Coarse grains and their nutritive values

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Population explosion and food demands are always going parallel. Traditionally, we consume varieties of coarse grains. The urban way of life cuts down the meaning of balanced diet by excluding the coarse grain combination in our daily meal plan. The utility pattern of coarse grain is modified in a way to meet out the calorie needs of our country. Though the coarse grain production has increased, it has not touched the level of other cereals. Even though it consists of valuable micro- and macronutrients, it has the secondary importance. The per capita consumption of coarse cereals in India declined from 44.6 kg per annum during 1951-55 to 38.5 kg during 1970-74. The recent National Nutrition Monitoring Bureau report indicates that average consumption of cereals and millets though tend to decrease, it was above (or) equal to recommended dietary allowance.

Ragi

Ragi is also known as finger millet in English. Ragi is considered to be of Indian origin and it is a versatile millet with high value of calcium 344 mg/100 gm. No other cereal has this much calcium. The iron content of ragi is 3.9mg/100gm, which is higher than the other cereals except bajra. Ragi is recommended as a wholesome food for diabetic patients. Ragi's protein content has high biological value, so it is easily incorporated into the body. Several amino acids crucial to human health are found in the grain. Some of these amino acids are deficient in most other cereals. Phosphorus

content is also high.

Traditionally ragi is used as the weaning food in the form of porridge gruel etc. Now ragi vermicelli, an instant food is available in the market. Ragi can also be made into rotis, dosas, porridge, cookies and even tasty laddus.

Pearl Millet

Pearl millet is known as *bajra* in Hindi, and *kambu* in Tamil. Pearl millet is used in various industrial products. 100 gm edible portion of pearl millet consists of 11.6gm protein, 67.5gm carbohydrate, 8mg iron and 132 microgram of carotene which is highly essential to safeguard our eyes. Even though it has some anti-nutrients such as phytic acid, polyphenol and amylase inhibitors, after soaking in water, germination and other cooking procedures reduce the anti-nutrient. Pearl millet is used as an important source of food, feed and fodder wherever it is cultivated in our country.

Pearl millet has high levels of vitamins B, and dietary minerals potassium, phosphorus, magnesium, iron, zinc copper and manganese. It is gluten free and is ideal for those with wheat allergies. Pearl millet has been found to be nutritionally superior to rice and wheat, and a study based on research in India showed that pearl millet and pulses are somewhat better at promoting human growth than a wheat diet.

Sorghum

Jowar is an important cereal. The Industrial use of sorghum is predominant than other coarse grains. It is used in alcoholic beverages; bread making industry uses wheat-sorghum combination. Commercial weaning food industries utilize the sorghum - cowpea combination and sorghum - soyabean combination. It has 10.4gm protein, 66.2gm carbohydrate 2.7gm fibre and other micro and macronutrients.

The importance of dietary fibre

Dietary fibre is defined as plant cell component present as part of diet. Health benefits of dietary fibre are immense. Dietary fibre has the tendency to absorb water and act as a bulking agent. It facilitates faster transition of food in the gastrointestinal tract and reduces the retention time of faeces in the colon. It would bind bile salt and help in increasing the loss of cholesterol and act as a hypo cholestrelemic agent and therefore useful in dietary management of cardiovascular decease. Rice has the lowest percentage of dietary fibre than other cereals. The

decease. Rice has the lowest percentage of dietary fibre than other cereals. The dietary fiber of sorghum is 89.2%, pearl millet 122.3% and ragi has 113.5%.

Importance of Calcium in human diet

The Calcium intake of women in Asia and Africa are considerably below the recommended level. Due to calcium deficiently during pregnancy and lactation, the child may develop poor skeletal formation. In addition, inadequate calcium intake during pregnancy compromise the health of the mother, calcium from the mother's skeleton might be used to support foetal growth and breast milk production.

Calcium supplementation during the second half of pregnancy may reduce the incidence of pregnancy induced hypertension and pre-eclampsia. If we analyse the nutritive value of coarse grains, ragi and jowar are rich in calcium and dietary.

Coarse grains based processed food

Maize, sorghum and other millets account for one fourth of the total food grain production in India and occupy an important place in the food grain economy of the country. In addition to the traditional cooking methods, coarse grain has been used mainly in the weaning food preparation and other malted food production. Sorghum is used in glucose and other beverage preparation. Ragi and wheat mixed vermicelli is available in the market as a form of instant food.

How to reduce anti-nutrient content?

Some traditional food processing method like puffing, roasting, sprouting, soaking as well as malting has made a desirable change in the viscosity of the millet. Maximum viscosity reduction takes place during the process of malting. After the germination of the grains and sun drying most of the unwanted enzymes get destroyed. The amylase and viscosity of the mix is far lower then the unmalted grain mix. The malted coarse grain gives an advantage in the weaning food formula as well as geriatric nutrition.

Nutritive value of course gains (100 gms of edible portion)

Name of food	Energy kcal	Calcium m.g.	Iron m.g.
Bajra	361	42	8.0

Jowar	349	25	4.1
Maize	342	10	2.3
Ragi	328	344	3.9

Calcium rich food items (100 gms of edible portion)

Food items	mg
Ragi	344
Agathi	1130
Curry leaves	830
Drumstick leaves	440
Ponnanganni	510
gingilli seed	1450
Milk buffalo	210
Milk cow	120
Cheese	790

Source: Dr. T. Vijayapushpam and Ms. Amulya Rao, National Institute of Nutrition, Hyderabad

Related Resources

1. Department of AYUSH, Ministry of Health & Family Welfare, Government of India
2. Foods you should avoid and not eat
3. Nutrition and Health