



# A STUDY ON DEVELOPMENT OF FORTIFIED MULTIGRAIN PASTA WITH GINGER POWDER

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## Abstract:

Pasta is traditional food of Italy is known to us because of its taste and texture quality. In the present study Five samples (P1, P2, P3 and P4,P5) of pasta were prepared by using different quantities of wheat flour and ginger powder and keep ragi flour and rice flour constant in each sample. Each sample passed through sensory analysis and sample 4(P4) found best in that so it was pass through nutritional analysis and on basis of nutritional analysis and sensory evaluation we have found that sample contain 50% wheat flour, 10% ginger powder, 30% ragi flour and 10% rice flour that is P4 was found to be best in quality having more nutritional element and higher overall adequacy. All the four samples were estimated for the physicochemical properties (ash, texture and viscosity analysis), nutritional properties (carbohydrate, protein, fat, and fibre), and sensory quality.

**Key words:** Pasta, Ragi, Wheat, Rice, Ginger powder, Nutrition.

## Introduction:

In India pasta is in a group of fast food, but it is a traditional Italian food. Generally is made up of durum wheat, refined wheat flour and eggs [1]. It can be served as regular food, but because of its less nutritive value, it has been avoided by all age groups. Enhancing its nutritive value can serve it as regular food to infants and children as well [4]. Pasta is an extruded product and can be extruded in various shapes using different dies; then it is dried and cooked before eating. Pastas sensory and physical qualities depend upon their strength and elasticity, if the dough has high tensile strength then there will be less cooking loss [6].

Enhancing its nutritive value by incorporating nutritive ingredients like sprouted ragi flour and wheat flour, rice flour, ginger powder (sunth). Sprouting improves the nutritive value of wheat and ragi seeds so that they could be accepted widely. Sprouting improves nutritive value and reduces antinutritional factors from the seeds [9]. Sprouting increase protein digestibility and improve sensory properties as well. Germinated wheat and ragi seeds should be dry before formulating a new product. Sun-drying is one of the most common methods used for drying sprouted seeds, we can also use air drying and infrared drying for seed drying. Sun drying is efficient and observed better than infrared drying.

In many studies, it has been found that ragi is rich in calcium, iron, vitamin D, B complex vitamin and vitamin E; it also contains high fibre, proteins which are required to make baby food and is frequently

consumed by elder people because it is easy to digest. [4] Wheat is rich in carbohydrates especially in dietary fibre, fat, protein, vitamin and some minerals. Rice, rice is reaching in natural inflammatory and gluten-free grain, it improves nervous system health, it is a good source of energy, prevents obesity, rice can be used for skincare, rice flour is rich in calcium and it makes good food for bone health. Rice flour is rich in chlorine, calcium, niacin and sodium. Ginger powder helps to smooth a bad stomach, helps to reduce cancer risk, ginger powder contains protein, crude fibre, fat and ash, it also contains carotene and ascorbic acid [10].

### Objectives:

- To prepare consumer acceptable, nutritious and good quality fortified multigrain pasta.
- To study physiochemical properties of multigrain pasta.

### Sample preparation:

**Materials:** Superior quality of Kamuth (khorsan) wheat purchased, Kalimuch rice were taken to make rice flour. Ragi, salt, ginger powder (sunth) purchased from local market. All kind of impurities, like stones, dust, and broken grain was removes from ragi, wheat and rice. Normal drinking water having TDS of 150 ppm had taken to moist flour and for other purpose also.

### Preparation of ragi and wheat flour:

**Soaking-** 250 gm wheat and ragi soaked in 1 litter of water for 3:30 hours at room temperature. Drained out excess water with the help of wire mesh. After soaking of wheat and ragi they placed on germinating paper.

**Sprouting-** Soaked ragi sample and wheat sample allowed germinating for 72 hours at 20<sup>0</sup>C in incubator. After sprouting weight of ragi and wheat got increase into double.

**Drying-** Sprouted ragi and wheat allowed drying. Drying is a process which reduces the moisture level of product and makes it long lasting. There are various ways to dry grains like radiation drying, sun drying, air drying. We use sun drying here, wheat and ragi dried in for 1 day and roasted slightly on low flame to enhance taste and reduces moisture of final product.

**Kilning-** After removing moisture from ragi and wheat, removing of dried sprouts was done, grinding was followed by kilning to make fine powder of ragi and wheat sample.

**Preparation of composite flour-** Rice was washed and sun-dried and then grinded into fine.

**Table .1** compositions of flours and ginger powder

Parameters	Wheat flour	Ginger powder	Ragi flour	Rice flour
P1	60%	0%	30%	10%
P2	57%	3%	30%	10%
P3	55%	5%	30%	10%
P4	50%	10%	30%	10%
P5	40%	20%	30%	10%

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ger powder, rice flour, ragi flour, and wheat flour, five combinations were made (p1, p2, p3, p4, p5) as shown in table 1. There is contrast in wheat flour and ginger powder and we keep rice flour and ragi flour constant in all five samples. Added salt for taste and water to form dough of flour. All samples were weight accurately and all the analysis was done triplets. All the sample flour was passed separately through sieve to improve the mixing. For extruding product, used kents cold extruder.

**Sensory analysis:** The panel for sensory evaluation includes 5 panellists. The panellists were selected from all age groups from 5 years to 60 years. They were semi trained for evaluation. Only boiled pasta was

serving to them, they mark colour, aroma taste, texture and overall acceptability of the product on the basis of 9 hedonic scales ranging from 1 to 9.

### Nutritional analysis:

**Ash content-** Oven dried pasta sample was left inside muffle furnace for 700- 800<sup>0</sup>C for 5 hours. Sample were placed in desiccator for cooling, noted the weight of crucible.

% of ash= weight of ash/ Initial weight of oven dried sample\*100

**Moisture content-** Determination of moisture content was done by oven drying method (AOAC, 2005). Analysis was done at 105<sup>0</sup>C for overnight heating, then sample were cooled in desiccator, weight were note.

% of moisture content (wb)= (initial weight of sample – dry weight of sample)/ initial weight of sample \*100

**Fat content-** Fat content was determined by oxalate method, by taking 3g of sample in each oxalate tube.

% of fat=  $W_1 - W_0$  / Weight of sample taken\*100

**Crude fibre-** The Henneberg- stomann method was followed to determine crude fibre percentage.

% of crude fibre= loss of weight/weight of sample\*100

**Determination of carbohydrate-** Total carbohydrate contain can calculate by many methods rather than analysing it.

% of carbohydrate= 100-( protein+fat+fibre+moisture+ash)

**Protein content-** AOAC method 6.25 (2005) method was followed to determine the protein content in multigrain pasta. There are 3 steps for finding protein %, Digestion, Distillation, Titration followed by calculation,

% nitrogen= Titrate value\*N\*0.014/weight of sample\*100

% of protein= % nitrogen\*6.25

Here 0.014 is milliequivalent weight of N<sub>2</sub>.

### Result:

**Cooking time:** cooking time of multigrain pastas 5 samples was remarkably decreased as compare to the other samples used for study. In each test 30 g of each sample was tested and cooked separately for the evaluation of cooking time. The cooking times of samples are mention in table given below.

**Table 2.** Cooking time of prepared multigrain pasta sample.

Sample	Cooking time (minutes)
P1	6.01
P2	5.48
P3	5.10
P4	4.32
P5	4.31

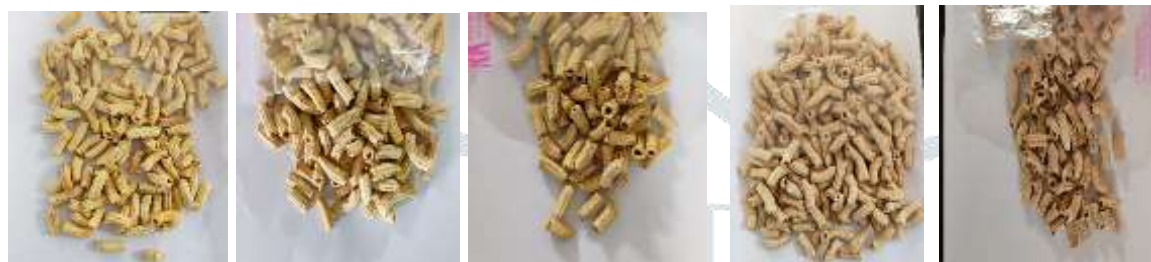
### Sensory characteristic:

Sensory evaluation of the product was carried out by 9 hedoinc scale of sensory test. The colour score of samples was 6.0, 8.8, 8.5, 9.0, 7.9 respectively, Colour of sampleP4 found best than rest of samples. The

flavour score 8.4, 7.9, 8.5, 9.5, 8.0 not only colour but flavour of P4 found best in sensory evaluation. The texture, taste, overall acceptability of only P4 best than rest of samples. Product contains 10% ginger powder in it found best in all parameters. There were no improvements in taste and colour.

**Table 3.** Sensory evaluation of samples.

sample	Colour	Flavour	Texture	Taste	Overall acceptability.
P1	6.0	8.4	7.9	6.2	7.9
P2	8.8	7.9	7.5	7.4	7.5
P3	8.5	8.5	7.8	7.7	7.7
P4	9.0	9.5	8.2	8.6	8.1
P5	7.9	8.0	8.1	5.3	6.1



Sample1(P1)    Sample 2 (P2)    Sample 3 (P3)    Sample 4 (P4)    Sample 5 (P5)

### Nutritional analysis:

Proximate nutritional analysis includes parameters such as protein, carbohydrate, fat, fibre, minerals and moisture. The carbohydrate, Protein, mineral, moisture, fat and fibre is 70.30, 14.16, 8.94, 7.1, 6.00, 3.20 respectively. Fiber percentage is higher in multigrain pasta as it does not contain refined wheat flour, and rich in minerals as well because of malted ragi. The nutritional composition of sample4 (P4) is shown in table 4.

**Table 4.** Nutritional composition

Components	% Per110g
Carbohydrate	70.30%
Protein	14.43%
Minerals	8.97%
Moisture	7.1%
Fat	6.00%
Fibre	3.20%

### Conclusion:

Multi grain pasta was prepared with different proportions of wheat flour and ginger powder. As per results sample 4 that is P4 has best in taste and nutritional and sensory analysis and it was highly acceptable. On basis of cooking time, physiochemical properties and sensory evaluation pasta which contains 50% wheat flour, 10% ginger powder, 30% ragi flour, 10% rice flour resulted best. Ginger powder prevents major diseases like asthma, arthritis and improves heart and vascular health. Ragi gluten free product and is easy to digest.

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