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The biochemical and molecular basis of succinate mediated (catabolite) repression of mineral phosphate solubilization in nitrogen fixing *Klebsiella pneumoniae*

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Klebsiella pneumoniae SM6 & SM11 strains were studied for their mineral phosphate solubilizing (MPS) ability. This phenotype was due to oxalic acid production and it was transcriptionally repressed by IclR in presence of succinate. Oxalic acid production and expression of genes of the glyoxylate shunt (aceBAK) was found only in glucose but not in succinate- and glucose+succinate-grown cells. This phenomenon is known as Succinate Mediated Catabolite Repression (SMCR). IclR, repressor of aceBAK operon, was inactivated using an allelic exchange system resulting in derepressed MPS phenotype through constitutive expression of the glyoxylate shunt. Insertional inactivation of iclR resulted in increased activity of the glyoxylate shunt enzymes even in succinate-grown cells. An augmented phosphate solubilization up to 54 and 59% was attained in glucose+succinate-grown SM6Δ and SM11Δ strains respectively as compared to wildtype strains. Wheat seeds inoculated with wildtype SM6 and SM11 improved both root and shoot length by 1.2 fold. However, iclR deletion SM6Δ and SM11Δ strains increased root and shoot length by 1.5 and 1.4 folds, respectively, compared to uninoculated controls. The repressor inactivated phosphate solubilizers better served the purpose of constitutive phosphate solubilization in pot experiments, where presence of other carbon sources (e.g., succinate) might repress mineral phosphate solubilization phenotype of wildtype strains.

Biography

Shalini Rajkumar is Associate Professor at Institute of Science, Nirma University, Ahmedabad, Gujarat, India. She did her PhD research at IARI, New Delhi. She has published more than 32 research articles, book chapters and filed a patent in fields like Molecular physiology of PGPR, Catabolite repression of MPS Phenotype, *Actinomycetes* Diversity, Breach of Rhizobium legume specificity

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