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Preparation of value added food products with incorporation of peanut milk and kodo millet

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ABSTRACT

Three products, namely *Kheer*, *Laddoo* and *Thekuwa* were used to prepare with three treatments and one control for each products *i.e.* T_1, T_2, T_3 and T_0 in which except T_0 all treatment were prepared by incorporation of peanut milk and kodo millet. T_0 was prepared by 100% buffalo milk in *Kheer,* in *Laddoo* 100% rice flour and in *Thekuwa* 100% refined wheat flour. Organoleptic quality and nutritive value of the prepared food products were evaluated. Sensory evaluation of food products were done by using nine point headonic scale based score card. The nutritive value of the prepared food products was determined by self during research work in Nutrition Research Lab. The experiment was replicated three times and the data obtained during investigation were statistically analysed using analysis of variance (ANOVA) and critical difference (CD) techniques. Sensory evaluation of prepared products T_3 was highly acceptable on the basis of overall acceptability for *Kheer* and *Laddoo* and T_2 was for Thekuwa. From the results, it is concluded that incorporation of peanut milk and kodo millet enhance the nutritive value specially energy, protein, fat, calcium, iron and fiber. Cost was increased marginally in all treatment of prepared products comparatively control.

Key Words : Kodo millet, Peanut milk, Headonic scale, Organoleptic, Kheer, Laddoo, Thekuwa

INTRODUCTION

Peanut (*Arachis hypogeal*) is an ancient annual herbaceous plant belonging to Popilionaceae, a suborder of the family leguminoseae. Arachis is a Greek word for a legume and hypogeae means underground. So it is also known as groundnut. These huge benefits of peanuts have encouraged recommendations to increase its consumption and thus processing in many forms. Providing safe, nutritious, and wholesome food for poor and malnourished populations has been a major challenge for the developing world. Hence, the past decade is witnessed by increased consumption of vegetable proteins in many food products. Peanuts have a very high amount of protein, with 25.5 grams per 100g. This makes them beneficial for post workout muscle recovery. They contain very good quality amino acids, which are

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vital for growing and development, again, necessary for those who work out regularly. Overall, due to the evidently beneficial properties of peanuts, it is an excellent idea to drink peanut milk after periods of intense exercise where the muscles need to recover. Peanut milk is non dairy beverages. It does not contain any lactose and is therefore suitable for people with lactose intolerance. Peanut milk is made by blending peanuts and water together, and then straining it. This is due to the great nutritious values and the excellent hydration benefits. It's also good for anyone seeking a healthy drink.

Kodo millet*(Paspalum scrobiculatum)* is an annual grain that is grown in primarily in India, but also in the Philippines, Indonesia, Vietnam, Thailand, and in West Africa where it originates. This cereal is also known as varagu, kodo, haraka and arakalu. It forms the main stay of the dietary nutritional requirements. It has high protein content (11 %), low fat (4.2 %) and very high fibre content (14.3 %). Kodo millet is very easy to digest; it contains a high amount of lecithin and is excellent for strengthening the nervous system. Kodo millets are rich in B vitamins, especially niacin, B6 and folic acid, as well as the minerals such as calcium, iron, potassium, magnesium and zinc. Kodo millets contain no gluten and is good for people who are gluten intolerant. It is the main source of protein and minerals in the daily diets of tribal and weaker section living in remote rural areas. Millets are nutritionally superior than other cereals. The millet contains a high proportion of complex carbohydrate and dietary fiber which helps in prevention of constipation and slow release of glucose to the blood stream.

METHODOLOGY

The present investigation was carried out in the Nutrition Research Laboratory of the Department of Food, Nutrition and Public Health, Ethelind College of Home Science, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad. Kodo millet was purchased from the rural area of Faizabad. Peanut was procured from the local market of Allahabad.

Preparation for peanut milk:

Clean Peanut
↓
Washing
↓
Soaking (6-8 hours)
↓
Drained water
↓
Removal of outer layer
↓
Grinding
↓
Straining with muslin cloth

(Source: David, 2014)

Preparation of kodo millet flour :

Whole kodo millet
↓
Clean the millet
↓
Wash the millet
↓
Drying in shade for 2-3 hours
↓
Grind it in fine powder
↓
Roast it in low flame for 5 minutes
↓
Stored it the air tight container

(Source: Poornima's Cook Book, 2016)

Development of products:

Value added products namely *Kheer, Laddoo* and *Thekuwa* were developed by incorporation of peanut milk and kodo flour. The products were prepared by using standard recipe.

Treatments and replication of products:

Three products, namely *Kheer*, *Laddoo* and *Thekuwa* were used to prepare with three treatments and one control for each products *i.e.* T_1, T_2, T_3 and T_0 in which except T_0 all treatment were prepared by incorporation of peanut milk and kodo millet. T_0 was prepared by 100% buffalo milk in *Kheer,* in *Laddoo* 100% rice flour and in *Thekuwa* 100% refined wheat flour. Organoleptic quality and nutritive value of the prepared food products were evaluated.

Details of treatments:

Preparation of kodo Kheer with incorporation of peanut milk:

T_0 (control) was prepared using 100g rice and normal milk. T_1 was prepared using 80 ml normal milk, 10 gram peanut milk, 5 gram kodo millet and 10 gram jaggery. T_2 was prepared using 60 ml normal milk, 30 ml peanut milk, 5 gram kodo millet and 5 gram jaggery. T_3 the product was prepared using 40 ml normal milk, 50 ml peanut milk, 5 gram kodo millet and 5 gram jaggery.

Preparation of kodo *Laddoo* with incorporation of peanut milk:

T_0 (control) the product was prepared using only 100 gram rice flour. T_1 was prepared using 80 g rice flour, 10g kodo millet flour, 5 g peanut milk and 5 g jaggery. T_2 was prepared

using 60g rice flour, 30 g kodo millet flour, 5 g peanut milk and 5 g jaggery.T_3 was prepared using 40g rice flour, 50g kodo millet flour, 5 g peanut milk and 5 g jaggery.

Preparation of kodo Thekuwa with incorporation of peanut milk:

T_0 (control): the product was prepared using only 100 gram rice flour. T_1 was prepared using 80 per cent maida, 10 per cent kodo millet flour, 5 per cent peanut milk and 5 per cent jaggery. T_2 was prepared using 60 per cent maida, 45 per cent kodo millet flour, 5 per cent peanut milk and 5 per cent jaggery. T_3 was prepared using 45 per cent maida, 45 per cent kodo millet flour, 5 per cent peanut milk and 5 per cent jaggery.

Organoleptic evaluation:

The organoleptic evaluation of the prepared products was done by a panel of 5 judges from the Department of Food, Nutrition and Public Health to assess the acceptability of the products based on the various sensory attributes like colour, appearance, texture, flavour and taste. The evaluation was done on the 9 point Hedonic scale based score card (Srilakshmi, 2011)

RESULTS AND DISCUSSION

The result illustrated in the above Table 1 pertains to the average sensory scores of different parameters in treated sample of the prepared *Kheer.* This clearly indicates that the treatment T_3 had the highest score in terms of colour and appearance (8.6). This is followed by T_2 (7.93), T_1 (7.46) and T_0 (6.66), respectively, The consistency of the *kheer* indicates that the treatment T_3 (8.5) has the highest score for consistency followed by T_2 (7.93), T_1 (7.4) and T_0 (6.6), respectively. Treatment T_3 has the highest score in terms of taste and flavour of the prepared *kheer* in treatment T_3 (8.6) has the highest score followed by T_2 (8.4), T_1 (7.2) and T_0 (6.6), respectively. Again the treatment T_3 (8.57) has the highest score regarding the overall acceptable of the product. It was found to be the most acceptable by the panel member followed by T_2 (8.16), T_1 (7.44) and T_0 (6.86), respectively. T_3 was found to the most acceptable by the panel of judges.

Abou-Dobara *et al.* (2016) studied that to incorporating peanut milk and cow milk at different level as T_1 (75% cow milk and 25% peanut milk) and T_2 (25% cow milk and 75% peanut milk). Scores of colour and appearance of peanut milk were lower than those of cow milk which may be attributed to the light brown colour of peanut. In the same trend, smell, taste and mouth feel scores of peanut milk were lower than those of cow milk. This was due to the be any taste which mixing of various levels of cow milk with peanut milk highly improved colour appearance, smell, taste, texture, body and mouth feel scores. In term colour and appearance T_1 (8.5) had highest score as compared to T_2 (8.5), in body and texture T_1 (8.5) had highest score as compared to T_2 (8), in taste and flavour T_1 (8.5) had highest score as compared to T_2 (8.25). T_1 was best in overall acceptability. Therefore, it is appropriate to use cow and peanut milk blinds in industrial operations instead of using of peanut milk individually.

The average sensory scores of different parameters in treated sample of the prepared *Laddu*. This clearly indicates that the treatment T_3 had the highest score in terms of colour

and appearance (7.93). This is followed by T_2 (7.13) T_1 (7.3) and T_0 (6.5), respectively, The Body and texture of the *Laddu* indicates that the treatment T_3 (8.16) has the highest score for consistency followed by T_1 (7.2), T_2 (6.4), and T_0 (6.6), respectively. Treatment T_3 has the highest score in terms of taste and flavour of the prepared *Kheer* in treatment T_3 (8.26) has the highest score followed by T_2 (6.5), T_1 (7.26) and T_0 (6.53), respectively. Again the treatment T_3 (8.050) has the highest score regarding the overall acceptable of the product. It was found to be the most acceptable by the panel member followed by T_2 (6.473), T_1 (6.593) and T_0 (6.53), respectively. T_3 was found to the most acceptable by the panel of judges. A study conducted by Yadav *et al.* (2013) studied that to prepare value added *Idli* prepared by kodo millet incorporating 20 per cent (T_1), 40 per cent (T_2) and 60 per cent (T_3) of millets was found acceptable for colour, flavour and taste, texture and over all acceptability and there was no significant difference between control and all treatments. Sensory score of *Sewai upma* prepared by incorporating kodo millet at 20 per cent (T_1), 40 per cent (T_2) and 60 per cent (T_3) of flour showed that treatment T_3 was best for flavour and taste, whereas there was no significant difference between colour, texture and overall acceptability.

Table 1 : Average sensory scores of control and treated sample of *Kheer*, *Laddoo* and *Thekuwa*

Control and treatment	Colour and appearance			Body and texture			Taste and flavour			Overall acceptability		
	Kheer	Laddoo	Thekuwa	Kheer	Laddoo	Thekuwa	Kheer	Laddoo	Thekuw	Kheer	Laddoo	Thekuwa
T_0	6.66	6.5	6.43	6.6	6.6	5.66	6.6	6.53	5.73	6.86	6.5	5.69
T_1	7.46	7.3	7.93	7.4	7.2	7.86	7.2	7.26	7.96	7.44	6.59	7.88
T_2	7.93	7.13	8.63	7.93	6.4	8.53	8.4	6.5	8.73	8.16	6.47	8.3
T_3	8.6	7.93	7.4	8.5	8.16	7.3	8.6	8.26	7.43	8.57	8.05	7.33
F-test	S	S	S	S	S	S	S	S	S	S	NS	S
C.D.	0.650	0.41	0.481	0.14	0.19	0.047	0.05	0.29	0.058	0.25	0.95	0.15

The result illustrated in the above Table 2 pertains to the average sensory scores of different parameters in treated sample of the prepared *Thekuwa*. This clearly indicates that the treatment T_2 had the highest score in terms of colour and appearance (8.63). This is followed by T_1 (7.93), T_3 (7.4) and T_0 (6.43), respectively, The Body and texture of the *Thekuwa* indicates that the treatment T_2 (8.53) has the highest score for consistency followed by T_1 (7.86), T_3 (7.3), and T_0 (5.66), respectively. Treatment T_3 has the highest score in terms of taste and flavour of the prepared *Kheer* in treatment T_2 (8.73) has the highest score followed by T_1 (7.96), T_3 (7.43) and T_0 (5.73), respectively. Again the treatment T_2 (8.3) has the highest score regarding the overall acceptable of the product. It was found to be the most acceptable by the panel member followed by T_1 (7.88), T_3 (7.33) and T_0 (5.69), respectively. T_2 was found to the most acceptable by the panel of judges.

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