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Research Article

PREPARATION OF LOW COST SNACKS BY INCORPORATION OF DEVELOPED FLOUR MIXTURES

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Abstract: The low cost nutritious recipies namely *Maalpua, Shakarpara* and *Laddoo* were prepared by using three combination of flour mixtures Fm_1T_1 (100gm wheat flour, sesame seed 5gm, soybean 5gm, peanuts 5gm and drumstick leaves 2gm), Fm_2T_2 (100gm wheat flour, sesame seed 3gm, soybean 5gm, peanuts 5gm and drumstick leaves 3gm), Fm_3T_3 (100gm wheat flour, sesame seed 2gm, soybean 5gm, peanuts 5gm and drumstick leaves 5gm).Nutrient composition of the developed flour mixture determined using standardized AOAC (2005) methods. Organoleptic evaluation was carried out using nine point hedonic scale.The nutritive value of the prepared mixture was calculated using the value obtained by analysis of prepared mixture and food composition tablesfrom the book of Nutritive Value of Indian Foods given by **Gopalan** *et.al* 2007.The experiment was replicated three times and the data obtained during investigation was statistically analysed by using analysis of variance (ANOVA) and critical difference (C.D.) techniques.*Maalpua, Shakarpara* and *Laddoo*were found best in treatment Fm_1T_1 with regards to colour and appearance, body and texture, taste and flavor and overall acceptability. *Maalpua*was rich in β.carotene (82.2ug/100g), calcium (59.7mg/100g) and protein (5.56g/100g), *Shakarpara*was rich inβ.carotene (69.6ug/100g), calcium (39.3mg/100g) and protein (5.36g/100g) and *Laddoo*β.carotene (345ug/100g), calcium (42.8mg/100g) and protein (6.9g/100g), were found highest in Fm_3T_3 in all prepared products. The cost of *Maalpua* ranged between Rs. 3.8 to Rs. 4.6, for *Shakarpara* was between Rs. 3.6 to Rs. 4.4 and for *Laddoo* it ranged between Rs. 11 to Rs. 15.Thus, it can be concluded that the flour mixtures can be successfully used for the development for low cost nutritious recipes.

Key words: Flour mixture, Nutritive value, Recipe, Drumstick leaves and Sensory acceptability

INTRODUCTION

Malnutrition is seen to be an important concern in women, children and the elderly. Because of pregnancies and breastfeeding, women have additional nutrients requirements[5]. Children can be at risk for malnutrition even before birth, as their nutrition levels are directly to the nutrition of their mothers. The 2008 Copenhagen Consensus estimated that undernutrition causes 35 percent of the disease burden in children younger than 5 years old, and that the nutrition of children 5 years and younger depends strongly on the nutrition level of their mothers during pregnancy and breast feeding.[1] Vitamin A is another essential nutrient in the human diet, contributing to the functioning of the retina, the growth of bone, and the immune response. Apart from preventable, irreversible blindness, vitamin A deficiency also causes reduced immune function, leading to an increased risk of severe infectious disease and anaemia. It also increases the risk of death during pregnancy for both the mother and foetus and after birth for the newborn. Vitamin A deficiency occurs when too little vitamin A is taken in and absorbed from food. Vitamin A also comes from beta-carotene, a precursor found in fruits and vegetables. An estimated 250 million pre-school children in developing countries are affected by Vitamin A deficiency, although severe deficiency that causes blindness is declining**.**

METHODOLOGY

Drumstick leaves were procured from local area of SHIATS Allahabad, India. Leaves were cleaned by removing adhering dirt and damaged parts and leaflets were separated from branches and washed under running water. They were drained after blanching and spread on steel trays for drying in an oven for 60°C for 15 hours.After drying the leaves were powdered in a mixer and stored in an airtight container. In order to determine the nutritional characteristics of dehydrated Drumstick leaves powder, standard methods described below as follows-:

Proximate Composition

Methods describe by AOAC (2005**)** was used for determination of chemical composition of leaves powder mix, this included estimation of moisture, ash, fat, protein and carbohydrate was calculated by difference method. [2]

Mineral and Vitamin Analysis

Beta-carotene and calcium content was analysed using standard methods AOAC (2005)[2]

Formulation and preparation of products-

Three products namely*maalpua, shakarpara*and*laddoo* were prepared using developedflour mixture. Three different treatments coded as-

Fm_1T_1: 100 gm wheat flour, Sesame seeds 5gm, Soybean 5gm, Peanuts 5gm and drumstick leaves 2 gm.

Fm_2T_2: 100 gmwheat flour, Sesame seeds 3gm, Soybean 5gm, Peanuts 5gm and Drumstick leaves 3gm.

Fm_3T_3: 100 gm wheat flour, Sesame seeds 2 gm, Soybean 5gm, Peanuts 5gm and Drumstick leaves 5gm.

were selected for the study. To perform sensory evaluation judge were drown from the group of facultymemebersof Ethelind School of Home Science, SHIATS. Sensory attributes i.e. colour and appearance, body and texture, taste and flavour and overall acceptability of the prepared products by using nine points hedonic rating.[4]

Statistical analysis

The data obtained from sensory evaluation were statistically analysed by using analysis of variance technique (ANOVA). Significant difference between the treatments was determined by using CD (critical difference test)[3]

RESULTS AND DISCUSSION

The products were standardized and were subjected to organoleptic evaluation within one hour of preparation which was considered as zero days. All experimental recipies were accepted in terms of colour and appearance, body and texture and overall acceptability.

Nutritional composition of the flour mixture.

Proximate composition-The Moisture content was maximum inFm_1T_1(9.8%) followed byFm_3T_3 (9.6%) and Fm_2T_2 (9.0). The Ash content was maximum in Fm_1T_1 (7.7g) followed by Fm_2T_2 (7.2g) and Fm_3T_3 (6.5g). The Protein content was maximum in Fm_3T_3 (15.8g) followed byFm_2T_2 (15.5g) and Fm_1T_1 (15.1g). The Fat content was maximum in Fm_3T_3 (5.9g) followed byFm_2T_2 (5.6g) and Fm_1T_1 (5.1g). The Carbohydrate content was maximum in Fm_3T_3 (62.9g) followed byFm_2T_2 (62.7g) and Fm_1T_1 (62.3g). TheFiber content was maximum in Fm_3T_3 (2.7g) followed by Fm_2T_2(2.6g) and Fm_1T_1 (2.6g).

Mineral and Vitamins composition- The Calcium content was maximum in Fm_3T_3 (141.45mg) followed byFm_2T_2 (112.12mg) and Fm_1T_1 (102.1mg). The Beta-carotene content was maximum in Fm_3T_3 (45.2µg) followed by Fm_2T_2(44.78µg) and Fm_1T_1 (41.28µg).

(Table1)The mean scores of *Maalpua*in relation to colour and appearance which indicates that Fm_1 had the highest score (8.4) followed by T_0 (8.0), Fm_2T_2 (7.0) and Fm_3T_3 (6.0) respectively. The mean scores of *Maalpua* in relation to body and texture which indicates that $Fm1T_1$had the highest score (8.0)followed byT_0 (8.0), $Fm2T_2$ (6.0) and Fm3 T_3 (6.35) respectively. The mean score of*Maalpua* in relation to taste and flavor which indicates that Fm_1T_1 had the highest score (8.0) followed by T_0 (7.25), Fm_2T_2 (6.55) and Fm_3T_3 (5.7) repectively.The mean scores of *Maalpua* in relation to overall acceptability which indicates that $Fm1T_1$ had the highest score (8.1) followed by T_0 (7.25), $Fm2T_2$ (6.5) and $Fm3T_3$ (5.7) respectively. Scoring shows that the treatment Fm_1T_1 was liked very much while control and Fm_2 and Fm_3 were moderately liked by the panel of judges.

(Table 2.) The mean scores of *Shakarpara* in relation to colour and appearance which indicates that Fm_1T_1 had the highest score (8.6) followed by T_0 (7.9),Fm_2T_2 (7.0) and Fm_3T_3 (5.8) respectively.. The mean scores of*Shakarpara* in relation to body and texture indicates thatFm_1T_1 had the highest score (7.8) followed byT_0 (7.15)Fm_2T_2(6.45) and Fm_3T_3(5.9)respectively. The mean score of*Shakarpara* in relation to taste and flavor indicates that Fm_1T_1 had the highest score(8.1) followed by T_0 (7.2),Fm_2T_2(6.45) andFm_3T_3 (5.7) respectively.The mean scores of *Shakarpara*in relation to overall acceptability indicate that Fm_1T_1 had the highest score(8.11) followed by T_0 (7.3), Fm_2T_2 (6.5) and Fm_3T_3 (5.7) respectively. Scoring shows that the treatment Fm_1T_1 was liked very much while control and Fm_2T_2 and Fm_3T_3 were moderately liked by the panel of judges.

(Table 3.) The mean scores of *Laddoo*in relation to colour and appearance which indicates that Fm_1T_1 had the highest score (8.55) followed by T_0 (7.45), Fm_2T_2(6.9) and Fm_3T_3(6.3) respectively. The mean scores of*Laddoo*in relation to body and texture which indicates that Fm_1T_1 had the highest score(7.4) followed by T_0 (6.7),Fm_2T_2(6.6) and Fm_3T_3 (6.24) respectively. The mean scores of*Laddoo*in relation to Taste and flavor which indicates that Fm_1T_1 had the highest score(7.4) followed by T_0 (6.7),Fm_2T_2 (6.6) andFm_3T_3 (6.4) respectively. The mean scores of *Laddoo*in relation to overall acceptability indicate that Fm_1T_1had the highest score (7.9) followed by T_0 (6.94),Fm_2T_2(6.6) and Fm_3T_3(6.4) respectively. Scoring shows that the treatment Fm_1T_1 was liked very much while control and Fm_2T_2 and Fm_3T_3 were moderately liked by the panel of judges.

The cost of *Maalpua* was maximum (Rs. 4.6) for Fm_1T_1, followed by (Rs. 4.3) for Fm_2T_2 (Rs. 4.0) for Fm_3T_3 and it was least for T_0, control (Rs. 3.8). The cost of *Shakarpara* was maximum (Rs. 4.4) for Fm_1T_1, followed by (Rs. 4.1) for Fm_2T_2 (Rs.4.0) for Fm_3T_3 and it was least for T_0, control (Rs. 3.6). The cost of *Laddoo* was maximum (Rs. 15.0) for T_0, control followed by (Rs. 11.6) for Fm_1T_1 (Rs. 11.3) for Fm_2T_3 and (Rs. 11.0) for Fm_3T_3.

Table 1: Sensory acceptability of *Maalpua*

Control/Treatment	Colour and appearance	Body and Texture	Taste and flavor	Overall acceptability
To	8.0±0.1	8.0±0.32	7.25±0.11	7.4±0.53
Fm_1T_1	8.4±0.012	8.0±0.14	8.0±0.18	8.1±0.13
Fm_2T_2	7.0±0.42	6.0±0.07	6.55±0.15	6.5±0.21
Fm_3T_3	6.0±0.07	6.35±0.77	5.8±0.15	5.7±0.30

Table 2: Sensory acceptability of*Shakarpara*

Control/Treatment	Colour and appearance	Body and Texture	Taste and flavor	Overall acceptability
To	7.9±0.11	7.15±0.23	7.2±0.18	7.3±0.57
Fm_1T1	8.6±0.07	7.8±015	8.1±0.20	8.11±0.15
Fm_2T_2	7.0 ±0.25	6.45±0.22	6.45±0.23	6.5±0.41
Fm_3T_3	5.8±0.18	5.9±0.18	5.7±0.11	5.7±0.18

Table 3: Sensory acceptability of *Laddoo*

Control/Treatment	Colour and appearance	Body and Texture	Taste and flavor	Overall acceptability
To	7.45± 0.13	6.7 ± 0.25	6.7 ± 0.16	6.94± 0.17
Fm_1T_1	8.55 ±0.08	7.4 ± 0.17	7.4 ± 0.18	7.9 ±0.12
Fm_2T_2	6.9± 0.11	6.6± 0.25	6.6± 0.14	6.6± 0.05
Fm_3T_3	6.3± 0.15	6.24± 0.07	6.4± 0.05	6.4± 0.013

Table 4: Nutritive value of prepared products (per 100 g)

	Maalpua				***Shakarpara***				***Laddoo***			
Control & Treatments / Nutrients	**T_0**	**Fm_1T_1**	**Fm_2T_2**	**Fm_3T_3**	**T_0**	**Fm_1T_1**	**Fm_2T_2**	**Fm_3T_3**	**T_0**	**Fm_1T_1**	**Fm_2T_2**	**Fm_3T_3**
Energy(Kcal)	488	488	486	486	528	523	521	520	546	520	518	517
Protein(g)	4.51	5.41	5.5	5.56	4.43	5.2	5.3	5.36	6.49	6.6	6.64	6.9
Fat(g)	34.7	32.8	32.4	31.6	31.8	31.7	31.5	30.8	35.9	32.19	32	31.9
Carbohydrate(g)	46.3	44.3	42.8	42.7	58.8	55.8	55.3	54.2	53.2	51.7	51.6	49
Calcium(mg)	41.9	58.6	58.9	59.7	12.8	38.2	38.5	39.3	35.6	41.7	42	42.8
Fiber(g)	0.10	0.39	0.25	0.24	0.12	0.4	0.27	0.26	0.9	0.8	0.6	0.65
Beta-Carotene(µg)	32.7	52.2	70.9	82.2	10	66.3	67.6	69.6	284	342.5	343.8	345

CONCLUSION

On the basis of findings it is concluded that the prepared flour mixture (Soybean, Peanuts, Sesame seeds, Wheat flour and Drumstick leaves) can be successfully used for the preparation of *Maalpua, Shakarpara* and *Laddoo*. *Maalpua, Shakarpara* and *Laddoo*were found best in treatment Fm_1T_1 (Soybean 5gm, Peanut 5gm, Sesame seed 5gm and Drumstick leaves 2gm)with regards to colour and appearance, body and texture, taste and flavor and overall acceptability. In *Maalpua*was rich in β.carotene (82.2ug/100g), calcium (59.7mg/100g) and protein (5.56g/100g), *Shakarpara*was rich inβ.carotene (69.6ug/100g), calcium (39.3mg/100g) and protein (5.36g/100g) and *Laddoo*β.carotene (345ug/100g), calcium (42.8mg/100g) and protein (6.9g/100g), were found highest in Fm_3T_3 in all prepared products. The cost of *Maalpua* ranged between Rs. 3.8 to Rs. 4.6, for *Shakarpara* the cost was between Rs. 3.6 to Rs. 4.4 and for *Laddoo* it ranged between Rs. 11 to Rs. 15.

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