VIEWS | OPINION

Deploying medicinal foods against diabetes

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By **Sanjiv Das** | October 28, 2021



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The incidence of diabetes mellitus continues to rise annually all over the world with India having recorded 7.7 crore cases in 2020 according to the International Diabetes Federation (IDF). The present available treatment options for diabetes like sulfonylurea, metformin and alpha-glucosidase are restricted by their limited actions, side-effects and are unaffordable to the majority of the population. Thus, there is a need to seek out more natural solutions in the form of medicinal foods with anti-diabetic properties to fight this growing problem.

The young Indian population, which constitutes 65 per cent of the country, is fast adapting to a new, unhealthy lifestyle. They are at a high risk of the increasing burden of diabetes and associated complications. The new evolving lifestyle is not only affecting people's health but also mounting the monetary burden on the developing country. India has more than 7 crore diabetes cases currently with a good majority across the nation not aware of the disease and comorbid factors. Some studies link diabetes with a vegetarian, while others suggest that the typical vegetarian diet actually helps in reducing the diabetes risk.

"Evidence does suggest that the type and source of carbohydrate, fats and protein play a major role in the prevention and management of type 2 diabetes. Multiple potential mechanisms underlie the benefits of a plant-based diet in ameliorating insulin resistance, including promotion of a healthy body weight, increase in fiber and phytonutrients, food-microbiome interactions, and decreases in saturated fat, advanced glycation end products, nitrosamines, and heme iron", says Dr Sapana Shah, Assistant Professor, Department of Medicine, NYU Grossman School of Medicine, US.

This brings our focus on the availability of numerous medicinal foods in India with anti-diabetic potential such as giloy, ashwagandha, aloe vera, neem, onion, garlic, beetroot, jamun, jackfruit etc. and most recently millets. Over the years, 800 medicinal plants and herbs have been identified that can be used for diabetes treatment. But only a few of them have been scientifically proven to be effective.

There is an urgent need to target isolation, purification, and characterisation of bioactive compounds present in these plants. The outcome of such studies may provide a starting point for development of anti-diabetic medicines in the form of food and supplements.

Breakthrough weapons against diabetes

A Kochi-based startup has recently received recognition from the American Diabetes Association (ADA) for developing jackfruit-based flour which is clinically proven to control blood sugar. Supported by the Kerala State Industrial Development Corporation, the startup is currently manufacturing the flour using green unripe jackfruits under the brand-name Jackfruit365.

“Only Sri Lanka and Kerala use mature unripe jackfruit to prepare a whole meal as an alternative to rice or wheat which means higher quantity of consumption. Rest of the world uses tender jackfruit as a side dish in low quantities per meal. Consumption of mature unripe jackfruit can reduce insulin dependency on patients due to low glycemic index, high dietary fiber especially insoluble fiber. It is possible to eat large quantities as a meal and satiate a hungry diabetic patient. In addition, jackfruit is gluten free and can be a silver bullet for diabetic patients with gluten allergy”, says James Joseph, Founder, Jackfruit365, Kochi.

Jamun or the Indian blackberry is another weapon being shaped up for the treatment of diabetes. A team of researchers at Coimbatore-based Bharathiar University has recently received a patent for showing promising anti-diabetic activity of jamun during pharmacological clinical analysis. The researchers had isolated active compounds from the tree bark and used them in various tests.

Researchers from Lovely Professional University in Phagwara have also recently patented a natural solution developed for diabetic patients. This sugar-free Asava formulation has been prepared using anti-diabetic herbs as the fermenting initiators which can be directly consumed by the patients with or without water. This reduces the side effects of anti-diabetic drugs and maintains insulin levels in the patients.

Addressing the oral health of diabetic patients, Mumbai-based Colgate-Palmolive India has released a unique blend of ayurvedic ingredients such as madhunashini, neem, jamun seed extract, and amla in the form of a toothpaste.

Adding on, giloy which is known for its immunity building properties can also be extremely beneficial to control blood sugar levels and prevent diabetes. A recent breakthrough in this regard has been made by the researchers from the Indian Institute of Science Education and Research (IISER) in Bhopal who have sequenced the genome of the medicinal plant.

“The genome and transcriptome sequencing of giloy is important due to its tremendous use in pharmaceuticals and ayurvedic formulations to treat various health conditions including diabetes and COVID-19. The availability of giloy genome will help in bridging the missing link between its genomic and medicinal properties”, points out Dr Vineet K. Sharma, Associate Professor, Department of Biological Sciences, IISER Bhopal.

Are millets turning panacea for diabetes?

Millet is another weapon getting honed to fight diabetes. In fact, the United Nations declaration of 2023 as the International Year of Millets has caught the attention of many scientific minds in this direction because minimally processed millets are considered to be 30 per cent more effective in lowering glycaemic index (GI) of a meal compared to milled rice and refined wheat.

Numerous studies have indicated that millets can be beneficial in managing and reducing the risk of developing diabetes and could therefore be used to design appropriate meals for diabetic and pre-diabetic subjects as well as for non-diabetic people for a preventive approach.

Drawing on research from 11 countries, a recent study published in 2021 shows that diabetic people who consumed millet as part of their daily diet saw their blood glucose levels drop 12-15 per cent (fasting and post-meal), and blood glucose levels went from diabetic to pre-diabetes levels. The HbA1c (blood glucose bound to hemoglobin) levels lowered on average 17 per cent for pre-diabetic individuals, and the levels went from pre-diabetic to normal status.

Sharing his perspective, Dr Vetriventhan Mani, Senior Scientist (Genetic Resources), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad says, “Nutrition and health benefits of millets can vary significantly by variety and so we need to design solutions taking the variety into account. It is also important to breed better varieties, not only for yield but also understanding and selecting by glycaemic index as well as micronutrients.”

Also, considering the fact that millets are climate-smart and nutritious, this could be turned into a triple win for the farmers, industry and consumers in the long run. Banking upon the various qualities of this grain, Hyderabad-based Indian Institute of Millets Research (IIMR), under the Indian Council of Agricultural Research (ICAR), has recently executed partnerships with the Agricultural and Processed Food Products Export Development Authority (APEDA) and Tata Consumer Products (TCP) to unlock the full potential of millets as a healthier alternative.

“There is a need to spread awareness on the nutrition and sustainability benefits of millets and make it widely available in formats that integrate with people’s lifestyles, so that they become a key part of the Indian diet. If millets are to be positioned as gluten free in the global market, we need to be looking at production that will be going up to almost 45-50 billion tonnes in 2050”, says Dr Vilas Tonapi, Director, Indian Institute of Millets Research (ICAR-IIMR), Hyderabad.

Although a large number of studies on millets and diabetes have been conducted by a wide range of research organisations with different millets, forms of cooking and testing methods, more individual studies will always be helpful on the prevention and management of diabetes. The greatest value could be one major study covering all the types of millets and range of varieties with different forms of processing and using consistent testing methodologies.

The presence of such countless natural solutions in the form of plants, fruits, grains, et al, to combat diabetes eventually requires policy interventions to promote the production of such medicinal foods in India and a constant push to all stakeholders associated with the industry in one way or the other. The success of defeating diabetes lies in systematically strengthening the medicinal food value chain- from cultivation to developing healthier, nutritious products with sound scientific backing.

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