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Metabolomics: A powerful tool for functional genomics

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Metabolomics, one of the newest Omics, is a multi-disciplinary science comprising areas of nutrition, genetics, biotechnology, cytology, chemistry, agriculture, ecology, chemometrics, informatics and bioscience. In metabolomics, metabolite targeted analysis refers to detection and precise quantification of single or small set of target compounds, whereas metabolite profiling provides identification and approximate quantification of group of metabolites associated with specific pathways. Metabolite fingerprinting is used for complete metabolome comparison. Food metabolomics enables analysis of relationship between food function and their components; and useful for development of evaluation system of food function, improvement of quality food production, food preservation, etc. Plant metabolomics have been employed in genomics-assisted selection for crop improvement. Metabolite profiling also been used to ascertain metabolic response to herbicide, equivalence of genetically modified and conventional crops and genotypes classification, investigate metabolic regulation and in studies related to environmental or genetic perturbations. Microbial metabolomics enables evaluation of food and fermentation microbes, and analysis of transgenic microbes for their function and performance. Metabolomics provides opportunities for characterization of pathways and metabolite network in plants experiencing environmental stress and gene functions discovery. Metabolomics as integral component of genomics have been used for identification of candidate genes and to assess the effect of specific genetic modifications for comprehensive understanding of regulation of metabolic networks. Environmental metabolomics have been employed in characterization of interactions of organisms with their environment. All together, metabolomic approaches expected to open-up new ways to understand organism-environment interactions, and assessment of gene function and organism health.

Biography

Barku M Mahale is Ph.D. scholar from Univ. of Agricultural Science, Dharwad. He worked on functional modulation of selected miRNAs in heat shock regimes in *Arabidopsis thaliana* and currently focusing on the development of transgenic pigeonpea for pod borer resistance. He published three short articles and given oral presentation in international conference on "Perspective of climate change and plant diversity inter-relation" at Manipal Life Science Center during 2011. He was JNU scholar for M.Sc. program.

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Productivity enhancement of groundnut (*Arachis hypogaea* L.) through multi nutrient customized fertilizer application under irrigated condition

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The productivity of groundnut is highly versatile and much lower than other oilseed crops of India. In recent years yield level was decreased due to improper management, climatic condition coupled with lack of potential varieties. Among better management practices to achieve sustained productivity balanced nutrition is very crucial. In addition to major nutrients, sulphur, zinc and boron are also critical in groundnut nutrition. In Karnataka most of the groundnut growing regions are highly deficient in sulphur and zinc. Customized fertilizer is a mixture of N-P₂O₅-K₂O-S-Zn-B (13-24-12-4-0.5-0.2 kg/100kg). It has the advantage over conventional fertilizers that supplying all the necessary nutrients required for the groundnut crop. A field experiment was conducted at Main Agricultural Research Station, Raichur during rainy seasons of 2010-11 and 2011-12. Soils of the experimental site was sandy loam with pH 6.7. Experiment was laid out in randomized complete block design repeated thrice. Different levels of customized fertilizer compared with state recommended fertilizer rate (25-50-25 kg NPK/ha+10 t FYM+500 kg gypsum +10 kg zinc sulphate). Results of the study have shown that application of 150% of customized fertilizer (375 kg/ha) enhances grain yield (2818 kg/ha) and economic returns (Rs. 68182/ha) over state recommended fertilizers and also reduce cost of cultivation. Results have inferred that customized fertilizers application to groundnut crop can reduce cost of cultivation, reduce quantity of fertilizers in addition to increased yield and higher returns per rupee invested.

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