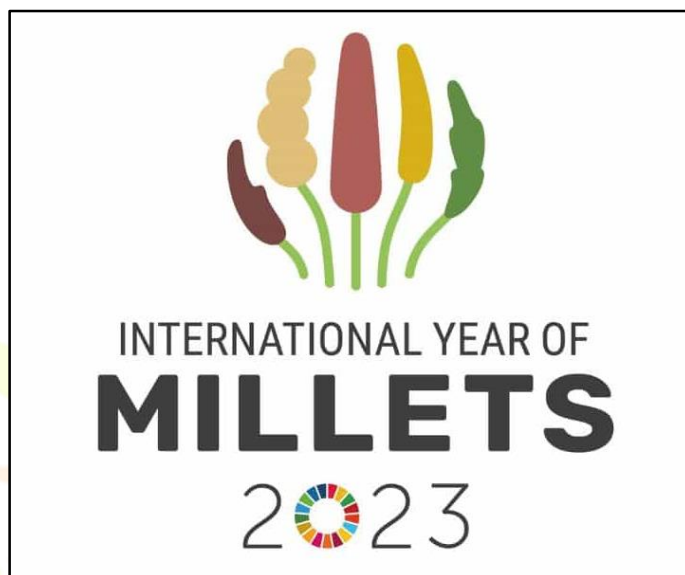




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## Need of Nutrition in Modern Era – Millets.



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### **Abstract:-**

Nowadays developed and developing countries are facing nutritional challenges and deficiency diseases. It is one of the major health issues in front of the central authorities. The citizens of these countries are not able to afford the cost of routine supplements. In search of cost-effective high nutritious value products WHO has arrived at a value of millets in such conditions.

Millets are nutria-cereals that contain vitamins, minerals, essential fatty acids, phytochemicals and antioxidants that help to eradicate nutritional deficiency diseases. The millets has various health benefits and are easy to cook. This is because it is gluten-free and a good source of protein, fiber, and micronutrients. This provides multiple benefits to physical and mental health.

**Keywords:** Millets, Nutritional challenges, Nutrition, Nutri-cereals, Micronutrient deficiency, fiber, gluten.

### **Background**

WHO has been dealing with nutritional deficiency conditions. The major challenge in front of various authorities that are dealing with such conditions is affordable solutions for such conditions. Economic crises are the basis of such nutritional deficiency conditions, especially in underdeveloped and developing countries.

### **Scope of the problem:-**

In 2014, approximately 462 million adults worldwide were underweight, while 1.9 billion were either overweight or obese. In 2016, an estimated 155 million children under the age of 5 years were suffering from stunting, while 41 million were overweight or obese.

Around 45% of deaths among children under 5 years of age are linked to undernutrition. These mostly occur in low- and middle-income countries. At the same time, in these same countries, rates of childhood overweight and obesity are rising<sup>1</sup>.

The world is in the clinch of several health disorders and chronic diseases. As per the 2016 Global Nutrition report, 44% population of 129 countries (countries with available data) experience very serious levels of undernutrition, adult overweight and obesity<sup>2</sup>.

#### Discussion:-

While challenging these vital social problems, i.e. the citizens of these countries are not able to afford the cost of routine supplements; India gave an affordable solution to the world that is In search of cost-effective nutritious values products i.e. use of millets in such conditions. WHO has approved as an International Year of Millets 2023.

Millets will provide vital nutrients and may have health benefits. Millets grains are also considered to be equal or superior in comparison to wheat, rice, maize, and sorghum. The role of millet in modern foods like multigrain and gluten-free cereal products is well-acquired. Due to the rich source of polyphenols and other biologically active compounds in millets which helps to lower the rate of fat absorption, and slow release of sugars i.e. low glycaemic index and thus reducing the risk of heart disease, type 2 diabetes mellitus, high blood pressure and plays important role in the prevention of arthritis, mental disorders like anxiety, celiac disease or gluten intolerance and inflammation in the body<sup>2</sup>.

#### Nutritional importance of Millets:-

Millets are of group a small, round whole grains grown in India, Nigeria, and other Asian and African countries<sup>3</sup>.

Intake of carbohydrates, fats, and proteins provides energy that can be used for various body functions or stored for later use. Stability of body weight and composition over long periods requires that a person's energy intake and energy expenditure be balanced. When a person is overfed and energy intake persistently exceeds expenditure, most of the excess energy is stored as fat and body weight increases; conversely, loss of body mass and starvation occur when energy intake is insufficient to meet the body's metabolic needs.

Because different foods contain different proportions of proteins, carbohydrates, fats, minerals, and vitamins, appropriate balances must also be maintained among these constituents so that all of the body's metabolic systems can be supplied with the requisite materials. This chapter discusses the mechanisms by which food intake is regulated by the body's metabolic needs and some of the problems of maintaining balance among the different types of foods<sup>4</sup>.

On the other hand, more than 1.9 billion (39% of the world's population) adults  $\geq 18$  years of age were overweight and a further 13% were reported to be obese. India is the home of the world's largest undernourished population. About 194.6 million people, i.e. 15.2% of the total population of India, are undernourished. Protein-energy malnutrition (PEM) was reported to result in 4,69,000 deaths with 84,000 deaths from the deficiency of other vital nutrients such as iron, iodine and vitamin A. Obesity is also a major health concern in India with a prevalence rate of 11% in men and 15% in women<sup>2</sup>.

**Macronutrients** - There are different types of millets **1. Pearl Millet, 2. Brown Top Millet, 3. Foxtail Millet, 4. Barnyard Millet, 5. Kodo Millet, 6. Little Millet, 7. Proso Millet Pearl Millet 8. Finger Millet, 9. Sorghum Millet**. These millets are traditionally used in rural areas of India. This habit of using Millet in daily food has provided more nutritive values than other major cereal grains. This also adds benefits of the millets like high fiber content, protein richness in bioactive compounds, low glycaemic index, and gluten-free making them a suitable health food and preventing malnutrition conditions.

#### nutrient compositions of millets<sup>5</sup> -

Food grain	Protein (g)	Fat (g)	Crude fiber (g)	Minerals		Sulfur containing amino acids		Unsaturated fatty acids		
				Ca(mg)	Fe(mg)	Methionine	Cysteine	Oleic	Linoleic	Linolenic
Finger millet	7.3	1.3	3.6	344	3.9	210	140	-	-	-
Kodo millet	8.3	1.4	9.0	27	0.5	-	-	-	-	-
Proso millet	12.6	1.1	2.2	14	0.8	160	-	53.80	34.90	-
Foxtail millet	12.3	4.3	8.0	31	2.8	180	100	13.0	66.50	-
Little millet	7.7	4.7	7.6	17	9.3	180	90	-	-	-
Barnyard millet	6.2	2.2	9.8	20	5.0	180	110	-	-	-
Sorghum	10.4	1.9	1.6	25	4.1	100	90	31.0	49.0	2.70

**micronutrients<sup>6</sup>-**

Cereals/Millets	Mg	Na	K	Cu	Mn	Mb	Zn	Cr	Si	Cl
Foxtail millet	81	4.6	250	1.40	0.60	0.070	2.4	0.030	171	37
Proso millet	153	8.2	113	1.60	0.60	-	1.4	0.020	157	19
Finger millet	137	11.0	408	0.47	5.49	0.102	2.3	0.028	160	44
Little millet	133	8.1	129	1.00	0.68	0.016	3.7	0.180	149	13
Barnyard millet	82	-	-	0.60	0.96	-	3	0.090	-	-
Kodo millet	147	4.6	144	1.60	1.10	-	0.7	0.020	136	11
Sorghum	171	7.3	131	0.46	0.78	0.039	1.6	0.008	54	44
Pearl millet	137	10.9	307	1.06	1.15	0.069	3.1	0.023	147	39
Rice	90	-	-	0.14	0.59	0.058	1.4	0.004	-	-
Wheat	138	17.1	284	0.68	2.29	0.051	2.7	0.012	128	47

Carbohydrates, proteins and fats a macronutrients and minerals and vitamins as micronutrients play a very significant role in the development of body and they are required in very small quantities. Minerals play an important role in the building of bones, sending and receiving signals, clotting of blood, cell energy production, keeping a normal heart beat, metabolizing and synthesize fats and proteins, transportation of oxygen, acting as co-enzymes, providing immunity to the body and help nervous system work properly.

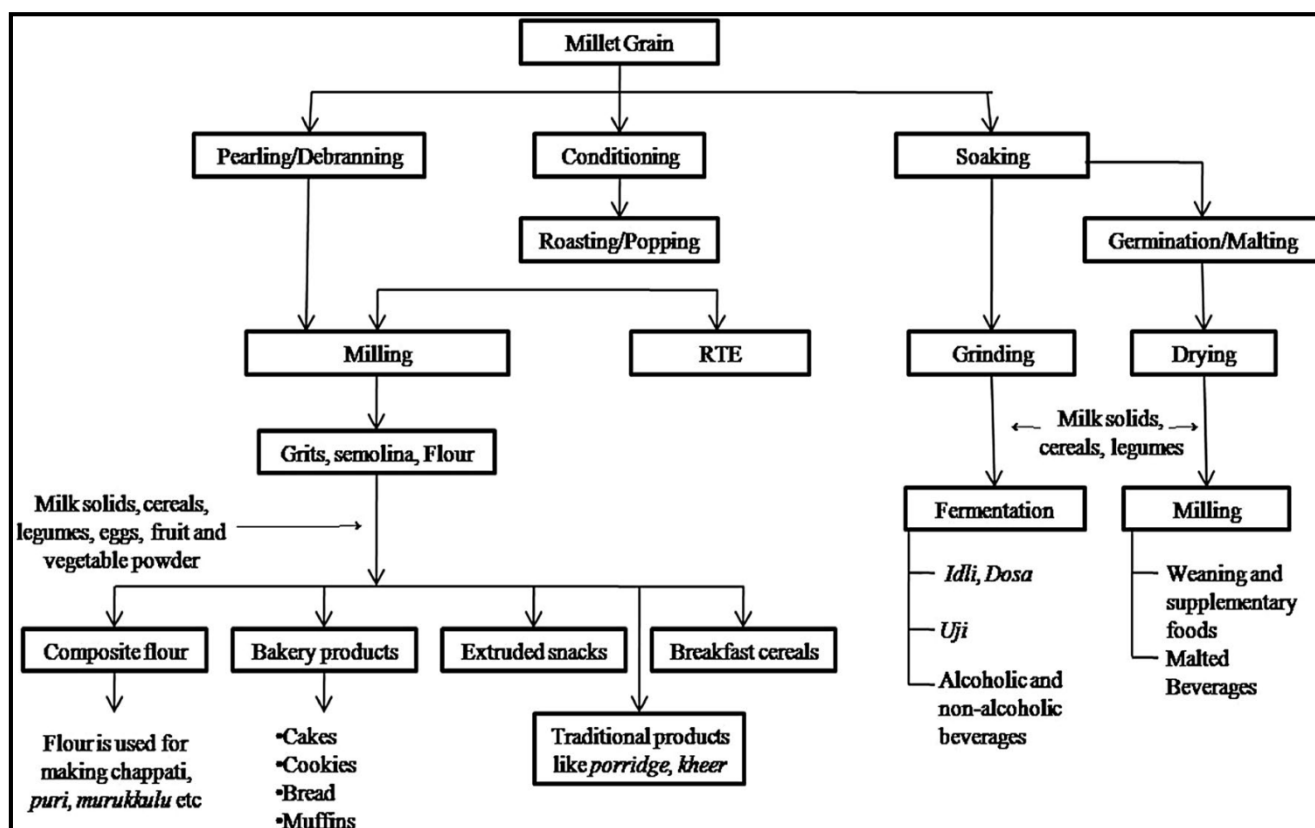
These macronutrients & micronutrients are very high in millet. A deficiency of these macronutrients & micronutrients leads to Calcium and iron deficiency which leads to osteoporosis, anemia, diabetes, obesity, cardiovascular diseases, Protein-energy malnutrition (PEM) etc. These conditions will be tackled economically by using millets. Keeping in view 2023 is declared as the international year of millet.

**Health benefits of millets:-**

1. Blood glucose level can be managed by Millet in type 2 diabetes. Overall, fermentation, germination, heat treatment, and other processing methods can increase the TPC in millets, thus enhancing the anti-diabetic potential<sup>8</sup>.
2. Millets are gluten-free, and high in protein and fiber, because of this people with celiac disease benefit a lot.
3. The 1st most common condition of the digestive system is related to the use of non-fiber food which is very well handled by fibers from Millets and improves digestive health and helps to regulate bowel movements.
4. Due to the use of Millets digestive health and immune response in general improved due to the prebiotics of millets, which stimulate the growth of probiotics within the microbiome.
5. Most common problems of modern lifestyle such as high levels of cholesterol and triglycerides which affect heart<sup>9</sup> and in general metabolic functioning are remarkably reduced by vitamins from Millet.
6. Depression, mood swings and anxiety remarkably improved by millet's high concentration of the amino acid, tryptophan.
7. Heart rhythm gets regulated by the magnesium of Millet.
8. Overweight, high cholesterol and obesity get reduced by consumption of Millet by reducing BMI.
9. Millets may help in oxidative stress which is a phenomenon caused by an imbalance between the production and accumulation of oxygen reactive species (ROS) in cells and tissues and the ability of a biological system to detoxify these reactive products<sup>10</sup> which are caused by various chronic conditions, including neurodegenerative disorders, arthritis, and diabetes by resisting oxidative stress.
10. Millets suppress cancer cell growth, promote wound healing, maintain bone health, act as antifungal and antimicrobial.

**Effects of processing on millets<sup>2</sup> -**

Processing of millets decreases the anti-nutritional factors in millets and improves the bio-accessibility of nutrients. Many processing methods have been used traditionally like roasting/popping, soaking, germination and fermentation. All these methods have been reported to have a significant impact on the nutritional value of the grain. Malting of millets improves access to nutrients and has been reported to increase the bio-accessibility of iron by 300% and of manganese by 17%



**schematic diagram for developing millet-based foods<sup>2</sup>**

#### Conclusions:-

Thus the use of millet in day-to-day food especially in underdeveloped and developing countries is the solution to nutritional challenges and various deficiencies. It is one of the economical, freely available solutions for poor people. This also helps to counteract conditions like the risk of heart disease, type 2 diabetes mellitus, and high blood pressure and plays an important role in the prevention of arthritis, mental disorders like anxiety, celiac disease or gluten intolerance and inflammation in the body.

The recommendation of millet-based products in day-to-day food is mixing millet flours with other flours.

The high acceptability of millet in the preparation of foods leads the world one step nearer to being free from nutritional conditions which is the goal of the WHO for announcing the year 2023 as an international year of millet.

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