



## Value Addition by Finger Millet (*Eleusine coracana* L.) to Increase the Nutritional Value and Fight the Nutritional Challenges

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### Abstract

Finger Millet (*Eleusine coracana* L.) is a coarse cereal and a hardy crop, one of those crops which can remain unaffected in several conditions. The finger millet has high protein, minerals and iron compared to other cereals. The regular consumption of finger millet may reduce the chance of diabetic mellitus. Finger millet contains amino acid methionine which is lacking in the diets of millions of the poor who live on starchy staples such as cassava, plantain, polished rice, or maize meal. Amino acid Lecithin Methionine help to cut down the cholesterol levels by eliminating extra fat from liver and theonine helps to block fat disposals in liver.

The incorporation with finger millet will increase the nutrient value of rice and also available for the financially challenged people and finger millet will provide the cheap source of health booster. There is much need of awareness in low cost food products to reduce the nutritional challenges in India.

**Keywords:** Finger Millet; Value Addition; Nutritional Value; Nutritional Challenges; Rice

### Introduction

A coarse cereal constituent an important part in the diet of millions of people in India. Coarse cereal refers to cereal other than rice and wheat. In India, Finger Millet (*Eleusine coracana* L.) is also known as Ragi. One of the important cereals occupies highest area under cultivation among the small millets. Compared to rice, finger millet is high in protein, fats, minerals calcium, phosphorus and dietary fibres. It is in-rich in dietary carbohydrates, but consumption of finger millet is restricted due to unaware of its health benefits and unavailability of its taste.

Processing the finger millet using traditional as well as modern techniques for the development of value added and convenient food products would be the possible solution for its promotion and enhancement of consumption, nutritional status and better livelihood for financially challenged people.

Finger millet is an excellent source of natural calcium which helps in strengthening bones for growing children and aging people. Regular consumption of finger millet is good for bone health and keeps diseases such as osteoporosis at bay and could reduce risk of fracture. Finger millet's phytochemicals help in slowing di-

gestion process. This helps in controlling blood sugar level in condition of diabetes. It has been found that finger millet based diet helps diabetics as it contains higher fibre than rice and wheat. The study found that diet based on whole finger millet has lower glycaemic response, lower ability to increase blood sugar level. This is due to presence of factors in finger millet flour which lower digestibility and absorption of starch.

Due to its high nutritional content, ragi is preferred in southern parts of India. It is a good source of natural iron, which helps in recovery of Anaemia. Ragi base products are recommended for expectant mothers because of high calcium and iron content.

### Methodology

#### Nutritional composition of ragi

Finger Millet (*Eleusine coracana* L.) has low protein content, but nutritionally superior because protein present in ragi compared to other cereals is high. Millets are having higher ash content which indicates the presence of minerals is high, finger millet is in-rich in iron and phosphorus, even it has the highest calcium content (300-350 gm/100g). High fibre content and lower digestibility of nutrients is the other characteristic feature of millet grains.

Content	Range
Carbohydrate	71.3-89.5
Protein	5.8-12.8
Fiber	3.5-3.9
Fat	1.3-2.7

**Table 1:** Approx. Nutritional value of finger millet.

Finger millet has good source of vitamin and minerals, it has high amount of calcium. Calcium is an important ingredient for our body and daily need is around 250-350 mg.

Mineral Content	Amount (mg)
Calcium	350
Iron	3.9
Niacin	1.1
Riboflavin	0.19
Thiamin	0.42

**Table 2:** Nutritional value of finger millet (minerals).

Amino acid Lecithin Methionine help to cut down the cholesterol levels by eliminating extra fat from liver.

Amino Acids Content	Amount(mg/g of protein)
Leucine	594
Valine	413
Phenylalanin	325
Isoleucine	275
Threonine	263
Methionine	194
Tryptophan	191
Lysine	181
Cystine	163

**Table 3:** Nutritional value of finger millet (Amino Acid).

## Result and Discussion

### Value addition and Value added products

Finger millet can be used in variety of ways, the incorporation of finger millet (ragi) with rice will increase the nutritional value of rice.

From higher class to below poverty line, people consume rice and rice products. In present scenario higher class people are suffering from hypertension, diabetic problems and high cholesterol

problems and below poverty line people are suffering from lack of nutritional problems, to overcome this situation, Finger millet is incorporated with rice and rice products.

### Idli and Dosa

Now a day's Idli and Dosa are very famous dish in India, the incorporation of finger millet powder with dosa or idli powder will not only enhance the taste of the dish but also uplift the nutritional values of that this.

### Khichdi

India's traditional food Khichdi, dish made up of dal, rice and spies. But mostly or daily it is consumed by financially challenged or below poverty line people, as khichdi contains the mixture of dal and rice which has high nutrient value but it is not enough for the poor people as the workload of the poor people is very much high, to overcome with this situation Finger millet or finger millet powder is added and the nutrient value of the dish gets boosted up.

### Homemade - Vegetable Khichdi/White Rice

Content	Amount
Calories	336
Total fat	16 g
Saturated	2g
Polyunsaturated	1g
Monounsaturated	9g
Cholestrol	10g
Sodium	620mg
Potassium	356mg
Total carbs	40g
Sugars	0g
Protein	8g
Dietary fiber	5g

**Table 4:** Nutritional value of homemade khichdi.

### Pasta

Pasta is becoming popular in upcoming generations, now a day's, kids are demanding for pasta the incorporation of finger millet powder with pasta dough will enhance the nutrient values and it will be healthier for the children.

### Breads

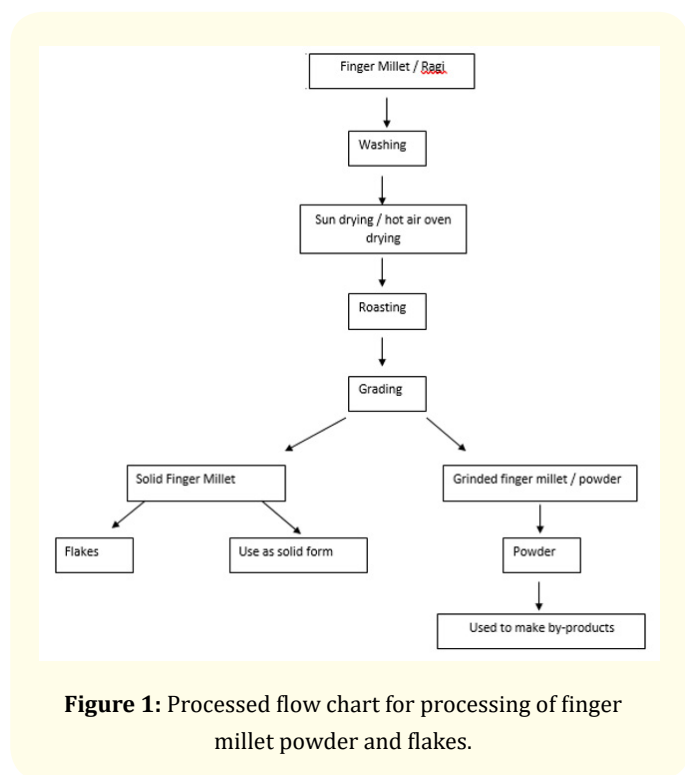
Breads are very famous breakfast in Indian kitchen, from last few years, people are consuming multigrain breads for the nutri-

tional facts but some didn't like the taste of the bread. For those people incorporation of ragi flour with wheat flour in increase the nutritional value and also the taste of the bread will remain same.

### Finger millet flakes

Finger millet flakes is added with corn flakes and can be consumed in the breakfast by children and adults, as growing children need higher amount of dietary fiber fats, carbohydrates and protein, and in the mean while adults are conscious of their health problems, so addition of ragi flakes will help adults to get control in cholesterol level and may reduce the chance of diabetic mellitus.

### Finger millet flakes



**Figure 1:** Processed flow chart for processing of finger millet powder and flakes.

Muffins were developed by using different combination of wheat flour and finger millet flour(FMF) type combination were like 0%,20%, 40%, 60%, 80%, 100%.Additives like emulsifiers, hydrocolloids were also added. It is found that combination of additives and 60%FMF significantly increased the volume and characteristics of products [1].

Saha., *et al.* [2] prepared the biscuit from composite flour containing 60:40 and 70:30 (w/w) (finger millet flour : wheat flour) and they evaluated the composition of 60:40 as the best for obtaining good shelf life and high fibre content of biscuits.

Krishnan., *et al.* [3] developed biscuit from finger millet seed coat. On the basis of sensory evaluation they found that 10% of SCM (seed coat matter) from native and hydrothermally processed millet, 20% from malted millet could be used in composite biscuit flour. The biscuits prepared using the composite flour were of crisp texture and exhibited breaking strength [4-12].

### Conclusion

Finger millet is superior to many cereals in terms of fibers, minerals and micronutrient contents. Finger millet has good potential of providing nutritional security to the consumers. Its major use as food has remained only in the area where it is cultivated and to the traditional preparations. With the advancement of post-harvest technology and value addition technology, this has become the possible process for preparing the value added products. This will not only help in increasing the income but also provide profit to the cultivators.

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