



Category: Plant Genomics

‘OMICS’-approach to regulate ripening and enhance fruit shelf-life in banana: an important fruit crop for food security

Subhankar Mohanty, Mahabir Prasad Das and Giridara-Kumar Surabhi*

Plant Molecular Biology & Genomics Lab., Regional Plant Resource Centre, Bhubaneswar 751015, Odisha, INDIA

Presenting and *Corresponding author: surabhighk@gmail.com

Abstract

Banana belonging to family Musaceae is the fourth most important crop after rice, wheat and corn. Fruit harvested from bananas and plantains are important components of food-security in the tropical world and provide main source of income to the agrarians through local and international trade. India stands as the major producer of banana with an annual production of 28.4 million tons on 796,500 ha, which contribute to 27% of the world production and about 38% of the total fruit crop production in the nation. In developing countries, post-harvest losses of fruits and vegetables account for almost 50% of the produce. India, the world's second largest producer of fruits and vegetables, loses 35–40% of the produce due to excessive softening, every year. Therefore, ripening associated softening is the obvious target to extend the fruit shelf-life and to control the post-harvest losses globally.

In this study, proteins were phenol extracted from different fruit tissues (peel and pulp) during different developmental (40, 60, 80 and 90-days after flowering) and ripening stages (2, 4, 6, 8, 10 and 12-days after ripening) of banana (cv.Grand naine), and resolved using global proteome approach. 2-D gel images were further submitted to powerful image analysis software (Image Master Platinum, Version.7.1) for qualitative and quantitative analysis. Several protein spots showed fold-change (increase and decrease in abundance), and some protein spots are unique to certain developmental and ripening stages, after image analysis. Further, spots of interest were subjected to both MALDI-TOF/TOF-MS and LC-MS/MS (Q-TOF) mass spectrophotometry for protein mass fingerprinting and peptide sequencing, after tryptic digestion of the excised protein spots. In parallel, experiments are in progress to subject the samples for transcriptome (RNAseq.) analysis. Based on protein/gene sequence information corresponding genes will be isolated and cloned, and knowledge will be utilized for RNAi constructs preparation to define individual role of identified key proteins/genes in ripening and enhancing fruit shelf-life in banana.

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