



Editorial

S. Gopalakrishnan¹ · Geraldine Sanchez² · Gillian Eggleston³ · P. Srinivasa Rao⁴

Received: 17 March 2018 / Accepted: 17 March 2018
© Society for Sugar Research & Promotion 2018

Sorghum (*Sorghum bicolor* L. Moench), a C4 annual grass, known by the terminologies ‘sugarcane of the desert’ and ‘camel among crops’ for its hardy, drought characteristics. It can be grown in tropical, subtropical, temperate and semi-arid regions and also in marginal soils. It has many salient features such as rapid growth, high sugar content (10–15%), higher biomass, wider adaptability to harsh agro-climatic conditions and metal absorbing property. Sweet sorghum is a variety of *S. bicolor* generally cultivated for syrup and also forage and feed. It has sweet juicy stalks and higher sugar levels (fructose, glucose and sucrose) than grain sorghum. Sweet sorghum is an efficient biofuel feedstock in terms of water use efficiency, radiation use efficiency and can be used for food, feed, fodder, fuel,

fibre and bio-products development. So, it can serve as a candidate feedstock for improving bio-economy via bio-ethanol ‘sweet fuel’ production and also a wide array of co-product generation. Of late, phytoremediation potential of sweet sorghum is also been explored. Further, many consider it as a resilient and model bioenergy feedstock that has wider adaptation and also a climate change ready smart crop without significant trade-offs on food cycle. In the past, commercial-scale plantations and processing, both on primary and secondary processing, have been reported. The research articles, specialized reviews on different aspects of sweet sorghum value chain with an emphasis on bio-product development, and success stories of global importance published in the journal “Sugar Tech” will be really imperative and valuable in redefining the R&D needs of the biofuel producing countries. This special issue entitled “NOVEL PATHWAYS OF SWEET SORGHUM UTILIZATION AND BIO-PRODUCTS DEVELOPMENT” is intended to solicit high-quality, original research contributions on different aspects of sweet sorghum—genetics, breeding, hybrids, physiology, microbiology, biotechnology, production, processing, conversion, utilization and bio-products—so as to provide an authoritative scientific backdrop for informed discussion and debates on sweet sorghum and also share our vision for a scientifically driven growth of sweet sorghum-based industries around the globe, albeit current lower global crude oil prices subdued biofuel industry growth. We are sure this special issue will usher furthering the sweet sorghum production and processing technologies to a new level for harnessing the full potential of this novel feedstock in the future.

✉ S. Gopalakrishnan
s.gopalakrishnan@cgiar.org

Geraldine Sanchez
gengsanchez@yahoo.com

Gillian Eggleston
gillian.eggleston@ars.usda.gov

P. Srinivasa Rao
psrao72@gmail.com

- ¹ International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, Hyderabad, Telangana 502324, India
- ² College of Veterinary Medicine of Pampanga State Agricultural University, 2011 Magalang, Pampanga, Philippines
- ³ USDA-ARS-Southern Regional Research Center, 1100 Robert E. Lee Boulevard, New Orleans, LA 70124, USA
- ⁴ Center for Viticulture and Small Fruits Research, Florida A&M University (FAMU), Tallahassee, FL 32308, USA



Dr. S. Gopalakrishnan is working as Principal Scientist (Microbiology) in the Integrated Crop Management (ICM) division of the Research Program Asia, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), based in Hyderabad, India. Dr Gopalakrishnan obtained Ph.D. Biology (Microbiology/Plant Pathology) from University College London (UCL), London followed by three-year postdoc

at Japan International Research Center for Agricultural Sciences (JIRCAS), Tsukuba, Japan. He is the recipient of the prestigious European Union, JIRCAS and Japan Society for Promotion of Science (JSPS) fellowships for doing his Ph.D. and postdoc, respectively. He joined ICRISAT in Sept 2008 and has a total of 19 years of research experience which includes 13 years of post-Ph.D. and 6 years of post-M.Sc. He is one of the “expert committee member” of “Plant Microbial Interactions” of DBT, Government of India. Dr Gopalakrishnan published a book in 2016 entitled “Plant Growth-Promoting Actinobacteria: A New Avenue for Enhancing the Productivity & Soil Fertility of Grain Legumes”, published by Springer Singapore. He has published widely with more than 100 research articles, a H-index of 17 and citations exceeding 977. His expertise areas are plant growth-promoting rhizobacteria (PGPR), biological control of plant pathogens and insect pests and plant–microbe interactions in sorghum, chickpea and pigeonpea. *Links:* Publications repository <http://oar.icrisat.org/view/creators/Gopalakrishnan=3AS=3A=3A.html>. *Google Scholar* https://scholar.google.co.in/citations?hl=en&user=tNLkpAAAAAJ&view_op=list_works (Citations =>977, H index=17). *Research Gate* https://www.researchgate.net/profile/Subramaniam_Gopalakrishnan.



Dr. Geraldine Sanchez is a licensed veterinarian and professor of the College of Veterinary Medicine of Pampanga State Agricultural University, Magalang, Pampanga Philippines. Dr. Sanchez obtained her Ph.D. in Animal Science Major in Reproductive Physiology and Minor in Rural Development at Central Luzon State University, Science City of Munoz, Nueva Ecija Philippines in 1998. She obtained her two postdoctoral studies by research in the USA.

One was taken at Purdue University, West Lafayette, Indiana, USA from 2003–2004 where she specialized in reproductive biology and the other one at Clemson University, Clemson USA specializing in nutraceutical research as a US Fulbright research scholar from September 2012 to March 2013. Dr. Sanchez is a prolific vet researcher whose interest focuses on nutraceutical and reproductive research. She has published papers and articles in various national and international journals. Her latest publication is Anticlastogenic Effects of Organically Grown Moringa, Lemongrass and Sweet Sorghum using Micronucleus Test. Dr. Sanchez is currently the Director of Extension and Training of Pampanga State Agricultural University and likewise is Project Leader of the PSAU’s Nutraceutical Research R&D Facility, the first nutraceutical laboratory in the Philippines. She is currently the principal investigator of the Department of

Agriculture (DA-Central Office) funded research project on nutraceutical research of organic plants in the Philippines.



Dr. Gillian Eggleston was born and reared in Blackburn, Lancashire and educated at Pleckgate comprehensive high school. Dr. Eggleston received her B.Sc. in Chemistry and Biochemistry in 1984 from the University of Nottingham, UK, and her Ph.D. in 1989 in Carbohydrate Biophysics from Cranfield Institute of Technology, UK. Since receiving her Ph.D., Dr. Eggleston has worked internationally in the field of carbohydrates and

industrial sugar and bio-products processing. During her career, she has had numerous accomplishments with her research having had major commercial and scientific impact in the world-wide sugar and related industries. Accomplishments include elucidation of the biochemical and physical processes leading to sugar crop deterioration, juice clarification, industrial enzyme applications and sugar losses, effects of extraneous sugarcane matter on processing, food authentication, and helping to establish a new, large-scale sweet sorghum processing industry in the USA. Her research has resulted in 325 publications (4 books, 132 peer reviewed journal papers and book chapters, 66 symposia and conference proceedings, 122 abstracts, etc.). Her major scientific and commercial accomplishments are reflected in 30 national and international awards, including three FLC National Technology Transfer Awards, the South African Society of Sugar Technologists Talbot-Crosbie Award, four Sugar Industry Technologists (International) Awards, the early and senior USDA-Mid South Area Scientist Awards, the American Chemical Society (ACS) Melville L. Wolfrom Award. She is also an ACS Fellow. Dr. Eggleston frequently gives international Key Note, plenary, and workshop presentations, and consults extensively world-wide, within her field of carbohydrate chemistry and industrial processing of sugarcane, sugar beet, and sweet sorghum, and even beyond in areas such as pharmaceuticals, food and beverages, and bioenergy. Dr. Eggleston has organized numerous scientific symposia and conferences and also mentored young scientists, as well as visiting scientists and graduates from all over the world. Through Dr. Eggleston’s leadership, USDA-ARS sugar research at SRRC is now recognized as a leader in sugar processing research in the world.



Dr. P. Srinivasa Rao Srinivasa Rao P is working as Research Scientist in the Center for Viticulture and Small Fruits Research, Florida A&M University (FAMU) based in Tallahassee, USA. Dr Rao obtained Ph.D. in Genetics from Indian Agricultural Research Institute, New Delhi. He is the recipient of the prestigious Department of Biotechnology Postdoctoral Fellowship and conducted research at Center for Cellular and Molecular Biology,

Hyderabad, India. He joined Acharya NG Ranga Agricultural University in 1998 as Scientist and played role in the release of two sugarcane varieties. Dr. Rao lead many international research and development projects on sweet sorghum while working for

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India. Dr. Rao served in many committees of Govt. of India and Canadian BiofuelNet. He has bred superior sugar or biomass yielding sorghum genetic resources (varieties/hybrids-) and hybrid seed parental lines (60) and delivered as International Public Goods (IPG). He has published six books on sorghum and over 50

peer reviewed publications. Currently he is exploring the nutraceutical properties of muscadine grapes at FAMU, USA. His expertise areas are plant breeding, genetic enhancement of sugars and biomass, host-pathogen interactions and seed systems. *Links:* Google Scholar <https://scholar.google.com/citations?user=auPcwb0AAAAJ&hl=en> (Citations =>765, H index=15).