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FORMULATION AND EVALUATION OF DOSA INSTANT MIX USING ITALIAN MILLET/ FOXTAIL MILLET (*Setaria italica*)

G. Sushmitha[1], V. Bhasker[2], Mogili Swathi[3], V. Prashanth[4] , Munugala surrender reddy[5]

[1]*Food Technology, University College of The Technology*
[2]*Food Technology, University College of The Technology*
[3]*Food Technology, University College of The Technology*
[4]*Food Technology, University College of The Technology*
[5]*Food Technology, University College of The Technology*

ABSTRACT- *Instant Food means simple, fast and convenient food which is easy and fast to prepare. Dosa is traditional fermented product in India generally prepared from milled rice and black gram dhal which is consumed mainly at the breakfast time. Here Dosa instant mix is prepared by using Italian millet. In Rayalaseema and Telangana areas Italian millet is cooked like rice. A generation back this was the common food of the people in this region. Italian Millet is making a comeback again as this is healthier than rice. There are hundreds of varieties of dosas and each has its own unique taste. Dosa has a very prominent place on our table. The process described here is mixing Italian millet flour, rice flour and roasted black gram flour in water followed by keeping them for fermentation at room temperature (30° ± 2°C) for a period of 12 to 14 hours. The fermented batter is then dried at a temperature of around 70° C for a period of 2 to 4 hours. This is powdered to a particular mesh size (about 0.5mm sieve) and reconstituted to prepare Dosa with a proportion of 1:1.5 to 1:1.6 of ready mix to water and addition of salt to taste (generally 2 to 2.5 % on the basis of the ready mix). Three formulations have been made by varying proportions of Italian millet flour and rice flour, keeping roasted black gram flour proportion constant. For these three samples Proximate and nutritional analyses, and Sensory Evaluations are estimated. The storage stability was good in instant mix with respect to color and texture. Present study revealed that sample 2 (Italian millet flour- 300g , roasted black gram flour- 50g , rice flour- 150g) has given best results in terms of sensory and optimal nutritional facts compared to other two samples.*

Key words*: Dosa, Italian millet, prefermented flour and sensory evaluation.*

I.INTRODUCTION

Instant mixes form a large range of convenience foods for housewives. Being easy to use without much terminal processing, housewives find it very convenience to use. It helps them to save time and effort and relives them of the tedious jobs of collecting various ingredients, cleaning and sorting them and preparations. Modern households also do not offer the facilities necessary for traditional processing and hence these products have gained instant acceptance. Today, in our kitchen has got important place by instant food products. It occupies a legitimate shelf space in stores and super markets in India. New and high quality of instant food products have changed the life style of people and led to more number of Indian companies enter the market with verities of instant food products. Instant food products save time and energy. Parents can send the children to school early, go to office in time and get more time to involve in other activities. Urban modern women seek to empower themselves in the society as they have higher education, better employment opportunities and good exposure environment that increase the needs at a faster rate. Instant food products make them to cook any time with less labour, time and energy. In India, majority of food consumption is still at home. Dosa, a common breakfast dishand street food, is high in carbohydrates, and contains no sugar or saturated fats. As its constituent ingredients are rice and urad dhal (Vigna mungo), it is also a source of protein. There are hundreds of varieties of dosas and each has its unique taste. Dosa in any form are family favorite. This recipe came from generations.. At one side it is flat and the other side has a bubbly structure. It is light sour in taste and crispy.Normally, Dosa is made from rice and urad dhal. First rice and urad dhal were soaked for about 3-4 hours then they were grinded into batter of pouring consistency. This batter is kept for fermentation for at least 6-7 hours according to Indian conditions. After fermentation once mix the batter and pour batter over hot pan.

Bake/cook till it becomes golden brown color. Therefore, to make this dosa it takes around 10-12 hours. The present investigation was undertaken to develop dosa instant mix using Italian millet flour.

II. MATERIALS AND METHODS

2.1 Raw materials:

2.1.1 Italian millet - Italian millet is the second-most widely planted species of millet, and the most important in East Asia. It has the longest history of cultivation among the millets, having been grown in China since sometime in the sixth millennium BC. Other names for the species include Teff Grains, Foxtail Millet and Korralu (in Telugu). This millet is a fine grain—about the size of a poppy seed—that comes in a variety of colors, from white and red to dark brown. Grows predominantly in Ethiopia and Eritrea, and thrives even in difficult climates. As such, it comprises the staple grain of their cuisines. The grain has a very mild, nutty flavor, and it packs a serious nutritional punch. It has an excellent balance of amino acids, and it is also high in protein, calcium, and iron. Ground into flour, it is used to make the traditional bread, injera: flat, pancake-like, fermented bread that complements the exotic spices found in the regional food. It can also be ground into flour to make excellent gluten-free flour alternative, and can be used to make pie crusts, cookies, breads, and an assortment of other baked goods. It can also be eaten whole and steamed, boiled, or baked as a side dish or a main course. Helps control Blood sugar levels when consumed on regular basis. It showed lowered riglyceride levels, LDL/VLDL Cholesterol and increase in HDL Cholestrol. Its known for its Low Glycemic index- gradual increase in blood sugar after food intake when compared to rice. Other ingredients used are rice flour, black gram dhal, salt and water.

2.2 Preparation of Ingredients:

The raw materials such as Italian millets, black gram and rice flour were procured from the local market. Italian millets were manually cleaned, milled and stored in polyethylene bags for further use. Similarly, black gram was manually cleaned, roasted for 10 minutes with medium heat (until light brown color) and milled.

2.3 Preparation of prefermented flour:

Millet flour, roasted black gram flour and rice flour mixed in three variations. By keeping roasted black gram flour constant other two flours are varied. Three flours (500g) in three variations and 1000ml of water for each variation were mixed and batter was left for fermentation for overnight. This batter which is ready to be baked in regular process was taken into dryers. The prefermented batter was poured into cleaned metal plates and this tray was kept in a hot air drying (tray drier) with a temperature of 70°C to avoid further fermentation. The dried batter was milled and sieved with a 0.5mm sieve, then packed in a polyethylene bags (sealed) for shelf life studies.

Table 1: Formulation of Instant Dosa Mix

Composition	Sample 1	Sample 2	Sample 3
Italian millet (g)	350	300	250
Roasted black gram flour (g)	50	50	50
Rice flour (g)	100	150	200
Salt (g)	10	10	10
Water (ml)	1000	1000	1000

2.4 Preparation of Dosa from prefermented flour

Three compositions are made. From those three variations three dosas are made. Take 25 gram of instant mix from each composition then add 35ml of water. Mix well and leave it for 20 minutes. Heat a flat griddle (dosa pan) and scoop batter in the middle and spread it, since batter is in pouring consistency we should pour the batter from outside in. This dosa may not be perfectly round. Let it cook till it becomes golden brown and crunchy at the edges. After 2 minutes reverse to other side and fry for 30 seconds. 25g of instant mix powder will produce about 11.34 cm dosa (one dosa).

PROCESS FLOW SHEET

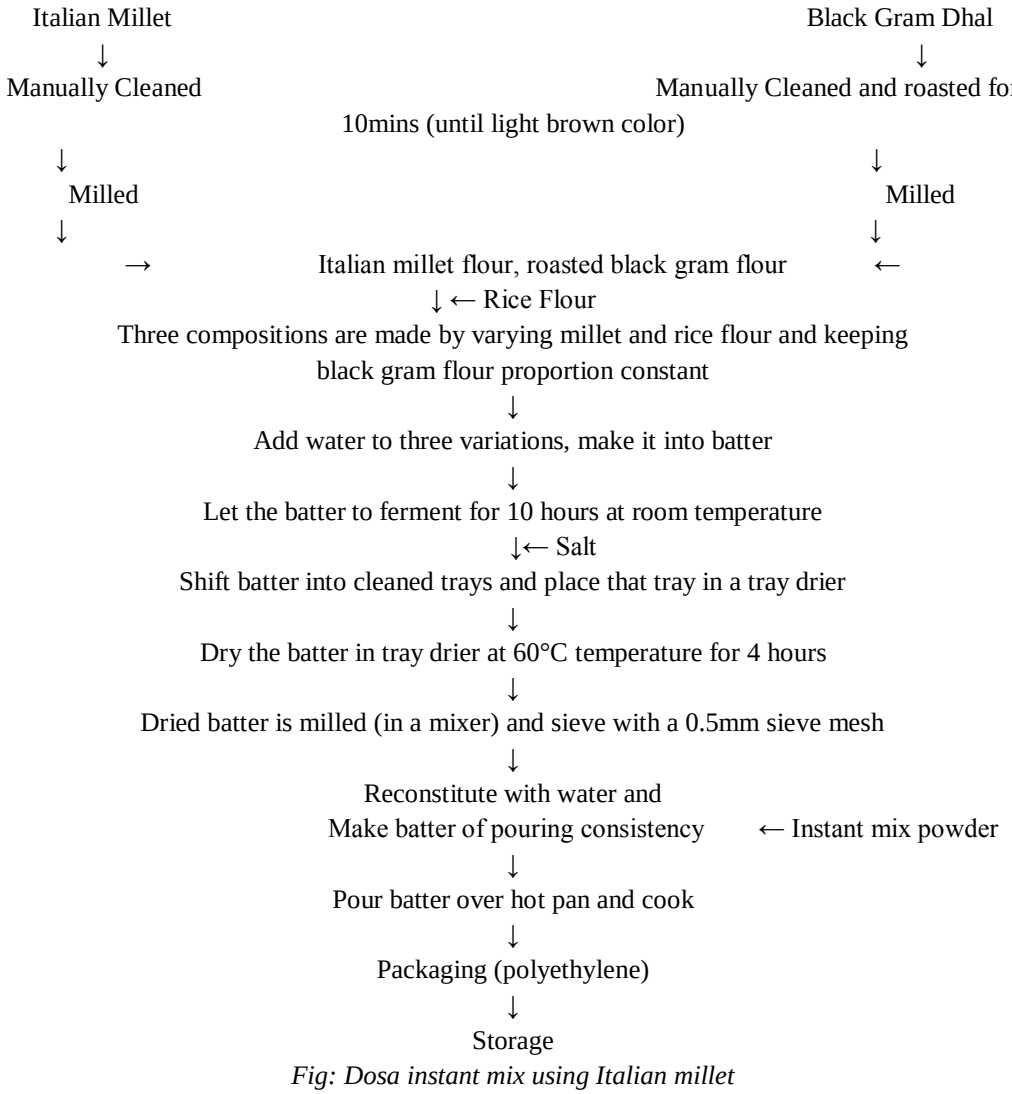

Fig: Dosa instant mix using Italian millet

2.5 Evaluating sensory quality of dosa prepared from prefermented flour

Dosa prepared from the different instant mix flours was evaluated for its sensory acceptability by using 6 consumer panels. The panelist was asked to evaluate the different types of dosa on the bases of appearance, color, taste, flavor, after taste and overall acceptability based on 9 point hedonic scale. The scoring scale was: 1 (Dislike extremely), 2 (Dislike very much), 3 (Dislike moderately), 4 (Dislike slightly), 5 (Neither dislike nor acceptable), 6 (Slightly acceptable), 7 (Moderately acceptable), 8 (Highly acceptable) and 9 (Extremely acceptable).

2.6 Evaluation nutritional quality of dosa prepared from prefermented flour

2.6.1 Proximate Composition

All the analyses were conducted on a dry weight basis except moisture content which is evaluated in wet bases. Moisture of the prefermented flours and dosa prepared from prefermented flour were determined according to AOAC (12). Total ash content of dosa samples was determined according to AOAC (13). The fat content of the samples were determined by Soxhlet, using diethyl ether as a solvent (13). Crude fiber content of dosa samples was determined according to AOAC (12). Total carbohydrates were calculated by difference with the following formula:

Total carbohydrates (g/100g dry weight) =100 - [g protein + g crude fat + g ash+ g crude fiber+ g moisture]

Total energy was calculated according to the following equations:

Energy (kcal/100g) =4 x (g protein +g carbohydrate) +9 x (g lipid)

2.6.2 Determination of Minerals

All the analysis was conducted on a dry weight basis. Mineral (calcium and phosphorus) contents of jam samples were determined as described by AOAC (1995).

III. RESULTS AND DISCUSSIONS

3.1 Nutritional Value of Raw Materials:

According to the National Institute of Nutrition's book, "Nutritive Value of Indian Foods," the following values per 100g:

Table1: Proximate Principles (Per 100g) Of Ingredients as Per NIN

Food stuff	Italian millet	Rice, raw, milled	Black gram dhal
Moisture(g)	11.2	13.7	10.9
Protein(g)	12.3	6.8	24.0
Fat(g)	4.3	0.5	1.4
Minerals(g)	3.3	0.6	3.2
Crude fiber(g)	8.0	0.2	0.9
CHO(g)	60.9	78.2	59.6
Energy(kcal)	331	345	347
Calcium(mg)	31	10	154
Phosphorous(mg)	290	160	385
Iron(mg)	2.8	0.7	3.8
magnesium(mg)	81	90	130
potassium(mg)	250	-	800

3.2 Evaluation nutritional quality of dosa prepared from prefermented flour

Different formulations of pre-fermented flour resulted in flour with different moisture contents; 5.45g/100g, 6.36 g/100g and 6.01 g/100g. The pH values of the pre-fermented flour were 3.14, 3.18 and 3.38. The moisture content of dosawhich were prepared from different instant pre-fermented flours ranged 45.76, 45.60 and 45.68 (g/100g). The protein content was reduced with deceasing Italian millet flour in formulations. The protein content was high in sample 1 i.e.; 12.58 (g/100g). Has Italian millet is rich in calcium content; the dosa prepared from prefermented flours was estimated for calcium. Results showed that sample 1 has high calcium content 39.0 (mg/100g).

Table2: Nutritive Content of Dosa Instant Mixes per 100 grams

Parameters	Sample1		Sample2		Sample3	
	Mean	SD	Mean	SD	Mean	SD
Moisture (g)	45.76	0.05	45.60	0.02	45.68	0.03
Protein(g)	12.58	0.01	12.26	0.01	12.01	0.01
Minerals (g)	2.75	0.02	2.15	0.01	2.19	0.01

Fat (g)	2.94	0.01	2.97	0.01	2.96	0.02
Crude fiber(g)	5.22	0.02	5.03	0.02	4.83	0.03
Carbohydrates (g)	70.74	0.03	71.99	0.04	72.33	0.01
Energy (k cal)	359.75	0.07	363.73	0.05	364	0.03
Calcium (mg)	39.0	0.01	36.83	0.02	32.45	0.01
Phosphorous (mg)	273.5	0.02	260.3	0.01	247.1	0.01
Iron (mg)	2.47	0.01	2.25	0.02	2.05	0.01

Note: All the values for 3 replicates

3.3 Evaluating sensory quality of dosa prepared from prefermented flour

Dosa prepared from different prefermented flours was evaluated for its sensory acceptability by 6 consumer panels using a 9-point hedonic scale ranging from dislike extremely (1) to like extremely (9). During product testing, panel members were allowed to clean their mouth at intervals.

Sample 1- Italian millet flour- 350 g, rice flour- 100 g, roasted black gram flour- 50 g. Italian millets have nutty flavor. Due to high proportion of Italian millet dosa made from sample1 instant mix has low flavor compared to other two samples.

Sample 2- Italian millet flour- 300 g, rice flour- 150 g, roasted black gram flour- 50 g. small reduction in Italian millet flour in composition increased the acceptance of dosa compared to dosa made from sample 1.

Sample 3- Italian millet flour- 250 g, rice flour- 200 g, roasted black gram flour- 50 g. Further reduction of Italian millet flour reduced nutritional value of dosa.

The texture of three dosas prepared from three different prefermented mixes showed good results. The mean score of second sample 7.95 explains its higher acceptability and a very neat and uniform appearance and taste. So present study conclude that sample 2 instant mix best suits to produce dosa.

Table3: sensory evaluation of Dosa Instant Mixes per 100 grams

Sample	Appearance		Taste		Flavor		Texture		Color		After taste		Overall acceptability	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	8.12	0.12	6.25	0.04	5.15	0.01	8.22	0.02	8.64	0.04	6.14	0.02	6.11	0.1
2	7.91	0.02	7.14	0.05	6.58	0.09	8.82	0.06	8.71	0.03	7.54	0.01	7.95	0.15
3	7.23	0.06	6.81	0.04	6.82	0.10	8.35	0.05	7.98	0.01	7.41	0.05	7.01	0.18

IV. CONCLUSION

The present study revealed that sample 2 (Italian millet flour- 300g, rice flour- 150g and black gram flour- 50g) has given best results in terms of sensory and optimal nutritional facts compared to other two samples i.e, sample 1 and sample 3. Though sample 1 (Italian millet flour- 350g, rice flour-100g and black gram flour- 50g) has rich nutritional value than sample 2 and 3, but it has mild, nutty flavor due to high proportion of Italian millet which reduced its Organoleptic quality. Taste of dosa prepared from sample2 scored high value compared to other two samples. Comparatively sample 2 has optimum nutritional quality and better organoleptic parameters among three variations. So, present study concludes that sample 2 best suits to produce desirable instant dosa mix using Italian millet with acceptable sensory properties. All sensory attributes like appearance, taste, flavor, texture, color and overall acceptability for dosa prepared from sample 2 scored acceptable values.

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