2	7.4	7.7
3.	Colour and Appearance	7.4	8.4	7.4	6.4	7.4
4.	Overall Acceptability	7.4	8.5	7.2	6.7	7.4

NOTE: 50:45:5 = Maize flour: Green papaya: Flaxseed flour
50:40:10= Maize flour: Green papaya: Flaxseed flour
50:35:15= Maize flour: Green papaya: Flaxseed flour
50:30:20= Maize flour: Green papaya: Flaxseed flour

Taste and Flavour

Table 1 showing mean score of I incorporated sample (50:45:5) was 7.0, II incorporated sample (50:40:10) was 8.8, III incorporated sample (50:35:15) was 7.0 and IV incorporated sample (50:30:20) was 6.4 with respect to taste and flavour.

The above table shows that the incorporated samples were highly significant at 5% in critical difference. It means taste and flavour of incorporated samples were differed from each other. The result shows that the mean value of II incorporated sample (50:40:10) was higher than others. It means that taste and flavour of II (50:40:10) incorporated product was better than others.

Kumudini (2011) [9] studied the "sensory evaluation of sorghum chakali enriched with different levels of soyabean flours". Results revealed that chakli prepared with 20 percent soyabean flour highest overall acceptability score (8.7).

Body and Texture

Table1 shows that the body and texture values determined by sensory evaluation of incorporated products. The mean score of I incorporated sample (50:45:5) was 7.8, followed by II (50:40:10) III (50:35:15) and IV (50:30:20) incorporated samples were 8.4, 7.2 and 7.4 with respect to body and texture.

The above table showed that the incorporated samples were non significant at 5% in critical difference. It means body and texture of incorporated samples were not differed from each other. The result of analysis reveals that the mean value of II incorporated sample (50:40:10) was higher than others. It means that body and texture of II (50:40:10) incorporated product was better than others.

Colour and Appearance

It is evident from the Table 1 the mean score of I incorporated sample (50:45:5) was 7.4, followed by II (50:40:10) III (50:35:15) and IV (50:30:20) incorporated samples were 8.4, 7.4 and 6.4 with respect to colour and appearance.

The above table indicates that the incorporated samples were highly significant at 5% in critical difference. It means colour and appearance of incorporated samples were differed from each other. The result shows that the mean value of II incorporated sample (50:40:10) was higher than others. It

means that colour and appearance of II (50:40:10) incorporated product was better than others.

Overall Acceptability

It is obvious from the Table 1 that the mean score of I incorporated sample (50:45:5) was 7.4, followed by II (50:40:10) III (50:35:15) and IV (50:30:20) incorporated samples were 8.5, 7.2 and 6.7 with respect to overall acceptability. Kadam *et al.* (2012) [8] developed composite flour of chapatti. The most acceptable flour mix contained wheat flour, chickpea, and soybean and methi leaves powder in the ratio of 75: 10: 10: 05 respectively.

The above table indicates that the incorporated samples were highly significant at 5% in critical difference. It means overall acceptability of incorporated samples was differed from each other. The result shows that the mean value of II incorporated sample (50:40:10) was higher than others. It means that overall acceptability of II (50:40:10) incorporated product was better than others.

The overall organoleptic acceptability of different samples of mix roti shows that II incorporated sample (50:40:10) had better sensory characteristic than other. In the sensory attributes of crust, aroma, taste and internal texture at the same level of probability ($p<0.05$). The implication of this is that plantain flour possesses similar sensory characteristics with the wheat flour (Ogazi, 1998) [10].

- **Mean score of organoleptic acceptability of Khasta Kachori**

The data of mean score were tabulated and analyzed statistically; results have been presented in table

Table 2: Mean Score of Organoleptic Acceptability of Khasta Kachori

S.N0.	Quality /sample	Level of incorporation				Mean
		50:45:5	50:40:10	50:35:15	50:30:20	
1.	Taste and Flavour	7.2	8.2	8.6	7.6	7.9
2.	Body and Texture	7.8	7.8	9.0	7.4	8.0
3.	Colour and Appearance	7.6	7.4	8.6	8.0	7.9
4.	Overall Acceptability	7.5	7.8	8.7	76	7.9

NOTE: 50:45:5 = Maize flour: Green papaya: Flaxseed flour
50:40:10= Maize flour: Green papaya: Flaxseed flour
50:35:15= Maize flour: Green papaya: Flaxseed flour
50:30:20= Maize flour: Green papaya: Flaxseed flour

Taste and Flavour

Table 2 shows that mean score of I incorporated sample (50:45:5) was 7.2, II incorporated sample (50:40:10) was 8.2, III incorporated sample (50:35:15) was 8.6 and IV incorporated sample (50:30:20) was 7.6 with respect to taste and flavour.

The above table shows that the incorporated samples were highly significant at 5% in critical difference. It means taste and flavour of incorporated samples were differed from each other. The result shows that the mean value of III incorporated sample (50:35:15) was higher than others. It means that taste and flavour of III (50:35:15) incorporated product was better than others.

Body and Texture

Table 2 shows that the body and texture values determined by sensory evaluation of incorporated products. The mean score of I incorporated sample (50:45:5) was 7.8, followed by II (50:40:10) III (50:35:15) and IV (50:30:20) incorporated samples were 7.8, 9.0 and 7.4 with respect to body and texture.

The above table shows that the incorporated samples were highly significant at 5% in critical difference. It means body and texture of incorporated samples were differed from each other. The result of analysis reveals that the mean value of III incorporated sample (50:35:15) was higher than others. It means that body and texture of III (50:35:15) incorporated product was better than others.

Pitiporn *et al.* (2011) [11] developed unripe banana flour as an ingredient to make dried noodles of high nutritional quality. The effect of wheat flour substitution with unripe banana flour was investigated in terms of the textural, cooking and sensory qualities of dried noodles.

Colour and Appearance

It is evident from the Table 2 that the mean score of I incorporated sample (50:45:5) was 7.6, followed by II (50:40:10) III (50:35:15) and IV (50:30:20) incorporated samples were 7.4, 8.6 and 8.0 with respect to colour and appearance.

The above table indicates that the incorporated samples were highly significant at 5% in critical difference. It means colour and appearance of incorporated samples were differed from each other. The result shows that the mean value of III incorporated sample (50:35:15) was higher than others. It means that colour and appearance of III (50:35:15) incorporated product was better than others.

Overall Acceptability

It is obvious from the Table 2 that the mean score of I incorporated sample (50:45:5) was 7.5, followed by II (50:40:10) III (50:35:15) and IV (50:30:20) incorporated samples were 7.8, 8.7 and 7.6 with respect to overall acceptability.

The above table indicates that the incorporated samples were highly significant at 5% in critical difference. It means overall acceptability of incorporated samples was differed from each other. The result shows that the mean value of III incorporated sample (50:35:15) was higher than others. It means that overall acceptability of III (50:35:15) incorporated product was better than others.

The overall organoleptic acceptability of different samples of khasta kachori shows that III incorporated sample (50:35:15) had better sensory characteristic than others.

In the present study, the acceptability of QPM products was studied through sensory evaluation method for the four products namely, QPM shakarpara and QPM mathri and wheat shakarpara and wheat mathri. It was found that the acceptability of QPM shakarpara and QPM mathri were quite satisfactory as compared to the same products prepared with wheat (Akriti Mishra and Mukta Singh, 2012) [1].

Conclusion

The sensory evaluation of products (mix roti and khasta kachori) concluded that the organoleptic value of products can be increased with incorporation of green papaya, flaxseed and maize flour at different increasing level. Analysis of variance revealed that II (50:40:10) incorporated sample mix roti and I (50:45:5) and III (50:35:15) incorporated sample khasta kachori was also extremely liked. The purpose of this study may contribute significantly in easy availability of overcoming measures of protein deficiency, vitamin A deficiency, and calcium deficiency deficiencies disease in developing countries like India. Green papaya, flaxseed and maize flour contains good amount of vitamin A, omega3-fatty acid, protein and high calcium. Therefore, they play an important role for a population suffering from atherosclerosis and other diseases.

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