



SUMMARY REPORT

IUFoST SRD - Scientific Roundtable Discussion #11

MILLETS FOR ENHANCING AGRI-ECONOMY, NUTRITION, ENVIRONMENTAL AND SUSTAINABLE DEVELOPMENT GOALS

March 31, 2023 at 07.00 EST (GMT -4)

In the International Year of Millets 2023, the first IUFoST Scientific Roundtable of 2023 and 9th in the series of SRDs focused on Millets for Enhancing Agri-economy, Nutrition, Environmental, and Sustainable Development Goals, was held on 31 March 2023 online. The importance of the consumption of varieties of Millets in the composite diet for a Sustainable Food System has been emphasized at the UN Food Systems Summit. IUFoST was one of the invited and leading organizations that gave scientific input to the summit. IUFoST experts focused on the role of food science and technology in achieving sustainable and healthy diets across nations. This dialogue attended by more than 200 participants shows the interest that the globe has in this very important agenda.

Introduction :

Millets are grown in more than 130 countries. They represent components of traditional foods consumed by more than 600 million people daily in Asia and Africa. Millets do require less water to grow and therefore are much lower in the carbon and water footprints. Most importantly, Millets have a good plant-based nutrition profile and are suitable for all strata of the economy in the society. The science and technology of Millets suggest these grains are affordable and are used extensively by small and medium industries in Asia and Africa and Central and Latin Americas. This meets the market demand of ready for consumption using pre-processing methods such as sprouting and drying, roasting, puffing, and flours and even in multigrain dietary patterns.

Thus, the focus of this IUFoST - SRD was to understand how Food Science and Technology can take on the challenges in the Millet Chain to deliver the needed end product to the consumer and the raw material for the food industries to make potentially nutritious, healthy and safe food products at an affordable cost and be a partner Globally in the transfer of Knowledge. The global experts addressed several relevant issues in food science and technology applicable to Millets and their role to

enhance the global and regional awareness of dietary patterns with better nutrition and improved health through regular consumption of Millets-based food products.

The resource personnel :

Expert Speakers in the IUFOST SRD on Millets included Ismahane Elouafi, PhD – Role of Millets in a Dynamic Agroecosystem, FAO Chief Scientist; Ruth Oniang’o, PhD – Agricultural Diversity of African Millets, Founder and Director of Rural Outreach Africa, Kenya; CV Ratnavathi, PhD - Global Perspective on History of Production, Use & Agri-economics of Millet: Indian Institute of Millets Research, Rajendranagar, Hyderabad, India; Anoma Chandrasekara, PhD - Bioactives and Health Implications of Millet: Wayamba University of Sri Lanka, Sri Lanka and Peter Pressman, MD, University of Maine, USA - Millet: Demystifying Health Claims.

More than 200 participants attended the SRD session from all over the globe. The session was co-chaired by Dr Roger Clemens and Dr PG Rao, the IUFOST Scientific Councilors. The session was opened by Dr Aman Wirakartakusumah, President of IUFOST. The global perspective on the subject was given by Dr V Prakash, Immediate Past President of IUFOST and Dr Hongda Chen, Chairman of IUFOST Scientific Council gave his initial remarks and details of the session. The whole programme was coordinated by Ms Judith Meech, Secretary General of IUFOST.

Sessions :

Dr Aman Wirakartakusumah, President of IUFOST in his initial remarks welcomed all the speakers and participants. He mentioned that the year 2023 was declared as an International year of Millets and IUFOST is planning to take it forward by addressing the scientific challenges in promoting and use of Millets as a part of healthy diet towards food and nutrition security, as Millets are available in many countries. Dr Aman highlighted the need for collaboration with science and technology and the need for innovation to overcome the challenges in production, harvesting, storing, preservation, packing and distribution. While IUFOST plays a significant role in Food and Nutrition Security, the organization will work to overcome the challenges in promoting an array of qualities and potential health benefits of Millets.

Dr Vish Prakash, Immediate Past president of IUFOST, while welcoming the speakers and participants, said that the year 2023 was declared as the year of Millets in 2020 at UN Assembly, which was spearheaded by India. Historically, Millets are food culture by itself in many countries, like in India. This could be an important food choice of people in the future, providing the agricultural dynamics are better understood, the potential nutritive values are considered based on human biology, and the environmental challenges are addressed. It is clear that addressing a vast diversity of Millets is critical. Millet is just not one grain. There are more than 20 different types of Millets in use. These are used as staples by the local populations, particularly in Asia and Africa, and has demonstrated to be a sustainable dietary component for centuries. Millets can play a major role in at least 5 to 6 Sustainable Development Goals of UN. Millets in the Food Chain build agriculture resilience, improved agri-economy, friendly to cultivator, consumer and climate changing challenges. IUFOST should look at powerful science and technology applications in millet mills, destoner, roasting, fermenting, main products and byproducts to be utilized. Dr Prakash recommended

that we need to focus on 1) Capacity development, 2) Technology dissemination, 3) High science but low cost and adaptability to low income entrepreneurs and affordable to women entrepreneurs, and 4) Food and Nutrition Security with food safety in food processing in the subject of Millets.

Dr Hongda Chen, Chair, IUFoST Scientific Council, welcomed the gathering and in his opening remarks, he mentioned that this is the first Scientific Round Table conference being organised this year on a very important topic of Millets. He also highlighted that the Scientific Council is an extended committee of IUFoST with the purpose of reviewing the scientific outputs of IUFoST keeping in view the mission and vision of IUFoST.

Presentation by the Panelists:

Dr CV Ratnavathi, Principal Scientist, Indian Institute of Millets, India, presented on “Global Perspective on history of production, use and agri-economics of Millets”. She mentioned that the research efforts on Millets are intended to improve the cultivation and consumption of Millets and thereby improve the sustainability of Millets and enhance nutritional security. Efforts are also to improve the content and bio availability of micro nutrients through bio fortification and development of value-added products. Globally Millets are cultivated over 718 lakh hectares (approx. 177.4 million acres), producing 863 lakh tons (approx. 0.19 billion pounds). She deliberated on the advantages of Millets cultivation, nutritional composition relative to other grains and potential health benefits. She concluded by suggesting that the scientific community should ensure a legitimate place for Millets in the global food basket for better health.

Dr Ismahane Elouafi, FAO Chief Scientist, presented on the Role of Millets in a dynamic agro-ecosystem. She mentioned that our current challenges to be addressed are hunger and poverty, understanding the drivers, causes of poverty and food insecurity. There is a need for extended use of dry lands in the world. Global production of Millets, like pearl and fonio, were mentioned. Her key messages for the International year of Millets as sustainable cultivation of these grains can support climate resilient agriculture, fight hunger, contribute to food security and nutrition, and can be part of a healthy diet. Cultivating Millets can offer opportunities to small holding farmers to improve their livelihood. She concluded by suggesting a call for action as 1) Policy support and investment in support of Millets, and 2) Research and development in all spheres of Millets production and consumption.

Dr Ruth Khasaya Oniang’o, Founder and Director of Rural Outreach Africa, Kenya; said nutrition wise, the Millets are gaining popularity. Millet types indigenous to Africa are widely cultivated across the continent. Overtime, African farmers there are custodians of the increased diversity of these grains to fit to various agro-ecological conditions and to adapt to increasing adverse climatic conditions. She highlighted the diversity of African Millets and the importance of millet species. Millets are a major source of protein and energy for 130 million people of Sub-Saharan Africa. Some nutritional qualities of Millets are better to most cereals, with an adequate source of essential amino acids relative to biological requirements and an array of minerals. Millets also aid in improving food and nutrition security. She highlighted the immense opportunities that exist from cultivation to sustainable consumption of Millets.

Dr John RN Taylor, University of Pretoria, South Africa, spoke on “Getting Millets into the worlds’ grocery food basket.” Dr Taylor started his presentation by saying that many of his points in the presentation were influenced by his participation in the recent International Millet conference in New Delhi, India. He highlighted the nutritional promoting aspects of Millets. Millets are becoming urbanised, due to accessibility and potential health-promoting attributes, in spite of Millets having a number of drawbacks like lower yield, leading to higher cost, stronger color and flavor, coarse structure, and lack of convenience. He suggested why consumers should choose Millets and the benefits of whole grain flours. He said technology is very important and highlighted examples where food technologies have addressed their quality issues and achieved considerable success, with specific reference to extrusion technology.

Dr Anoma Chandrasekhara, from Wayamba University of Sri Lanka, spoke on Bioactives of Millets in health promotion and wellness. She gave details on millet types, nutrient content, and unique nutritional benefits. She discussed potential health-promoting components of Millets with examples of scientific evidence of Millets for health with foxtail, kodo, finger, and porso Millets. The use of Millets as nutraceuticals and specialty foods in health promotion and overall wellness is justified in some of the scientific literature. *In vitro* and *in vivo* evidence suggest a number of potential beneficial roles of Millet grain consumption in the management of non-communicable diseases, such as cardiovascular diseases, and Type 2 diabetes. The possible roles of Millets may include in improving insulin sensitivity and cholesterol metabolism, reducing inflammation, and modulation of gut bacteria. In conclusion, she suggested that Millets are a valuable source of potential bioactive components, and possess a number of health-promoting properties. Regardless, the scientific evidence for these characteristics needs to be strengthened through acceptable clinical studies.

Dr. Peter Pressman, MD, spoke on Millets: demystifying health claims. He suggested that the scientific community, including food scientists, must 1) recognise and properly acknowledge the evidence based on data supporting the emergence of Millets. Such evidence must be foundational to environmentally friendly, nutritionally valuable, cost-effective, and economically viable crops that should be promoted across many resources in poor and austere environments. He further noted that scientists should 2) continue to generate and communicate good science, but be aware of and be able to balance the growing internet and blog sphere presence of dramatic health and medical claims. He further mentioned that it is essential that health claims must be measured in the way in which we can interpret and communicate quality scientific and medical evidence to date in terms of the role of Millets as an adjunct to the management of non-communicable diseases and global health.

Dr Jay Kant Yadav, University of Rajasthan, India, and a member of Early Career Scientists (ECS) of IUFoST spoke on the viewpoints of ECS. The ECS believes that Millets have strong potential in contributing to global food security and alleviating nutritional problems because Millets are affordable, low carbon and water footprint, cost-effective for farmers, promote healthy holistic food for humans and generate feed for animals from its byproducts. The challenges are social acceptance in high-income countries, processing technologies to minimise anti-nutrient factors, and the

need for novel product development. The ECS is committed to promotion, engaging in collaborative research, and puts emphasis on teaching students while expecting the government agencies to play a key role. Dr Yadav, as a rapporteur, summarised the points of the session below.

Summary:

Millets are important in addressing hunger and poverty as they are climate-resilient and farmer-friendly. There are varieties of Millets, and we need to maximise their usage as food and feed. Millets have not received proper attention despite their potential health and environmental benefits in policy frameworks. Novel food processing technologies to be developed and translated to beneficial Millets and its products required additional support in research and development. There is a need for effective identification and clinical relevance of bioactive components of Millets and their delivery on a food-based approach. It is critical that the Millets community and beyond support and generate credible scientific data on the potential health benefits of Millets. Early Career Scientists are committed to taking on these challenges of promoting Millets globally.

Views of Experts and General Discussion:

Dr Wirakartakusumah underlined the importance of technological development and collaboration among scientists, industry, and government towards establishing sustainable food security. Networking and sharing knowledge are key to the integrated development of Millets.

Dr V Prakash noted that as one reviews epidemiological data generated from more than 3000 years ago to present day, there appears to be traditional and ethnic foods containing Millets. However, in some countries the use varieties of Millets is not well documented. IUFoST has to see the holistic approach and leverage Food Science and Technology for deriving potential health benefits from Millets. He emphasized that it is good to have at least one millet meal every week to begin with and later aim at three to four meals a week and spread this Millet message to the community. This SRD is a game changer, and a robust road map needs to be developed to drive home the point of making Millets and its products main components of a sustainable diet in the Global Food Culture. However, he cautioned that in this spree of enthusiasm on Millets those who can afford should not deprive the population whose staple diets are Millets.

Dr Chen, in closing, noted that it was a fabulous roundtable discussion with a lot of knowledge brought out. The potential of Millets in production, health promotion and value addition appears to be quite valuable. Our basic and clinical research needs to establish the real benefits of health from Millets.

Take home messages from Speakers:

Dr Anoma : Health benefits to be brought into health guidelines with more evidence-based data.

Dr Oniang'o: Africa has already started taking a millet meal a day. Africa is ready to offer a lot of data on health claims. The world is now looking at Africa for traditional foods for health and wellness.

Dr Ishman: FAO appreciates India for championing the IYM, G-20, subsidizing policy guidelines and programs giving the importance of Millets. Subsidizing Millets is very important and markets have to be carefully watched. What happened to Quinoa should not happen to Millets.

Dr Aworh: The properties of Millets for full utilisation of the grain and the plant are very important. We should push our knowledge power to understand the bigger role of traditional foods in health and wellness.

Dr Taylor : Let us try and take the best and adopt Millets to the meals.

Thus, in conclusion, Millets for Enhancing Agri-Economy, Nutrition, Environmental and Sustainable Development Goals, 11th in the series of IUFOST Scientific Roundtable Discussions (SRDs) brought forward into focus the importance of a diversified diet with Millets as one of the major components of the meal globally. However, the backward integration of agriculture is needed to meet the demands as more people start consuming Millets. The small-scale Millet processing equipment that is developed with good R and D and Engineering in many countries needs to be replicated in many other countries to reduce drudgery and labour, especially women-oriented rural setups.

Equally importantly, convenient but nutritious Millet food products are required to meet the lifestyle needs of rapidly urbanizing communities in Africa and Asia. Further, nutritionally, Millets occupy a significant role in providing proteins, possible prebiotics, fiber, iron and zinc (despite their anti-nutrient attributes of phytates, which are common to all grains, and possible and goitrogenic polyphenols), and many forms of vitamins and minerals as well as potential bioactives to the diversified spectrum of diets. Global collaborative networks are to be anchored by Institutions like IUFOST in taking the lead to ensure cooperation and capacity building in Millets for sustainable food and nutritional security and safe food for society in tune with the UN Food System Summit Call.

The meeting ended by thanking the secretariat of IUFOST for the coordination, all the Panelists, Experts, and Chairs of the session, and the participants who made the meeting very interesting regarding the power of Millets in daily diets.

Members of IUFOST have priority access to the video, speakers' presentations and recordings through their Adhering Bodies. General Information and the Millet Summary are available here. Questions and comments welcome through secretariat@iufost.org Subject: Millets.

Scientific Papers pending on this SRD.