ISBN: 978-81-969534-6-1

4. Millets: A Wonder Food for Nutritional & Health Challenges

Dr. Bandana Singh

Professor,
P.G. Deptt. of Home Science,
Patna University, Patna.

Abstract:

The world is suffering from various nutritional challenges and captured by several health disorders and chronic diseases. The wonder food millets, full of vitamins, minerals, essential fatty acids, phytochemicals and antioxidants are a gift for being nutritionally secured and healthy. The most drought-resistant crops and a major source of carbohydrates and proteins showed a ray of hope to achieve food security and health to the world as the climatic changes, water scarcity, changing socio-demographic profile, providing food security to all has become a challenge for scientists, nutritionists and policy makers. In the light of the providing health benefits of people, adequate public support in consuming millets, awareness and education, availability, affordability and accessibility of millets in markets, changing perception towards the grain plus collaboration between farmers, processors, and sellers is required. This will give the nutritional and health benefits as well. Health risks due to the anti-nutrients can also affect the person. So, maintaining a healthy lifestyle, eating a well-balanced diet full of millets is advised.

Keywords:

Food security, nutrition, drought-resistant crops, phytochemicals, antioxidants.

4.1 Introduction:

With the pace of time, scientific knowledge and technological innovations have brought many changes in the field of agriculture and availability of food has been increased.

The climatic changes, water scarcity, changing socio-demographic profile, providing food security to all have become a challenge for challenges to scientists, nutritionists and policy makers. The world is suffering from various nutritional challenges and captured by several health disorders and chronic diseases.

About 45 million children less than five years of age are suffering from wasting, 149 million have stunted growth due to lack of nutritious food while 39 million are affected by overweight. Maternal anemia and obesity among adults especially continue to be alarming (UNICEF, 2022).

On the global land surface, 40% area is dry and it is expected that in 2100 AD, the percentage of the dry and less fertile land will be 78% in developing countries and approximately 815 million people will be trapped by hunger worldwide as World Bank report says. In the countries, where most of the people depends on agriculture, sustainable crops are needed to meet the world hunger and to improve the livelihood to the farmers in agrarian countries like India. And here the wonder food millets, full of vitamins, minerals, essential fatty acids, phytochemicals and antioxidants are a gift for being nutritionally secured. The most drought-resistant crops and a major source of carbohydrates and proteins showed a ray of hope to achieve food security and health to all over the world.

In India, Millets are cultivated in low-fertile, rain-fed land and hilly areas of Haryana, Uttar Pradesh, Chhattisgarh, Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu and Telangana which is considered to be an asset for us and the humankind.

In the last few years, the number of people suffering from lifestyle diseases like diabetes, obesity and other complications has reached almost epidemic levels. Not only the developing world, but the developed world also has been trapped by these diseases which have also become the leading cause of death.

Not only our lifestyle but one of the primary causes of the aggravation of these diseases is the food we eat. The essential nutrients that our bodies need are available in whole grains, essentially unpolished grains without depleted nutrient qualities. Although Millets which is whole grain full of essential nutrients, but no one was aware of till last few years. However, these crops have been an integral part of the diet for many generations and are good sources of energy in major food source in the world.

Ragi, jowar, bajra are some of the millets which provide protein, fatty acids, minerals, vitamins, dietary fibre and polyphenols along with essential amino acids, fibre, phytochemicals and antioxidants etc are gaining a lot of attention these days, just making a comeback.

Millets known as the "poor man's food grain" have been attracting the world for its immense potential. The name of millets are found in Srimad Bhagwat Geeta,Kalidasa's `Abhijnana Shakuntalam', Yajur Veda's verses,Sushruta's Samhita , Kannada Kanakdasa, Kautilya's Arthashastra and Ain-i-Akbari, written by Abul Fazl which shows the existence of cultivation and use of millets at that period on different occasions.

Millets are the sixth most widely grown cereal grain globally, and they are still a staple diet in many parts of the globe which contains several essential nutrients to fight with nutrient deficiency in developing nations. In India, commonly grown millets are Jowar (sorghum), Bajra, ragi (finger millet), Jhangora, Kangni, Kodra or Kodo millet) etc. Having difference in colour, texture, appearance, grain size, and species and size of the grain, these are classified into two types – Large or major millets, such as Jowar (Sorghum), Bajra (Pearl Millet), Finger Millet (Ragi). Foxtail Millet (Kagni), and Proso (Cheena)Millet and Small or minor millets for e.g., Kodo Millet (Kodra), Barnyard Millet (Sama), Browntop Millet (Hari Kagni), Little Millet (Kutki). Although these grains were traditionally used as food item across the country but with the pace of time due to different reasons, it is reduced and sometimes vanished from our plates. To fulfilling the dietary needs of the growing global population, the production of millets has been increasing in recent years.

But in the post-Covid era, the need of having healthy food was felt and consumption of millets again came into light due to increased awareness regarding the health promoting profile of millets. All important components, including protein, carbs, fat; minerals, vitamins, and bioactive substances are abundant in millets, making them a great food source.

4.2 Impact of Millets on Human Health:

A. Diabetes & Millets:

Diabetes Mellitus is a chronic metabolic disorder which takes place due to the metabolic disturbances of carbohydrate, protein, and lipids. Deficiency of insulin and its resistance is also a reason behind it. Millet is healthy and beneficial for the diabetic population which is expected to be increased from 77 million currently to over 134 million by 2045. Millets are non-acid forming, non-glutinous, highly nutritious, high in fibre, protein, vitamins, minerals and antioxidants and easily digestible foods. It is gluten free and helps in releasing sugar over a long period. So, no quick spikes take place.

The role of leucine from millets also helps in lowering blood sugar level. Magnesium, Saponin and niacin present in millets helps in increasing the efficiency of insulin and glucose receptors which helps in lowering sugar level and thus prevents diabetes. Bran, a rich source of dietary fibre, plays a key role in reduction of blood glucose level and insulin response due to higher viscosity, glycemic index and water holding capacity dietary fibres (Easwaran et al, 1991; Kavitha et al, 2001).

Millets have lower glycemic index in comparison to other cereal grains, (GI) raises blood sugar slowly.

B. Impact of Millets on Heart Ailments:

Millets full of niacin, reduces the Low-density lipoprotein (LDL) and triglyceride levels of the blood which slow up the sucking up the cholesterol from diet. In this way, millets-rich foods prevent the risk of heart diseases. Taking excess fat in diet increases the risk of heart diseases. Fibers found in millets play a major role in lowering cholesterol, eliminating LDL from the system and improving the effects of HDL. Saponin present in millets reduces cholesterol and homocysteine levels in blood vessels. Since millets are high in dietary fibre, some studies consider it beneficial to people with coronary artery disease. The soluble fibre and millet protein helps to improve gut health and helps in reducing bad cholesterol and triglycerides. Being rich in magnesium, it reduces blood pressure and risk of heart strokes, especially in atherosclerosis. Potassium content of millets also helps in this.

C. Impact of Millets on Cancer:

Millets are the world's third-largest cereal crop which acts as a wonder medicine. As per Research it is one of the most promising anti-cancer drugs currently accessible due to their ability to cleanse the body. Having various phenolic components, it lowers the risk of colon cancer in humans and animals both.

A study on in-vivo shows that millet-based diets assist in suppressing the STAT-3 signaling pathway and controls unregulated cell proliferation, angiogenesis, and apoptosis evasion in case of cancer. Peroxidase from foxtail millet barn also prevents the growth of colon cancer cells and suppresses the formation of cancerous cells in liver and breasts without damaging the normal cells.

The fiber present in sorghum millet and phenolic has been accredited lower cases of esophageal cancer than those consuming wheat or maize (Van Rensburg, 1981).

The fibers are one of the best and easiest ways to prevent the onset of breast cancer in women by 50%. Many of the antioxidants found in millet clean up the toxins and free radicals which causes cancer.

D. Celiac Disease & Millets:

Celiac Disease is an immune mediated enteropathic disease for which millet is safe for people with celiac disease as it doesn't show any toxicity for celiac patients. It is activated by the ingestion of gluten in susceptible individuals (Catassi and Fasano, 2008).

Millets are gluten free. It can meet the growing demand for gluten free foods will be suitable for individuals suffering from celiac disease. (Taylor et al., 2006; Taylor and Emmambux, 2008; Chandrasekara and Shahidi, 2011b and 2011c)

E. Anemia & Role of Millets:

Millets are one of the best sources of iron. Anemia caused by iron deficiency is one of the major health problems in humans especially women in reproductive age due to inadequate intake of iron-rich foods. Millets are excellent source of iron which can help in improving hemoglobin levels in women.

F. Weight Reduction & Obesity:

Obesity, an emerging problem not only in India but in all over the world is associated with several chronic diseases including diabetes and CVD. Foods rich in dietary fibre improve the large bowel function and slow the digestion and absorption process, by which the risk of chronic diseases can be reduced.

Sorghum is rich in dietary fibre aids to the hunger satisfaction which increases satiety and reduces the risk of development of obesity. It helps in reducing obesity. Its polyphenols and other biological active compounds lower the rate of fat absorption. Several studies prove that a high-fibre diet can help control obesity.

The low level of calories and high in vital elements like carbs, proteins, amino acids, lipids, minerals, and vitamins of millets help in losing weight. As it is low in calories and extremely high in magnesium, bioactive compounds, fibre, minerals, and vitamins, millet is an integral part of your weight loss journey. It also lowers BMI. Millets helps in fighting metabolic disorders.

G. Digestion & Millets:

The dietary fibers in millet are helpful in fighting with Constipation, cramps, bloating, flatulence, and regulating bowel movements and thus improve the digestion. Millets are of vital importance in production of hydrochloric acid, pancreatic fluid, and the helpful bacteria required for digestion and make the digestive system healthy. Role of millets is also very crucial for the health of kidneys and liver. It is important for the immunity of the body.

H. Millets for Bone Health & Skin:

Millets are a store of vital nutrients as they consist of vitamins, minerals, iron, zinc, manganese, potassium, magnesium, copper, and calcium which give strength to our bones. Calcium is helpful in making strong bones in the presence of Vitamin D. It helps in absorption of calcium from food. Vitamin E, amino acids, magnesium, and fatty acids present in millets are essential for skin health. They improve the skin's suppleness, moisture, and flexibility by which skin becomes smoother and more elastic.

I. Impact of Millets on Brain Disorders:

High –fat and high-calorie diet increases the risk of dementia. Increased level of oxidative stress stimulates pro-inflammatory factor in brain due to which inflammation in brain develops and dementia occurs. Millets helps in memory generation too.

J. Millets for Immunity, Degenerative Disease & Oxidative Stress:

Millets are immune booster and has anti-infective properties. It contains iron, manganese, magnesium, phosphorus, potassium, copper, selenium, and zinc, which a help in regular functioning of the body. Millets give protection against several degenerative diseases such as metabolic syndrome and Parkinson's disease (Manach et al., 2005; Scalbert et al., 2005; Chandrasekara and Shahidi, 2012).

It is essential in improving muscular and nervous system. Magnesium of millets is used for bone mineralization, teeth maintenance, building up of proteins, enzyme activities, normal muscular contractions and transmission of nerve impulses. Oxidative Stress-Free radicals are molecules with an unpaired number of electrons and can be formed with interaction of other molecules which are responsible for

oxidative stress related diseases like Alzheimer's disease, myocardial infarction, atherosclerosis, Parkinson disease, auto-immune diseases etc. Antioxidants play an important role in preventing oxidation process so that cellular damage can be prevented.

K. Stomach Ulcers & Millets:

Millets, especially Pearl millet helps in cure of stomach ulcers. Excess acid formation causes stomach ulcers. Pearl millet makes the stomach alkaline and reduces the effect of ulcer.

L. Millet's Role in Reproduction:

According to Glew (2008) millets take part in synthesis of nitric oxide which helps in production of growth hormone, reproductive ability and alleviates male infertility by sperm production and motility.

M. Millets in Pregnancy and Lactation:

Millets are regarded as highly nutritious and easy to digest, proving to be super foods for pregnant and lactating mothers. It produces positive nutritional impact on both the groups if given as supplementary food.

As they are Gluten free, rich in polyphenols, antioxidants, vitamins, minerals, and dietary fibres, it helps in proper functioning of a healthy body. Nutritional demand increases during pregnancy for the growth and development of foetus with changes in weight, plasma and blood volume. It is important to provide complete nutrition among pregnant women and lactating mothers to fulfill recommended calories, proteins, iron and calcium and the millet-based diet can be helpful in improving the nutritional status of mothers during pregnancy and lactation. Millets increase the production of breast milk in lactating mothers.

Recognizing the extensive potential of Millets to generate livelihoods, increase farmers' income, and health and ensure food & nutritional security worldwide, the Government of India has prioritized Millet's production. In April 2018, Millets were named as "Nutri Cereals", and now United Nations declared the Year 2023 as the International Year of Millets. An official gala dinner hosted by President Droupadi Murmu in G20 Summit in New Delhi on September 9, 2023, with recipes of millets as the Indian government is promoting 2023 as the International Year of Millets.

The main purpose of this was to boost production of the nutrient-rich healthy food millets and the agro-industries involved in its production in order to eradicate hunger and malnutrition from the globe.

4.3 Conclusion:

In the light of the providing health benefits of people, adequate Public Support in consuming millets, awareness and education, availability and accessibility of millets in markets, affordability, changing Perception towards the grain plus collaboration between farmers, processors, and sellers can help increase the supply and demand of millets. This will give the nutritional and health benefits as well. But consumption of millets in excess amount can be affected the functioning of thyroid gland. Health risks due to the anti-nutrients can also affect the person. So, maintaining a healthy lifestyle, eating a well-balanced diet full of millets is advised.

4.4 References:

1. Souvenior on the Seminar "National Conference on Millets: Magical Crops for Nutritional Sustainability, ICAR, Jagannath University, Jaipur, Rajasthan(year)
2. https://www.medicalnewstoday.com
3. https://www.webmd.com/diet/health-benefits-millet
4. https://www.healthline.com/
5. https://apeda.gov.in/milletportal/health_benefits.html
6. https://www.lybrate.com/
7. Sandhya Gugnani, Times of India, April 5,2023.