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MEDIA RELEASE

Embargoed until 28 July 06:00 CEST

Millet-based diet can lower risk of type 2 diabetes and help manage blood glucose levels

Hyderabad, 28 July 2021:

A new study has shown that eating millets can reduce the risk of developing type 2 diabetes and helps manage blood glucose levels in people with diabetes, indicating the potential to design appropriate meals with millets for diabetic and pre-diabetic people as well as for non-diabetic people as a preventive approach.

Drawing on research from 11 countries, the study published in *Frontiers in Nutrition* shows that diabetic people who consumed millet as part of their daily diet saw their blood glucose levels drop 12-15% (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% for pre-diabetic individuals, and the levels went from pre-diabetic to normal status. These findings affirm that eating millets can lead to a better glycemic response.

The authors reviewed 80 published studies on humans of which 65 were eligible for a meta-analysis involving about 1,000 human subjects, making this analysis the largest systematic review on the topic to date. "No one knew there were so many scientific studies undertaken on millets' effect on diabetes and these benefits were often contested. This systematic review of the studies published in scientific journals has proven that millets can keep blood glucose levels in check and reduce the risk of diabetes. It has also shown just how well these smart foods do it," said Dr S Anitha, the study's lead author and a Senior Nutrition Scientist at ICRISAT.

Millets, including sorghum, were consumed as staple cereals in many parts of the world until half a century ago. Investments in a few crops such as rice, wheat and maize, have edged nutritious and climate-smart crops like millets out of the plate.

"Awareness of this ancient grain is just starting to spread globally, and our review shows millets having a promising role in managing and preventing type two diabetes. In the largest review and analysis of research into different types of millet compared to other grains such as refined rice, maize and wheat we found that millets outperform their comparison crops with lower GI and lower blood glucose levels in participants," observed Professor Ian Givens, a co-author of the study and Director at University of Reading's Institute of Food, Nutrition and Health (IFNH) in the UK.

According to the International Diabetes Association, diabetes is increasing in all regions of the world. India, China and the USA have the highest numbers of people with diabetes. Africa has the largest forecasted increase of 143% from 2019 to 2045, the Middle East and North Africa 96% and South East Asia 74%. The authors urge the diversification of staples with millets to keep diabetes in check, especially across Asia and Africa.

Strengthening the case for reintroducing millets as staples, the study found that millets have a low average glycemic index (GI) of 52.7, about 36% lower GI than milled rice and refined wheat, and about 14-37 GI points lower compared to maize. All 11 types of millets studied could be defined as either low (<55) or medium (55-69) GI, with the GI as an indicator of how much and how soon a food increases blood sugar level. The review concluded that even after boiling, baking and steaming (most common ways of cooking grains) millets had lower GI than rice, wheat and maize.

“Millets are grown on all inhabited continents, yet they remain a ‘forgotten food’. We hope this will change from 2023, when the world observes the United Nations declared International Year of Millets, and with studies like this that show that millets outperform white rice, maize and wheat,” said Rosemary Botha, a co-author of the study who was based in Malawi at the time of the study, with the International Food Policy Research Institute (IFPRI).

“The global health crisis of undernutrition and over-nutrition coexisting is a sign that our food systems need fixing. Greater diversity both on-farm and on-plate is the key to transforming food systems. On-farm diversity is a risk mitigating strategy for farmers in the face of climate change while on-plate diversity helps counter lifestyle diseases such as diabetes. Millets are part of the solution to mitigate the challenges associated with malnutrition, human health, natural resource degradation, and climate change. Trans-disciplinary research involving multiple stakeholders is required to create resilient, sustainable and nutritious food systems,” said Dr Jacqueline Hughes, Director General ICRISAT.

Professor Paul Inman, Pro-Vice-Chancellor (International) of the University of Reading, stressed that “The rapidly accelerating threats of climate change and global health crises, including obesity and diabetes, require everyone to pull together in action. The partnership between ICRISAT and the University of Reading is doing exactly this, bringing together our world leading expertise in human nutrition with ICRISAT’s long established role as a leader in agricultural research for rural development.”

The study also identified information gaps and highlighted a need for collaborations to have one major diabetes study covering all types of millets and all major ways of processing with consistent testing methodologies. Structured comprehensive information will be highly valuable globally, taking the scientific knowledge in this area to the highest level.

NOTE: This study is part of a series that has been worked on for the last four years under the Smart Food initiative, led by ICRISAT and will be progressively released in 2021. Included are systematic reviews with meta-analyses of the impacts of millets on: diabetes, anemia and iron requirements, cholesterol and cardiovascular diseases and calcium deficiencies as well as a review on zinc levels. This is also part of a special edition and theme section in the *Frontiers* journal - Smart Food for Healthy, Sustainable and Resilient Food System. As part of this, ICRISAT and the Institute for Food Nutrition and Health at the University of Reading has formed a strategic partnership to research and promote the Smart Food vision that our diets become healthier, more sustainable on the environment and good for those who produce it.

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About the authors' organizations/affiliations

ICRISAT: The **International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)** is an international agriculture research organization specialized on the drylands across Asia and Africa to ensure food, nutrition and income security, with global headquarters in India. www.icrisat.org

IFNH: The Institute for Food, Nutrition and Health at the University of Reading in the UK, brings together the university's world-leading expertise in food, nutrition, agriculture, health and the environment to help deliver better diets and health. <https://research.reading.ac.uk/ifnh/>

IFPRI: The International Food Policy Research Institute, part of the CGIAR, provides research-based policy solutions to sustainably reduce poverty and end hunger and malnutrition in developing countries. It is headquartered in Washington DC, USA. www.ifpri.org

NIN: The National Institute of Nutrition is India's premier public research institute for nutrition. Headquartered in Hyderabad, NIN continuously monitors India's nutritional health and works to manage as well as prevent nutritional problems. www.nin.res.in

Kobe University: One of Japan's largest and oldest national universities. It is an institute of excellence for the social sciences and promotion of interdisciplinary research and education. www.kobe-u.ac.jp

Avinashilingam Institute for Home Science and Higher Education of Women (deemed to be University) is dedicated to higher education for women and has a specialization in a wide range of Home Science (including food and nutrition), Sciences, Arts, Commerce and Engineering based in India. <https://avinuty.ac.in>

NTBN: The National Technical Board on Nutrition advises the Government of India. It provides evidence-based, technical and policy recommendations and guidance for matters of nutrition.

For UK media: Additional media contact to be added:

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For Australia media

Replace para (“According to the International Diabetes Association....”) with:

Diabetes is increasing in all regions of the world. Diabetes Australia notes that diabetes is the biggest challenge confronting Australia’s health system with 280 Australians developing diabetes every day.

Add quote:

“Millets, including sorghum, have many advantages for Australia, being an option for farmers during a climate crisis as they are very hardy and able to grow in high temperatures with minimal water. There are many opportunities to develop a wide range of consumer products with millets, ranging from pancake mix to soups, energy bars, breakfast cereals, health shakes and more. This could be a triple win for the farmers, industry and consumers if promoted,” advocated Ms Joanna Kane-Potaka, a co-author of the study and an Australian who has spent the last nine years in India. Ms Kane-Potaka is ICRISAT’s Assistant Director General and leads the Smart Food initiative.

For Japan media

Replace para (“According to the International Diabetes Association....”) with:

Diabetes is significantly increasing in Japan. More than 10 million Japanese are strongly suspected to have diabetes and another 10 million believed to be at risk of contracting diabetes according to a survey on national health and nutrition conducted by the Ministry of Health, Labor, and Welfare. The authors urge the diversification of staples with millets to keep diabetes in check, especially across Asia and Africa.

Add quote:

Dr Takuji W Tsusaka, one of the study’s authors at the time with Kobe University, Japan, suggests opportunities for Japan, “Millets in Japan are an ancient grain and now almost a ‘forgotten food’. There could be significant positive health benefits if we promoted modern foods with millets, diversified our staple food, even cooking millets mixed with rice. This can have health and business opportunities for Japan.”

For All media

Add article link to “*Frontiers in Nutrition*”

Still to clear quote for Professor Paul Inman

For India media

See next page:



For more information, please contact:

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MEDIA RELEASE FOR INDIA

Embargoed until xxxx

Millet-based diet can lower risk of type 2 diabetes and help manage blood glucose levels

Hyderabad, xx June 2021:

A new study has shown that eating millets reduces the risk of developing type 2 diabetes and helps manage blood glucose levels in people with diabetes, indicating the potential to design appropriate meals with millets for diabetic and pre-diabetic people as well as for non-diabetic people as a preventive approach.

Drawing on research from 11 countries, the study published in *Frontiers in Nutrition* shows that diabetic people who consumed millets as part of their daily diet saw their blood glucose levels drop 12-15% (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% for pre-diabetic individuals, and the levels went from prediabetic to normal status. These findings affirm that eating millets can lead to a better glycemic response.

The authors reviewed 80 published studies of which 65 were eligible for a meta-analysis involving about 1,000 human subjects, making this analysis the largest systematic review on the topic till date. “No one knew there were so many scientific studies undertaken on millets’ effect on diabetes. These benefits were often contested, and this systematic review of the studies published in scientific journals has proven that millets keep blood glucose levels in check, reducing the risk of diabetes, and has shown just how well these smart foods do it,” said Dr S Anitha, the study’s lead author and a Senior Nutrition Scientist at ICRISAT.

Dr Hemalatha, Director, National Institute of Nutrition (NIN) highlights, “Diabetes contributed to very high disease burden from 1990-2016 in India. Diabetes-related health expenditure was over USD 7 million. There is no easy solution, and it requires a lifestyle change, and diet is a very important part of this. This study provides one part of the solution useful for individuals and governments. How we use this and implement it into programs needs careful planning.”

Dr Raj Bhandari, one of the study’s authors and a representative on the Indian National Technical Board of Nutrition, stressed, “Additional attention to our health has been accelerated due to COVID-19 and diabetics are even more vulnerable to the virus. Our diets play a critical role and if we could

bring millets back as a major part of our diet, we would not only help in controlling diabetes, but we would also be adding important nutrients to our plate.”

According to the International Diabetes Association, diabetes is increasing in all regions of the world. India, China and the USA have the highest numbers of people with diabetes. Africa has the largest forecasted increase of 143% from 2019 to 2045, the Middle East and North Africa 96% and South East Asia 74%. The authors urge the diversification of staples with millets to keep diabetes in check, especially across Asia and Africa.

Strengthening the case for returning millets as staples, the study found that millets have a low average glycemic index (GI) of 52.7, about 30% lower glycemic index (GI) than milled rice and refined wheat, and about 14-37 GI points lower compared to maize. All 11 types of millets studied were either low (<55) or medium GI (55-69), GI being an indicator of how much and how soon a food increases blood sugar level. The review concluded that even after boiling, baking and steaming (most common ways of cooking grains) millets had lower GI than rice, wheat and maize.

Dr Ananthan Rajendran, a study author and scientist at the National Institute of Nutrition (NIN) further emphasized, “Now we have strong proof that diversifying our diets with millets can help in prevention and management of diabetes and its complications. India urgently needs solutions to reverse the dangerous growing trend of diabetes and millets is one of the solutions we should be promoting.”

Dr Devraj J. Parasannanavar, author and scientist at the National Institute of Nutrition (NIN), added “This study has also identified the information gaps and it would be of great value to have an international collaborative approach to systematically study all types of millets and every form of processing them to identify their impact on diabetes.”

“Millets are traditional foods consumed in India. Use of locally available millets as dietary diversification coupled with good lifestyle modifications would help reduce not only Type II diabetes but also gestational diabetes,” said study co-author Professor Kowsalya Subramaniam, (Food and Science Nutrition), Registrar at Avinashilingam Institute for Home Science and Higher Education for Women (deemed to be university) in Tamil Nadu.

“The global health crisis of undernutrition and over-nutrition coexisting is a sign that our food systems need fixing. Greater diversity both on-farm and on-plate is the key to transforming food systems. On-farm diversity is a risk mitigating strategy for farmers in the face of climate change while on-plate diversity helps counter lifestyle diseases such as diabetes. Millets are part of the solution to mitigate the challenges associated with malnutrition, human health, natural resource degradation, and climate change. Trans-disciplinary research involving multiple stakeholders is required to create resilient, sustainable and nutritious food systems,” said Dr Jacqueline Hughes, Director General ICRISAT.

“Diversifying what we grow and eat with millets, can bring about significant impact given that millets have less negative impact on the environment than the major crops as well as the multiple health benefits,” emphasized Dr Arvind Kumar, Deputy Director General (Research), ICRISAT.

Dr Vetriventhan Mani, Senior Scientist (Genetic Resources) at ICRISAT, expressed, “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.”

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Kobe University: is one of Japan's largest and oldest national universities. It is an institute of excellence for the social sciences and promotion of interdisciplinary research and education. www.kobe-u.ac.jp