

Development and standardization of pomegranate peel powder incorporated instant idly mix

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ABSTRACT

India is one of the leading countries in pomegranate production. Pomegranate peels are the major wastage in food industry and they are mostly discarded and are also underutilized but they are valuable source of bio active compounds. It is a nutrient rich byproduct which are available in abundant. This is very useful for industrial applications and could provide a low-cost means to use a currently underutilized fruit by-product with potential health benefits. Hence, an instant idly mix, a traditional south Indian food was prepared by incorporating pomegranate peel powder. The dehydrated pomegranate peel powder was incorporated into the instant idly mix at 5 %, 10 % and 15 % using replacement method and research revealed that the overall acceptability of 10% pomegranate peel powder incorporated instant idly mix was excellent with the mean score of 4.75 ± 0.45 as compared with the other two incorporations. The pomegranate peel powder and pomegranate peel powder incorporated instant idly mix can be stored up to 60 days without any deterioration.

Key Words : Pomegranate peel powder, Instant idly mix

INTRODUCTION

Pomegranate peels are the major wastage in food industry and they are mostly discarded and are also underutilized but they are valuable source of bio active compounds. Pomegranate peel powders are rich in flavonoids, resveratrol, anthocyanin, which are the richest source of antioxidants. Besides high antioxidant capacity, pomegranate peel extracts have been reported to possess a wide range of biological actions including anti-cancer activity, antimicrobial activity, antidiarrheal activity, apoptotic and anti-genotoxic properties, anti-tyrosinase activity, anti-inflammatory and anti-diabetic activities (Fawole *et al.*, 2012). Pomegranate fruits peel can be used as functional ingredient as a good source of crude fibers which provide numerous health benefits such as their ability to decrease serum LDL-Cholesterol level, improve glucose tolerance and the insulin response, reduce hyperlipidemia and hypertension, contribute to gastrointestinal health and the prevention of certain cancers such as colon cancer (Lansky and Newman, 2007). Many researchers reported that pomegranate peels could be used in therapeutic applications. Instead of discarding this as waste it

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can be added to many food products as a functional ingredient.

Objectives :

The objectives of the study are to:

- Prepare the dehydrated pomegranate peel powder
- Develop instant idly mix by incorporating various proportions of pomegranate peel powder and to find its acceptability by sensory evaluation
- Analyse the phytochemicals and antioxidant activity of pomegranate peel powder
- Find the nutritional composition of the pomegranate peel powder
- Determine the microbial load of pomegranate peel powder and the pomegranate peel powder incorporated idly mix.

METHODOLOGY

Dehydration of pomegranate peel powder :

Cabinet dryer was used for dehydrating the pomegranate peel. They were dried in cabinet dryer at 80°C for 2 days until they are fully dried. They are checked now and then to prevent them from charring. Then they were powdered and stored. The dried pomegranate peel and powdered pomegranate peel are shown in Plate 1 and 2, respectively.



Plate 1 : Dried pomegranate peel



Plate 2 : Pomegranate peel powder

Development of pomegranate peel powder incorporated instant idly mix :

The dehydrated pomegranate peel powder was incorporated into the instant idly mix at 5 %, 10 % and 15 % using replacement method and the acceptability test was done by eight panel members. The ingredients used for preparing the instant idly mix are given in Table 1.

Rice was soaked in water for two hours, it was then dried in cabinet dryer at 60°C for 2 hours. Then it was powdered using powder mixer and sieve well to get fine powder. Sauté the black gram dhal and rice flakes till the colour changes to golden brown. Powder sago and fenugreek together. Mix rice flour, black gram dhal, rice flakes, sago, fenugreek and pomegranate peel powder.

Preparation of idly using pomegranate peel powder incorporated instant idly mix :

The instant idly mix incorporated pomegranate peel powder was soaked in 60ml curd for two hours. A pinch of salt was added to it. And then steamed for 5 minutes and served hot. The prepared idly is shown in Plate 3.

Table 1 : Ingredients used for the preparation of pomegranate peel powder incorporated instant idly mix

Control		Experimental			
Ingredients	Amount (g)	Ingredients	Amount (g)		
			Sample A	Sample B	Sample C
Rice	65	Rice	60	55	50
Black gram dhal	30	Black gram dhal	30	30	30
Rice flakes	10	Rice flakes	10	10	10
Sago	3	Sago	3	3	3
Fenugreek	2	Fenugreek	2	2	2
		Pomegranate peel powder	5	10	15

**Plate 3 : Pomegranate peel powder incorporated instant idly****Sensory evaluation of pomegranate peel powder incorporated idly :**

For evaluating the sensory characteristics, the three different formulations of pomegranate peel powder incorporated idly was prepared by standardized procedure. They were assessed by 8 panel members. The Panelist were asked to determine the sensory attributes on the basis of 5 point hedonic scale and they were scored on basis of sensory qualities such as appearance, colour, texture, odour taste .the overall acceptability was evaluated by the mean score of all the attributes.

Analysis of phytochemicals in pomegranate peel powder :

The pomegranate peel powder was prepared by dissolving 2g of sample in 10ml of 80% ethanol. It was kept for 24 hours and then centrifuged to collect the extract. This extract was used for further phytochemical analysis.

Estimation of antioxidant activity in pomegranate peel powder :

The free radical scavenging activity of the extracts were measured in terms of hydrogen donating or radial scavenging ability using the stable free radical DPPH.

Nutrient analysis of dehydrated pomegranate peel powder :

The biochemical composition of pomegranate peel powder was analysed by AOAC method

Analysis of the microbial load for pomegranate peel powder and pomegranate peel powder

incorporated instant idly mix :

The microbial load was carried out to find out the shelf life of pomegranate peel powder, control and the developed product. The microbial load was determined at 15 days interval for 60 days using standard plate count method.

RESULTS AND DISCUSSION**Analysis of phytochemicals in pomegranate peel powder :**

The phytochemical tests were performed in the pomegranate peel powder. The results obtained were shown in Table 2.

Table 2 : Estimation of phytochemicals present in pomegranate peel powder	
Name of phytochemical	Pomegranate peel powder
Tannin	+
Saponin	+
Quinones	+
Flavonides	+
Glycosides	—
Terpenoids	+
Phenol	+
Steroids	+
Coumarins	+
Anthocyanin	—
Betacyanin	+
Carbohydrate	+

The qualitative analysis of phytochemicals like tannin, saponin, quinones, flavonides, glycosides, terpenoids, phenol, steroids, coumarins, antocyanin, betacyanin, protein and carbohydrates are present in the pomegranate peel powder. The results revealed that the phyto chemicals glycosides and anthocyanin are absent in pomegranate peel powder. Which is shown in Table 2. The results obtained were similar to the research done by Sangeetha (2003).

Estimation of antioxidant activity of pomegranate peel powder :

The free radical scavenging activity of the extracts were measured in terms of hydrogen donating or radical scavenging ability using the stable free radical DPPH. Extract of pomegranate peel powder was evaluated for antioxidant test. The research found that the antioxidant activity of pomegranate peel powder was (57.06%). Hence pomegranate peel powder was incorporated in the developed instant idly mix. This coincides with the results obtained by Gil and Noda (2002) who found that it was 56%.

Sensory evaluation of pomegranate peel powder incorporated instant idly mix :

The developed product was subjected to sensory evaluation by panel members and then mean scores were obtained for 5%, 10 %, 15%, pomegranate powder incorporated instant idly mix and statistically analyzed.

The above Table 3 shows the mean score for colour, flavour, taste, texture and over all acceptability of pomegranate peel powder incorporated instant idly mix by using replacement method in the proportions 5%, 10%, and 15%.

Evaluation of Organoleptic attributes of the pomegranate peel incorporated instant idly mix

Table 3 : Sensory evaluation of pomegranate peel powder incorporated instant idly mix					
Proportions of pomegranate peel	Colour	Texture	Flavour	Taste	Overall acceptability
Control	4.15± 0.25	4.25± 0.47	4.5 ±0.25	4.75± 0.15	4.35± 0.25
Sample A (5%)	4.10± 0.25	4.5±0.25	3.45± 0.25	4.45± 0.25	4.0 ±0.40
Sample B (10%)	4.75± 0.25	4.5± 0.28	4.75 ±0.25	4.0± 0.25	4.75± 0.45
Sample C (15%)	3.75± 0.47	4.10± 0.47	3.75± 0.25	3.75± 0.45	3.0 ±0.40

for colour, texture, flavour, taste and over all acceptability revealed that the overall acceptability of 10% pomegranate peel powder incorporated instant idly mix was excellent with the mean score of 4.75±0.45 as compared with the other two incorporations.

Nutrient analysis of pomegranate peel powder :

The nutrient content of pomegranate peel powder was found as 13.25g protein, 42.98g carbohydrate, 5% moisture, 5.26g ash, 20.14mg iron, 532mg calcium, 30.96mg phosphorus, 50.22mg vitamin C.

Microbial analysis of pomegranate peel powder and pomegranate peel powder incorporated instant idly mix :

The storage study for the pomegranate peel powder and the pomegranate peel powder incorporated idly mix was carried out for a period of two months at 15 days interval. The bacterial count was enumerated by using the standard plate method in the pomegranate peel powder and the pomegranate peel powder incorporated instant idly mix. They were stored at room temperature. On storage of these products showed some changes in flavour that was seen in eighth week of storage. Thus it can be concluded that the pomegranate peel powder and the pomegranate peel powder incorporated instant idly mix can be stored up to 60 days without any deterioration.

Conclusion :

The pomegranate peel powder contains the phytochemicals of tannin, saponins, quinonens, flavonoids, terpenoids, sterols, coumarins and Betacyanin. The research revealed that the antioxidant activity of the pomegranate peel was 57.06% and 10% pomegranate peel powder incorporated instant idly mix was excellent compared with the other two incorporations. The pomegranate peel powder and pomegranate peel powder incorporated instant idly mix can be stored up to 60 days without any deterioration.

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