ISBN: 978-81-969534-6-1

5. Millets: Grains for Good Nutrition and Health

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5.1 Introduction:

Millets are traditional grains, grown and consumed in the Indian subcontinent from the past more than 5000 years. Millets are small-grained, annual, and warm - weather cereals belonging to grass family.

They are rain - fed, hardy grains which have low requirements of water and fertility when compared to other popular cereals.

They are highly tolerant to drought and other extreme weather conditions. Millets are nutri cereals comprising of sorgum, pearl millet, finger millet (Major millets) foxtail, little, kodo, proso and barnyard millet (minor millets). These are one of the oldest foods known to humanity.

There are several species of coarse cereal grasses in the family poaceae, cultivated for their small edible seeds. Pseudo millets are so called because they are not part of the Poaceae botanical family, to which 'true' grains belong, however they are nutritionally similar and used in similar ways to 'true' grains.

Millets are highly nutritious, non-glutinous and non-acid forming foods. Millets have many nutraceutical and health promoting properties especially the high fiber content.

Millets act as a probiotic feeding for micro - flora in our inner ecosystem. Millets hydrate our colon to keep us from being constipated. Niacin in millet can help lower cholesterol.

Millets contain major and minor nutrients in good amount along with dietary fiber. Millets are gluten free and can be a substitute for wheat or gluten containing grains for celiac patients.

5.2 Millets with Their Important Features:

A. Sorghum (Jowar):

- It is rich in protein, fiber, thiamine, riboflavin, folic acid, and carotene.
- It is rich in potassium, phosphorus and calcium with sufficient amounts of iron, zinc and sodium.
- Major portion of sorghum protein is prolamin (kaffirin) which has a unique feature of lowering digestibility upon cooking which might be a health benefit for certain dietary groups.

B. Pearl Millet (Bajra):

- Pearl millet contains considerably high proportion of proteins (12-16%) as well as lipids (4-6%).
- It contains 11.5% of dietary fiber. It increases transit time of food in the gut. Hence, reduce risk of inflammatory bowel disease.
- The niacin content in pearl millet is higher than all other cereals.
- It also contains folicate, magnesium, iron, copper, zinc and vitamins E and B-complex. It has high energy content compared to other millets.
- It is also rich in calcium and unsaturated fats which are good for health.
- It contains the highest amount of proteins (12.5%).
- Health benefits of proso millet come from its unique properties. It has significant amounts of carbohydrate and fatty acids.
- It is cheaper source of manganese as compared to other conventional sources like spices and nuts.
- It contains high amounts of calcium which is essential for bone growth and maintenance.
- It reduces cholesterol levels and also reduce the risk of heart diseases.

C. Amaranth (Ramdana/Rajgira):

- High protein content (13-14%) and a carrier of lysine, an amono acid that's missing or negligible in many other grains.
- Consists of 6 to 9% of oil which is higher than most other cereals. Amaranth oil contains approximately 77% unsaturated fatty acids and is high in linoleic acid.
- It is high in dietary fibre.

- High in iron, magnesium, phosphorus, potassium and appreciable amounts of calcium.
- A rich dietary source of phytosteriols, with cholesterol-lowering properties.
- Contains a lunasin-like peptide and other bioactive peptides which are thought to have cancer - preventive and antihypertensive properties.

D. Finger Millet (Ragi):

- Finger millet is the richest source of calcium (300- 350 mg/100g)
- Ragi has the highest mineral content.
- It contains lower levels of protein (6-8%) and fat (1.5- 2%)
- Finger millet proteins are unique because of the sulphur rich amino acid contents.
- The grains have excellent malting properties and are widely known for its use as weaning foods.
- It has high antioxidant activity.

E. Foxtail Millet (Kakum):

- It is high in carbohydrates.
- It has double quantity of protein content compared to rice.
- It contains minerals such as copper & iron.
- It provides a host of nutrients, has a sweet nutty flavour and is considered to be one of the most digestible and non-allergic grains.

F. Proso Millet (Chenna/Barri):

- It contains the highest number of proteins (12.5%).
- Health benefits of proso millet come from its unique properties. It has significant amounts of carbohydrate and fatty acids.
- It is cheaper source of manganese as compared to other conventional sources like spices and nuts.
- It contains high amounts of calcium which is essential for bone growth and maintenance.
- It reduces cholesterol levels and also reduce the risk of heart diseases.

G. Amarnath (Ramdana/Rajgira):

High protein content (13-14%) and a carrier of lysine, an amono acid that's missing or negligible in many other grains.

It Consists of 6 to 9% of oil which is higher than most other cereals. Amaranth oil contains approximately 77% unsaturated fatty acids and is high in linoleic acid.

H. Buckwheat (Kuttu):

- It contains protein 13-15% protein and rich in the amino acid lysine.
- Rich in carbohydrates (mainly starch).
- Contains vitamins B1, C and E.
- Rich in polyunsaturated essential fatty acids, such as linoleic acid.
- Contains higher levels of zinc, copper, and manganese than other cereal grains, and the bioavailability of these minerals is also quite high. High in soluble fibre.
- A rich source of polyphenol compounds.
- Contains rutin, a bioflavonoid thought to help control blood pressure and possess anti-inflammatory and anti-carcinogenic properties.

5.3 Overall Nutritional Value and Health Benefits of Millets:

Millets are gluten-free, highly nutritious and rich in dietary fibre. They are rich in micronutrients, including calcium, iron, phosphorus, etc. They are low in Glycemic Index (GI) as such don't cause huge spike in blood sugar.

Millets should ideally be an integral part of our daily diet. Millets are non-allergenic, and consumption of millets decreases triglycerides and C-reactive protein, thereby preventing cardiovascular disease. All millets are rich in dietary fibre.

Dietary fibre has water absorbing and bulking property. It increases transit time of food in the gut which helps in reducing risk of inflammatory bowel disease and acts as detoxifying agent in the body. Millets are found to be helpful with the reduction of weight, BMI, and high blood pressure.

In India, Millet is generally consumed with legumes, which creates mutual supplementation of protein, increases the amino acid content, and enhances the overall digestibility of protein.

A. Suggestions Before Purchase of Millets:

- Prefer to buy Multi grain processed food products like Multigrain Atta, Multigrain Biscuits, and Multigrain Bread etc having millets as one of the ingredients.
- Don't buy, if odour is unpleasant and taste is bitter or gritty. Avoid millets if living or dead insects are visible in the product.
- Prefer millets in packed form and certified under AGMARK.
- Check FSSAI license number on the package label.
- Always read the manufacturing/ packaging date and best before date before buying.
- Look for FSSAI Organic logo (Jaivik Bharat) on the pack while buying organic food products.

5.4 Summary:

Millets are group of small, grained cereal food crops which are highly tolerant to drought and other extreme weather conditions and are grown with low chemical inputs such as fertilizers and pesticides. Most of millet crops are native of India and are popularly known as Nutri-cereals as they provide most of the nutrients required for normal functioning of human body. Millets are classified into Major Millets and Minor Millets based on their grain size. Pseudo millets are so called because they are not part of the Poaceae botanical family, to which 'true' grains belong, however they are nutritionally similar and used in similar ways to 'true' grains.

Ministry of Agriculture and Farmers Welfare has recognized the importance of Millets and declared Millets comprising of Sorghum (Jowar), Pearl Millet (Bajra), Finger Millet (Ragi/Mandua), Minor Millets i.e., Foxtail Millet (Kanngani/kakun), Proso Millet (Cheena), Kodo Millet (Kodo), Barnyard Millet (Sawa/Sanwa/Jhangora), Little Millet (Kutki), Brown top millet and two pseudo millets i.e., Buck-wheat (Kuttu), Amaranth (Chaulai)) as "Nutri-Cereals" for production, consumption and trade point of view. Millets are gluten free and non-allergenic. Millet consumption decreases triglycerides and C-reactive protein, thereby preventing cardiovascular disease. All millets are rich in dietary fibre. Dietary fibre has water absorbing and bulking property. It increases transit time of their Local Name. Millets are high in nutrition and dietary fibre. They serve as good source of protein, micronutrients and phytochemicals. The millets contain 7-12% protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre.

The essential amino acid profile of the millet protein is better than various cereals such as maize. Millets contain fewer cross-linked prolamins, which may be an additional factor contributing to higher digestibility of the millet proteins.

Similar to cereal proteins, the millet proteins are poor sources of lysine, but they complement well with lysine - rich vegetables (leguminous) and animal proteins which form nutritionally balanced composites of high biological value.

Millets are more nutritious compared to fine cereals. Small millets are good source of phosphorous and iron.

Millets contributes to antioxidant activity with phytates, polyphenols, tannins, anthocyanins, phytosterols and pinacosanols present in it having important role in aging and metabolic diseases. All millets possess high antioxidant acitivities.

Thus, millets possess nutritional as well as health values for all age groups.

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