

MILLETS: AN IMPORTANT WEAPON FOR DIABETES WARRIORS

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ABSTRACT

Diabetes mellitus is a very prevailing disorder harming the body. In this the body loses its ability to produce or respond to a hormone insulin and becomes weak in maintaining proper levels of sugar (glucose) in the blood. Diabetes is a major cause of morbidity and mortality throughout the world. Many studies suggest that this disease can be controlled through change in diet and food. Dietary choices are to be made to maintain blood glucose levels and overall health for people with prediabetes and diabetes. Millet is a whole grain which is lower on the glycemic index (GI) than many other grains, it raises our blood sugar slowly and gradually. High-fiber, low-GI foods keep blood sugar steady, lower the level of cholesterol, and help us lose weight. In this article various information are collected to find out the effect of millets on lowering the blood sugar level and easing the stress of diabetes through introduction of various millets in our diets.

Keywords: Diabetes Mellitus, Glycemic Index, Diabetes, Insulin, Millet.

Introduction

Diabetes mellitus is a carbohydrate metabolism disorder in which the body becomes weak and loses its ability to produce insulin hormone and it becomes weak in maintaining proper levels of sugar in the blood. Type 2 diabetes is more common than type 1 diabetes and most patients with this type 2 diabetes are adults but it is also occurring in children and adolescents. Prevention of Acute complications can be done and risk of the disease can be reduced with medical support and self-management, by promoting beneficial lifestyle modifications, a healthy diet, physical activity and by losing weight (1). Dietary interventions are an easy and cost-effective way to provide health benefits to people at risk and those who have been diagnosed with type-2 diabetes(2). In diabetics blood glucose levels can be controlled either by taking insulin injections or by oral medications. This disease can be controlled through diet and regular exercise. For people with prediabetes and diabetes, dietary choices make important to maintain optimum blood glucose levels and good overall health. Rice, wheat and maize are the major staple foods in Asia and Africa. polished rice, is deficient in micronutrients which provides 80% of the energy intake (3) in high rice consuming countries. Grains like rice and wheat, have high glycemic indices (GI), raising the blood sugar levels. Consuming a diet consisting of highly processed foods high in carbohydrates and saturated fats are found associated with insulin resistance where the body's cells become less responsive to the hormone insulin, which can greatly influence dietary choices.

Millets

Plants that produce small pearl-like grains and not a single plant is Millets. Millet is low in essential amino acids and higher than most grains in fat content, 75 percent of which is heart-healthy polyunsaturated fat. Millet has been found to be potentially beneficial in the cure and management of diabetes.

Millets are like whole grain that takes longer to digest, so it releases sugar slowly in the blood. Millets help keep blood sugar steady and prevent spikes after meals. Nutrition Millets are small-grained cereal crops that are highly nutritious and are hardy rainfed crops grown in less fertile and marginal lands with very low inputs. Most of the millets are native to India and nowadays it is called Nutri-Cereals. foods like white bread, rice, and watermelon, have a high glycemic index (GI), and can cause significant spikes in blood sugar levels. Whereas low glycemic index foods, like whole oats and avocado, digest slowly, resulting in a gradual and controlled increase in levels of blood sugar. Based on its grain size and area

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under production it is categorized into 2 types, i.e., Major and Minor Millets. Millets like Sorghum (Jowar), Pearl Millet (Bajra), Finger Millet (Ragi/Mandua), Minor Millets i.e. Proso Millet (Cheena), Foxtail Millet (Kanngani/kakun), 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) are called as "Nutri-Cereals" by Ministry of Agriculture and Farmers Welfare. Millets are composed of complex carbohydrates which digest slowly in the body. Typical millet protein contains high quantity of essential amino acids especially the sulphur containing amino acids (methionine and cysteine). The millets are a good source of antioxidants like phenolic acids and glycosylated flavonoids. Millet foods are potential prebiotic and can enhance the viability or functionality of probiotics with significant health benefits (4).

Millets are gluten free and non-allergenic and they decrease triglycerides and C-reactive protein, preventing cardiovascular disease. Millets being rich in dietary fiber have water absorbing and bulking property. It increases staying time of food in the gut and helps in reducing risk of inflammatory bowel disease and also acts as detoxifying agent in the body. Millets have the superpower of growing in arid regions with high temperatures. Millets have relatively lower GI are widely used in managing diabetes. Depending upon the type of millet and how it is prepared, their consumption can manage sugar level in the diabetic patients. Choice of food is very significant as foods like white bread, rice, and watermelon, with a high glycemic index (GI), can cause significant spikes in blood sugar levels. Whereas low glycemic index foods, like whole oats and avocado, digest slowly, resulting in a gradual and controlled increase in blood sugar levels. There are over 13 varieties of millets grown, with the most common ones being: Jowar (sorghum millet), Bajra (pearl millet), Finger millet (ragi/hachni), Foxtail millet (kangni/kakum), Barnyard millet -Vari, Kuttu (amaranth), Proso (chena), Kodo (kodri/kodro/arikelu), they are not only good in taste but they also have a range of health benefits.

- Promotes Heart Health: With loads of magnesium and potassium, millets reduce the risk of cardiovascular diseases.
- Helps in reducing cholesterol levels.
- Improves the gastrointestinal tract health.
- Reduces the risk of cancer.
- Helps in detoxifying the body.
- Improves the body immunity.
- Reduces the risk of diabetes and hyperglycemia.
- Due to its low glycemic index Millets helps in regulating the blood sugar levels
- Millets reduce insulin resistance in the body.
- They help in reaching the target post prandial blood glucose levels (5).

Millets are more tolerant of poor soils and drought. They can resist heat, scarcity of water and other harsh growing conditions and need fewer inputs like fertilizers and pesticides. Millets grow in low and shallow fertile soils with a pH of soil ranging from acidic to basic (6). On acidic soils Millets can be a good alternative to wheat and Rice, as these are very sensitive to saline soils and has poor growth (7).

We get lignans, flavonoids, phenolics, beta-glucan, sterols, and inulin from millets. These are biologically-active plant compounds that lower down cholesterol, boost immunity, reduce inflammation and reduce the risk of several diseases, like cancer, heart disease and diabetes.

Benefits of Millets in Diabetes

- Glycemic index (GI) of Millets is low therefore it slows down the absorption of sugar in the blood of the human body.
- High dietary fiber of millets retains food in tract and food takes more time for digestion
- It keeps satiated for a longer time reducing hunger pang feel between meals.

Studies

People with prediabetes consuming millets for a long period reported a significant reduction in HbA1c levels. Minimally processed millets were found more effective in lowering a the glycemic index of meal than white rice and refined wheat.

This systematic review of the findings noticed has proved that millets can keep blood glucose levels low and reduces the risk of diabetes. Seetha Anitha, PhD, a senior scientist at the International

Crops Research Institute for the Semi-Arid Tropics in Patancheru, India and lead author of the study, says that millet promotes gut health. Finger millet, contains prebiotics that feeds gut bacteria *Faecalibacterium* and *Eubacterium*, and probiotic *Bifidobacterium* and *Lactobacillus*, that generate short-chain fatty acids (SCFAs) and these fatty acids have anti-diabetic properties. Therefore, indirectly helps the diabetic patients in improving the gut health.

Studies shows that the intake of foxtail millet increases serum leptin decreasing insulin resistance, and marginally reduce inflammation. A sex-dependent difference in glucose-lowering effect of foxtail millet was observed (8). A significant reduction was observed in the postprandial glucose level of patients consuming a millet-based dosa as compared to those who consumed a rice-based dosa (3).

Conclusion

India is celebrating 2023 as the 'Year of the Millets'. Currently, India is also the second-highest country in the world affected by diabetes. Management of diabetes can be effectively done by diet management and foods having low glycemic index delay the release of glucose in the blood. Millet's high fiber content slows digestion and releases sugar into the bloodstream at a more even pace. This helps diabetics avoid dangerous spikes in blood sugar that lead to glucose spilling over into the urine, known as glucosuria. Millet also contains high quantities of methionine, an amino acid that is deficient in most grains, giving millet a valuable place in a vegetarian diet.

Millets have complex carbs, releases sugar slowly keeping one full for a longer time and therefore give a feel of satiety. This helps in reducing weight. Being rich in protein Millet is a diabetes-friendly grain and it promotes insulin sensitivity. Fibre in millets helps in slowing down the absorption of sugar into the bloodstream. low-medium glycemic index of millets makes it valuable for reducing the risk of diabetes and manage blood sugar levels. Studies suggest that consuming millets can be beneficial in managing and lowering the risk of diabetes. different kinds of millets affect people differently. Incorporating millet-based food in diets helps in maintaining the health. Modifications in the recipes using millets would enhance the taste buds leading to a healthy body and improved lifestyle. Some irresistible recipes with millets:

- Millet idli (Siridhanya idli). This is prepared with foxtail millet (Navane), urad dal and beaten rice.
- Millet neer dosa. This is prepared with siridhanya, coconut, and urad dal.
- Ragi porridge, dosa, roti, and sankati.
- Barnyard millet dosa.
- Jowar roti.
- Bajra roti.
- Millet pongal.
- Millet upma (8).

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