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Understanding the molecular mechanisms underlying high grain calcium content in finger millet (*Eleusine coracana*): Paving way to calcium biofortification

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Understanding the molecular mechanisms underlying the uptake, transport, accumulation and of the existing genetic variation for storage of minerals in grains is of utmost importance for development of biofortified crops. Finger millet (*Eleusine coracana*) has an immense potential as a food security crop due to its high nutritional profile and exceptionally high calcium (Ca) content. Seeds, tubers and fruits are generally low in Ca content however, finger millet grains has been reported to contain Ca as high as 376-515 mg/100 g. In order to understand the molecular machinery associated with this high Ca accumulation and to identify the candidate genes and proteins, a combination of biochemical, functional genomics and proteomics approaches were used. Genotypes with contrasting grain Ca content were selected. Members of calcium transporters and sensors i.e., Calmodulin and CaM/Ca dependent kinases were isolated and transcriptional expression analysis of these genes was carried out in various tissues i.e., from root tips to different stages of developing spikes amongst the contrasting genotypes. Calmodulin (CaM) protein was also assessed in their grains using anti-CaM antibodies. Results correlated the variable Ca accumulation in different tissues to differential expression of these genes. Immmuno-detection showed higher CaM in the grains of high Ca accumulating genotype. Also, higher transcript levels of CaM and Ca transporters was seen in the high Ca accumulating genotype, which might cause greater stimulation of the downstream calcium transport machinery leading to elevated calcium accumulation. The results provide a model for explaining the mechanism of elevated calcium accumulation in finger millet and pave way for development of nutraceuticals or designer crops.

Biography

Neelofar Mirza has completed her PhD in Molecular Biology & Biotechnology from G. B. Pant University of Agriculture & Technology, India and has since been involved in Teaching and Research in Jamia Millia Islamia University and Indian Agriculture Research Institute. She is currently working as a Research Associate on crop related NGS technology at National Bureau of Plant Genetic Resources, New Delhi, India. She has six publications to her credit and has won the USSTC Young Scientist Award in 2013.

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