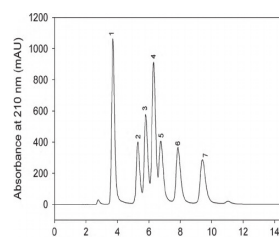
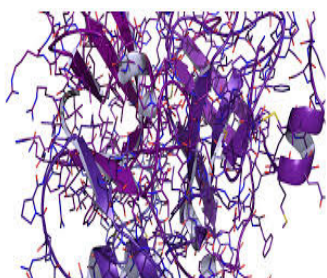


**SOCIETY FOR PLANT BIOCHEMISTRY AND BIOTECHNOLOGY**  
New Delhi

**Proteomics and Metabolomics: Application in Agriculture  
for Enhancing Grains Productivity and Processability**



**One Day Workshop Program organized under the aegis of SPBB, New Delhi**

**Ranjeet R Kumar, Suneha Goswami, Vinutha T.**

**Organizing Secretary**

**Division of Biochemistry  
ICAR-Indian Agricultural Research Institute  
New Delhi-12**



# One Day Workshop Program

on

## Proteomics and Metabolomics: Application in Agriculture for Enhancing Grains Productivity and Processability (19<sup>th</sup> August, 2019)

Funded by  
SOCIETY FOR PLANT BIOCHEMISTRY AND BIOTECHNOLOGY  
New Delhi



**Ranjeet R Kumar, Suneha Goswami, Vinutha T.**  
Organizing Secretary

Division of Biochemistry  
ICAR-Indian Agricultural Research Institute  
New Delhi-12

E-mail: [ranjeetranjaniari@gmail.com](mailto:ranjeetranjaniari@gmail.com)

2019

# INTRODUCTION

Proteomics involve the large-scale study of proteins, their structure and physiological role or functions. Proteins are quintessential cellular components or biomolecules in any living organism. The term proteomics first appeared in 1997. To be precise and specific, proteome is the entire complement or database or set of proteins produced by a living organism. The proteome is a broad term that also encompasses the alterations or modifications produced in native protein when organisms are subjected to a plethora of changes.

Proteomics is used to investigate when and where proteins are expressed; rates of protein production, degradation, and steady-state abundance; how proteins are modified (for example, post-translational modifications (PTMs) such as phosphorylation); the movement of proteins between subcellular compartments; the involvement of proteins in metabolic pathways; how proteins interact with one another, etc.

With the support of high-throughput technologies, a huge volume of proteomics data is collected. Bioinformatics databases are established to handle enormous quantity of data and its storage. Various bioinformatics tools are developed for 3D structure prediction, protein domain and motif analysis, rapid analysis of protein-protein interaction and data analysis of MS. The alignment tools are helpful for sequence and structure alignment to discover the evolutionary relationship. Proteome analysis provides the complete depiction of structural and functional information of cell as well as the response mechanism of cell against various types of stress using single or multiple proteomics techniques.

Metabolomics provides valuable insight into the underlying processes of cellular metabolism and its regulation, diseases and, in turn overall quality of the crops. To understand regulation of the biosynthesis of important metabolites and the molecular mechanisms of several biochemical pathways in plant cell on the basis of how the metabolite fluxes divided between the biosynthesis of any metabolite and its precursor pathways, one should link metabolite network to gene through analysing the metabolome of seed. Such information supports the identification of biomarkers which are having immense value in identification of superior trait containing crops.

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 2009). Now-days, major part of the world is suffering from nutritional deficiency, reason, being the poverty and low quality of available food products. A nutritional deficiency occurs when the body doesn't absorb or get from food the necessary amount of a nutrient. Deficiencies can lead to a variety of health problems. The loss/depletion in the nutrient and quality of major food grains, vegetables and fruits are major grave concern.

Millet is known for its umpteen health benefits and has been given prime importance in last few years, as evident from the celebration of year 2018 as “National Year of Millet” by India and Year 2023 as “International Year of Millet” by FAO. Packed with the goodness of iron, protein, fibre, and minerals such as calcium, magnesium, zinc, etc. millet has provide the potential substitute for the cereals. Out of all millets, Ragi has special niche due to high nutrient dense grains. Ragi is a super grain hardy crop that can withstand the vagaries of nature and is perfectly suited for the Indian climatic conditions. Ragi is a rich source of good carbohydrates and is one of the best non-dairy sources of calcium (344 mg/100 g flour) when compared to any other grains. The grain's seed coat is abundant in polyphenols and dietary fibres as compared to rice, maize or wheat. It has very low glycemic index and also helps in maintaining young and youthful skin due to the presence of vital amino acids like Methionine and Lysine. The high fiber content of ragi also helps manage cholesterol problems. Several processing technologies were found to improve nutritional characteristics of millets. Traditional household food processing and preparation methods have been used from hundreds of years to enhance the bioavailability of micronutrients in plant-based diets. These include thermal processing, mechanical processing, soaking, fermentation, and germination/malting. These procedures aim to increase the physicochemical accessibility of micronutrients, decrease the content of antinutrients, such as phytates, or increase the content of compounds that improve bioavailability. Utilization of millet grains as food is still limited to populations in rural areas. This is due to lack of innovative millet processing technologies. There is a need to develop cheap and user friendly millet processing technologies to enhance the utilization of nutri-cereals to larger part of poor and downtrodden population dwelling in developing countries in order to craved a world free of nutritional hunger.

The present workshop has been planned with the following objectives.

## OBJECTIVES

- a) To discuss the importance and future of proteomics and metabolomics in Agriculture.
- b) To discuss different proteomics and metabolomics tools for characterizing the Defence Network and nutritional quality of grains.
- c) To explore different bioinformatics tools used in proteomics and metabolomics.
- d) To develop a policy paper on application of proteomics and metabolomics in Agriculture for enhancing the productivity of important crops

## EXPECTED PARTICIPANTS

The workshop has been planned for one day only (19<sup>th</sup> August, 2019) and we are expecting ~50-75 participants from diverse areas of Agriculture and other allied sciences.

## PROGRAM SCHEDULE

<b>08:30 - 09:00 am</b>	Registration of the participants	<b>Dr. Vinutha T.</b> Organizing Secretary
<b>09:00 – 09:15 am</b>	Welcome address and brief introduction about SPBB	<b>Secretary</b> SPBB
<b>09:15 – 09:30</b>	Remarks of President SPBB	<b>President/Vice President</b> SPBB
<b>09:30 – 09:45 am</b>	Brief of the training program	<b>Dr. Ranjeet R. Kumar,</b> Organizing Secretary
<b>09:45 - 10:00 am</b>	Introduction of participants	
<b>10:00 – 10:30 am</b>	High Tea	
<b>10:30 - 01:30 pm</b>	Technical Session-I on “ <b>Proteomics</b> ”	Invitee Talk ( <b>6 speakers, 30 min each</b> )
<b>1:30-2:30 pm</b>	Lunch Break	

<b>2:30 – 3:30 pm</b>	Technical session-II on “ <b>Metabolomics</b> ”	Invitee Talk for young scientists <b>(4 speakers, 15 min each)</b>
<b>3:30 – 04:00 pm</b>	Poster Session with High Tea	
<b>04:00 – 05:00 pm</b>	Panel Discussion on “ <b>Finger Millet: a potential substitute for cereals and its role in food security</b> ”	(Panelists - 5, presentation of 10 min each with 1 slide)
<b>05:00 – 05.30 pm</b>	Open Interactive Session	
<b>05:30 – 06:00 pm</b>	Distribution of certificates	
<b>06:00 – 06:10 pm</b>	Vote of Thanks	<b>Dr. Suneha Goswami</b> Organizing Secretary

## ELIGIBILITY

- I. Master’s Degree in Plant Biochemistry, Plant Molecular Biology & Biotechnology and allied disciplines.
- II. Students (M.Sc & PhD), Assistant Professor, ARS scientist, Subject Matter Specialist from KVKs and equivalent in the above mentioned subject under Agricultural University / ICAR Institutes/ KVKs.

## REGISTRATION FEE

Registration fee of **Rs. 500/-** (Students and Research Scholar), **Rs 1000/-** (for SPBB members) and **Rs. 1500/-** (for others) is mandatory for all the participants. The Demand draft or local cheque should be drawn in favour of “SPBB Annual Activities” payable at New Delhi.

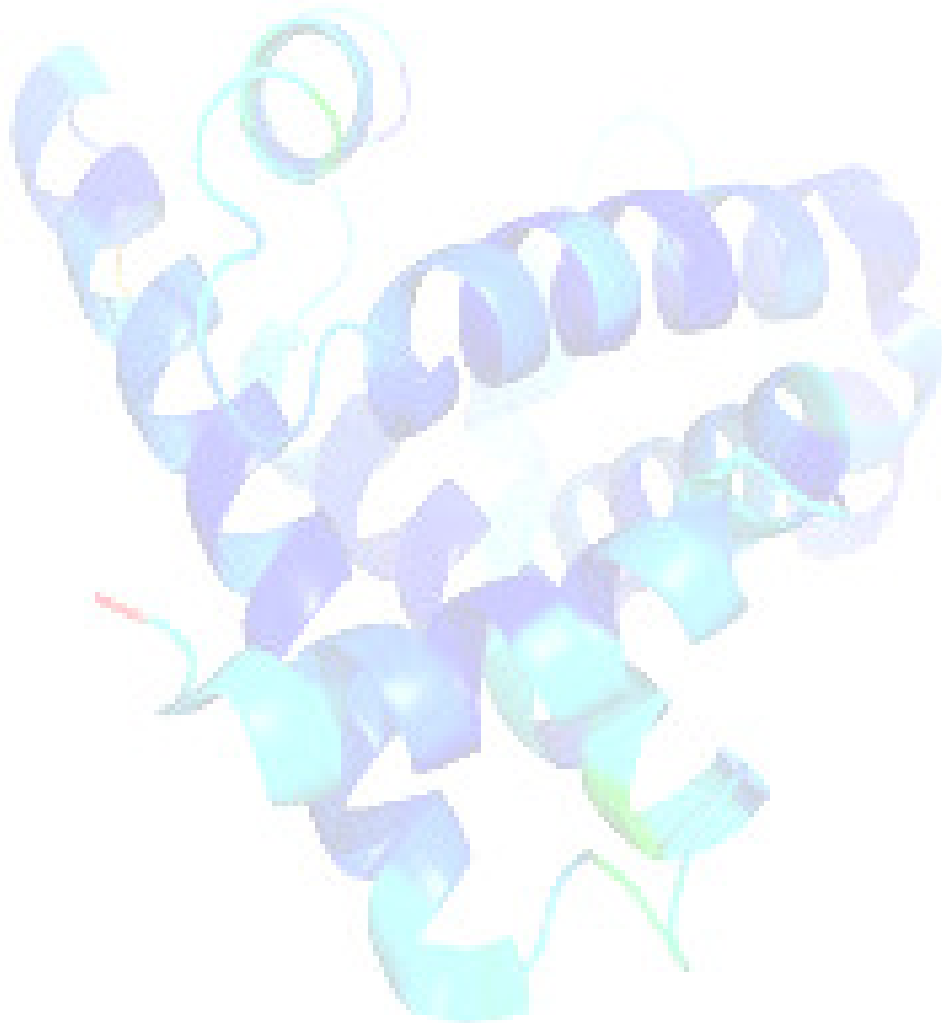
Online Transaction: as per mentioned bank details in the registration form

## MODE OF APPLICATION

The research scholars/ scientists interested in participating the workshop should apply through proper channel in the given proforma. The application from the candidates should be directly sent to the organizing

secretary (ranjeetranjaniari@gmail.com). Selection of participants will be purely on first come first served basis. A total of 50-75 participants will be selected for this workshop.

\*No TA/DA or accommodation will be provided.



## ORGANIZING SECRETARY



**Dr. R. R. Kumar**

**Senior Scientist**  
**Division of Biochemistry**  
**ICAR-IARI, New Delhi**  
**E-mail: [ranjeetranjaniari@gmail.com](mailto:ranjeetranjaniari@gmail.com)**  
**[Ranjeet.kumar@icar.gov.in](mailto:Ranjeet.kumar@icar.gov.in)**  
**Tel. no. 8368958133/ 9968563788**



**Dr. Suneha Goswami**

**Scientist**  
**Division of Biochemistry**  
**ICAR-IARI, New Delhi**  
**E-mail: [suneha08@gmail.com](mailto:suneha08@gmail.com)**  
**Tel. no. 7021803354**

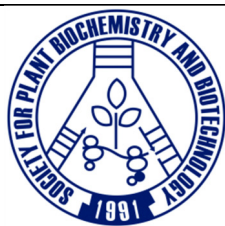


**Dr. Vinutha T.**

**Scientist**  
**Division of Biochemistry**  
**ICAR-IARI, New Delhi**  
**E-mail: [vinuthabiochem@gmail.com](mailto:vinuthabiochem@gmail.com)**  
**Tel. no. 9968599250**



## SPBB ANNUAL ACTIVITIES



*One day workshop  
On  
Proteomics and metabolomics: application in  
agriculture for enhancing productivity and  
processability*



### REGISTRATION FORM

SPBB Membership no.	
Name in Block letters	
Designation	
Affiliation/Institute	
Mailing Address	
Category	Student*/ Member/ Non-Member
Email ID	
Contact No.	
Registration fee details:	
	(Signature with date)

### **Mode of Payment**

<p><i>Online:</i> Account Name: SPBB Annual Activities Bank: Syndicate Bank; Branch: Pusa Campus Account No: 90291010004451 IFSC Code: SYNB0009029</p>	<p><i>Offline:</i> Demand Draft/Cheque should be drawn in favour of 'SPBB Annual Activities' payable at New Delhi (<i>Outstation cheque will not be accepted</i>)</p>
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Please return the duly filled form to:  
**Dr. Ranjeet Ranjan Kumar/ Dr. Suneha Goswami/Dr. Vinutha T.**  
 Organising Secretaries  
 SPBB Annual Activities , Division of Biochemistry  
 ICAR-IARI, Pusa Campus, New Delhi – 110012  
 Email: [ranjeetranjaniari@gmail.com](mailto:ranjeetranjaniari@gmail.com); Contact: 8368958133

*\*Copy of Identity card issued by University should be submitted along with the registration form*