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Nutritional evaluation and development of value added products rice flakes powder to improve iron status

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Abstract

Rice flakes are prepared from paddy. It is also popularly known as "poha. It is easily digestible. The shelf life of flakes is longer. It rich in iron, carbohydrates, protein, and calcium. It is excellent supplement to diet rice flakes are the main ingredients of many rice cereal products. Rice flakes supplemented product was prepared by using rice flakes powder. Supplemented rice flakes product was standardized and analyzed for their sensory evaluation. Sensory evaluation of products was made in terms of their color, appearance, aroma, taste, texture, and over all acceptability using nine point hedonic scales. The recipes for the preparation of various products from processed rice flakes powder were standardized by use of various degrees (5%, 10%, and 15%). The sensory evaluation of supplemented products was significantly different compared to those of control. All supplemented product were desirable and moderately desirable in all terms. The moisture, protein, and fiber contents of supplemented products were similar to control. Iron was maximum in supplemented products. It was 8.92 ± 0.07 in *ladoo* followed by *sev* 5.31 ± 0.27 as compared to their control. Due to high iron content these products are very useful for combating in different communities.

Keywords: Rice flakes powder, sensory and nutritional quality, Sev, Ladoo

Introduction

Skills development is key to improving rural productivity, employability and income-earning opportunities, enhancing food security and promoting environmentally sustainable rural development and livelihoods. Despite rural women's major role in agriculture and other rural activities, higher barriers in education and training limit their participation in more productive and remunerative work, perform managerial and leadership roles and participate fully in the development of their communities. Targeted action is needed to dismantle these barriers. Education and training are essential components of any strategy to improve agricultural and non-farm productivity and pull households out of poverty (www.org/skill). Learning about improved production technologies and methods, new products and markets, business and life skills can make a big difference. Skill development improved through the high quality local laddoos, candy, cereals, namkeens, and various other kinds of fried, grain and lentil based Indian snack utilizing the resources of the in house enterprise, hands on training programs are available to up skill community members who hold on interest in the food sector, An advantage of focusing on traditional focusing that a number of women in the community are aware of the products, comfortable with their preparation, and hence are likely to engage. (Cheryl doss. 2011) [3]. It's has been observed at that these women are interested in creating modern variations to traditional of flavours. The social partner and local communities to improve the situation of rural workers through skill development and there by contribute increased productivity and. incomes and improved social welfare (www.ilo.org/skill.com). Rice flake is a food item prepared from paddy. It is also popularly known as "Poha". It is consumed either after frying in oil or soaked in milk or urad. It is a fast moving consumer item and generally eaten as breakfast item (FAO, 2014) [6]. It is also used in large quantities for making 'Chevda' (a Farsan item) and many caterers use it for thickness of gravy. Rice flakes are made from paddy and hence they are easy to digest. Most of its preparations can be made at a short notice and hence bulk of the households store it on regular basis. Rice flakes or poha is an important breakfast in semi-urban and rural areas and middle class families of urban India. With proper storage, its shelf life is 2-3 months.

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This is a common product and can be produced anywhere in the country. (Global Agri System., 2000) [7]. Rice flakes the husked rice which is flattened into flat light dry flakes these flakes of rice swell when added to liquid whether hot or cold as they absorb water Milk or any other liquids. The thickness of these flakes vary between almost translucently thin (to more expensive varieties) to nearly four times thicker than a normal rice grain these are also known as Poha. It provides nutrition breakfast and food to a large number of household in cities town and even villages of India. Poha consumed by people of all ages and all times. Poha make a tasty and nutritious snack. (Global Agri System., 2000) [7]. Rural women often manage complex household and pursue multiple livelihood strategies, their activities typically include producing agricultural crops, processing and preparing food. This paper has examined the opportunities for Indian women to develop their skill development. India needs to impart adequate and appropriate skill to its workforce. Skill development as an instrument to improve the overall effectiveness and empowers an individual to work more efficiently. (Krunal K Punjani).

As cereals & pulses perform a principal role in diets of developing countries, this study was the evaluation of low cost snack products based on cereals (rice) & pulses. Composite flour were prepared using rice, rice by product i.e. rice flakes, rice flour & pulses (Bengal gram, & green gram) flour in ratio of 2:1. The rice flour used in two parts were as

pulse has only one part. Three major products were developed using different composite flour i.e. rice-pulse noodle, rice-pulse flakes, flakes (rice flakes + green gram powder). Developed product was evaluated on sensory evaluation. Sensory evaluation of prepared product was carried out using 9 point hedonic scale, out of the three, best acceptable product was T1 (rice-pulse noodle) with the highest average (43) & with least S.D.(1.63). (Mishra Malvika *et al.*, 2013) [9].

Materials and Methods

The seed involving rice flakes were purchased from the town market of Gohana, Sonapat, Haryana.

Fig 1 Processing of rice flakes

- Rice flakes
- Milling (Hammer traverse)
- powder
- Sieving
- Packaging
- Storing for further use in airtight container.

Standardization of recipes

The recipes for the preparation of various products from processed rice flakes powder were standardized making use of various levels (5 g, 10 g, 15 g). The processed rice flakes powder incorporated products *sev*, and *Ladoo* were prepared.

Table 1: Method of preparation of products

Products	Method of preparation
Rice flakes powder <i>sev</i>	<ul style="list-style-type: none"> ▪ Sieved Bengal gram flour and rice flakes powder. ▪ Added salted and a table spoon oil. ▪ Made stiff dough using water. ▪ Filled dough in <i>sev</i> machine and pressed to make thin <i>sev</i> from dough directly over <i>karahi</i> containing hot oil. ▪ Fried on low flame till golden brown.
Rice flakes powder <i>Ladoo</i>	<ul style="list-style-type: none"> ▪ Sieved all flours separately. ▪ Roasted flours separately till light brown. ▪ Mixed roasted flours together and fried in ghee for two- three minutes. ▪ Removed from fire and allowed to cool. ▪ Added ground sugar and mixed well and formed into shape of laddoos.

Organoleptic evaluation

Organoleptically evaluation was done using 9- point hedonic scale by semi trained members.

Statistical analysis

Statistical analysis of data was done by using complete randomized design (Panse and Sukhatme, 1961) [11], and all work was done in triplicates along with the data presented usually are necessarily mean \pm S.D. The data obtained in the experiments were recorded and subjected to statistical analysis using standard procedure.

Results and Discussion

Sensory evaluation of Rice flakes powder based products

Sev: *Sev* prepared by without use of rice flakes powder (control) were 'moderately desirable' in all attributes. *Sev* which were prepared by incorporating 5% rice flakes flour were 'desirable' in texture, and taste. It was 'moderately desirable' in terms of colour, appearance, aroma, and overall acceptability. Addition of 10% rice flakes powder were brought down the score in term of colour and aroma, but it was increase in appearance, texture, and over all acceptability.

However, the *Sev* prepared by incorporating 15% of rice flakes powder were 'desirable' in term of texture, taste and over all acceptability. *Sev* prepared by 15% rice flakes powder was better accepted as compared with control, 5% and 10 % incorporated *sev* (Table 1.)

Ladoo

Ladoo prepared without incorporation of rice flakes powder (control) were 'desirable' in all attributes. The result of the sensory analysis is presented in table 2. The control *ladoo* received score in the range of 8.10-8.40 for different attributes. Incorporation of 5% level brought down the scores for all sensory attributes and rated as 'desirable' in term colour, appearance, aroma, and over all acceptability. Addition of 10% rice flakes powder received score 8.10- 8.40 for all attributes and it was all most similar in terms of colour, appearance, aroma. Incorporation of 10% brought down the score in texture, taste, and over all acceptability rated as 'desirable' in all attributes. However, the *ladoo* prepared by incorporating 15% of rice flakes powder were 'desirable' in all attributes. *Ladoo* prepared by 15% rice flakes powder was all most similar as compared with control.

Table 2: Mean scores of various characteristics of rice flakes powder *Sev* and *Ladoo*.

Products	Color	Appearance	Aroma	Texture	Taste	Over all acceptability
Sev						
Control	7.60±0.22 ^b	7.60±0.22 ^b	7.60±0.22 ^{ab}	7.90±0.18 ^c	7.80±0.13 ^c	7.70±0.16 ^b
Type I	7.50±0.16 ^{bc}	7.70±0.15 ^b	7.70±0.15 ^b	8.10±0.18 ^b	8.10±0.18 ^b	7.82±0.13 ^b
Type II	7.40±0.16 ^c	7.70±0.21 ^b	7.50±0.26 ^c	8.00±0.25 ^{bc}	8.30±0.21 ^{ab}	7.78±0.19 ^b
Type III	7.80±0.24 ^a	7.80±0.29 ^a	7.90±0.23 ^a	8.20±0.20 ^a	8.40±0.26 ^a	8.02±0.21 ^a
CD (<i>P</i> <0.05)	0.58	0.64	0.63	0.59	0.58	0.51
Control=100% Bengal gram flour I=95% BGF+5% RFP II=90% BGF+10% RFP III=85 % BGF+15% RFP						
Ladoo						
Control	8.40±0.30 ^a	8.30±0.33 ^a	8.30±0.26 ^{ab}	8.10±0.31 ^b	8.40±0.22 ^a	8.30±0.27 ^{ab}
Type I	8.20±0.20 ^a	8.20±0.20 ^b	8.00±0.21 ^b	7.90±0.23 ^c	7.80±0.20 ^c	8.02±0.16 ^c
Type II	8.40±0.16 ^a	8.30±0.21 ^a	8.30±0.26 ^{ab}	8.20±0.29 ^b	8.10±0.18 ^b	8.26±0.17 ^b
Type III	8.50±0.22 ^a	8.30±0.26 ^a	8.40±0.26 ^a	8.40±0.26 ^a	8.40±0.22 ^a	8.40±0.22 ^a
CD (<i>P</i> <0.05)	0.65	0.73	0.71	0.79	0.59	0.61
Control=100% Bengal gram flour I=95% BGF+5% RFP II=90% BGF+10% RFP III=85 % BGF+15% RFP						

Values are mean ± SE of ten panelists

Values with same superscripts do not differ significantly CD (*P*≤0.05)

Nutritional evaluation of rice flakes powder based products

Proximate composition and iron content

Moisture

The moisture content in control *ladoo* was 0.81%, while it was 0.77% in supplemented *ladoo* as shown in Table 3. The moisture content of supplemented *sev* (4.58%) as compared to the control ones (4.69%).

Protein

The protein content of control *ladoo* was 14.82%, it was decrease in supplemented *ladoo* (14.44%). Similarly in rice flakes *sev*, the protein content was 14.57% in control and 14.20 % in supplemented ones.

Fat

The fat content in control *ladoo* was 19.50% while it was 19.22% in supplemented *ladoo*. The fat content of supplemented *sev* was increase (26.50%) significantly as

compared to their control (15.80%).

Fibre

Table 3. Reveals that the decrease in fibre content of supplemented *ladoo* (2.21%) as compared to the control *ladoo* (2.37%), and the fibre content of supplemented *sev* was 1.03%, while it was 0.79% in control ones.

Ash

The ash content in control *ladoo* was 1.43%, which was increased significantly to 3.20% in supplemented *ladoo*. The ash content of supplemented *Sev* was 6.19% as compared to the control ones (3.39%). It was significantly increased.

Iron

The rice flakes *ladoo* (15% flour) contained iron content 8.92 mg/100 g, which was significant higher as compared to the control ones 6.49 mg/100 g (Table 3). The iron content of supplemented *sev* was 5.31mg, while it was (3.51mg).

Table 3: Proximate composition and iron content of Rice flakes powder products.

Product	Moisture%	Crude protein%	Crude fat%	Crude fiber%	Ash%	Iron mg
Ladoo						
Control	0.81±0.01	14.82±0.1	19.50±0.9	2.37±0.04	1.43±0.01	6.49±0.01
Type I	0.77±0.03	14.44±0.05	19.22±0.02	2.21±0.02	3.20±0.03	8.92±0.07
CD (<i>P</i> <0.05)	0.12	1.06	2.02	0.09	0.15*	0.13*
Sev						
Control	4.69±0.09	14.57±0.03	15.80±0.59	0.79±0.01	3.39±0.01	3.51±0.01
Type I	4.58±0.06	14.20±0.08	26.5±2.88	1.03±0.05	6.19±0.09	5.31±0.27
CD (<i>P</i> <0.05)	0.04	0.13	0.02*	0.06*	0.01*	0.17*

Values are mean ±S.E of three independent determinations.

Conclusion

Present investigation reveals out the effect of different treatment on rice flakes and its utilization into products like *sev*, and *ladoo*. The sensory characteristics of the product were analyzed by 9 point hedonic scale. This varies with respect to the different levels of rice flakes powder. Quality of the *sev* and *ladoo* could be improved by rice flakes powder. Rice flakes products were desirable in terms of color, taste and texture. The result of sensory evaluation showed that the incorporation of rice flakes powder up to 15% was found to be most acceptable to obtain *sev* and *ladoo*, with improved nutritional quality and good sensorial attributes. It is needed to develop recipe in the form of common food products.

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