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Stable isotope based metabolic profiling revealedcatabolic multitasking of L-phenylalaninein *Rubrivivaxbenzoatilyticus* JA2

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Rubrivivaxbenzoatilyticus JA2 is a metabolically versatileanoxygenic photosynthetic bacterium capable of growing under different growth modes by utilising wide array of organic compounds.It has remarkable ability to transform aromatic compounds such as L-tryptophan, anthranilate to indoles and L-phenylalanine andL-tyrosine to phenolic compounds.Though strain JA2 does not grow at the expense of L-phenylalanine as sole carbon source, it utilises L-phenylalanine for its growth as sole source of nitrogen.It can grow under different growth modes in the presence ofL-phenylalanine, possibly by employing different metabolic routes and evidences suggest that metabolic patterns are defined by change in growth modes.In view of this,an attempt was made to decipher the metabolic variations to L-phenylalanine and its catabolism in strain JA2under oxic and anoxicconditions by employing metabolomics approach. Comparative GC-MS based global metabolic footprinting followed by multivariate statistical analysis revealed that L-phenylalanine significantly altered the metabolisms in anaerobic and aerobic conditions. Principal Component Analysis (PCA) and Partial Least Squares Discriminant Analysis (PLS-DA) models separated the aerobic and anaerobic groups indicating the metabolic variations influenced by L-phenylalanine. Further, fold change analysis revealed thespecific metabolic pathwaysmodulated.LC-MS based metabolic profiling revealed Ehrlich'spathway of L-phenylalanine catabolism along with other aryl metabolites under anaerobic condition.Under aerobic conditions,L-phenylalanine channelized to synthesis of other phenolic compounds (pigments) apart from Ehrlich's pathway, which are yet to be characterized. The findings of the present studyrevealed dynamic nature of metabolisms and catabolic shifts to changing growth modes in strain JA2.

Biography

M Lakshmi prasuna is currently pursuing her doctoral studies at Department of Plant Sciences, University of Hyderabad, India. Her work spans on bacterial physiology and metabolism of a model system, Rubrivivaxbenzoatilyticus JA2 a phototrophic Betaproteobacterium which is metabolically versatile. Her study is focused on aromatic amino acid (L-phenylalanine) metabolism under oxic/anoxic growth modes coupled to aryl-metabolites synthesis. Her studies demonstrated insights of catabolic complexity of strain by employing stable isotope tracers and global metabolic profiling. Her work has been published in the journal, Microbiological Research and also part of genome sequence project of this organism has been published in Journal of Bacteriology.

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