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Metabolomics assisted bio-prospecting of halotolerant bacteria for novel compatible solutes

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Compatible solutes accumulated by halotolerant and halophilic bacteria to achieve osmotic balance at high salt concentrations possess protein stabilizing and chaperoning properties. The diversity observed in the hypersaline environments and the inhabiting halophilic microorganisms awaits the exploration of these extremophiles for discovery of naturally occurring potent compatible solutes. We studied the accumulation of compatible solutes in four halotolerant bacteria isolated from the salterns of Arabian seacoast, India, characterized as *Halomonas hydrothermalis* strain VITP09, *Bacillus aquimaris* strain VITP04, *Virgibacillus dokdonensis* strain VITP14, *Planococcus maritimus* strain VITP21 in response to salt stress in two types of growth media, minimal (M9) and complex (LB) media, using 1H NMR based metabolomics supported with the data from TLC, 2D TOCSY and ESI-MS studies. The analysis of intracellular polar metabolite pools showed glycine betaine as the major solute along with glutamate (VITP9, VITP14 and VITP21), proline (VITP4, VITP21), N6-acetyl lysine (VITP21, VITP14) and an unknown diaminoacid (VITP4) as minor solutes used for osmoregulation by the cells cultured in complex media. Whereas, the cells cultured in minimal media accumulated ectoine (VITP9, VITP14), proline (VITP4), N6-acetyl lysine (VITP21) and an unknown disaccharide (VITP21) as major solutes along with glutamate (VITP9, VITP14) and an unknown diaminoacid (VITP4) as minor solutes. The structures of the unknown compounds were identified using NMR and ESI-MS. These halotolerant bacterial strains could be further studied for the development of biochemical methods for the production of these potential natural products.

Biography

Nidhya N Joghee is doing her Ph.D. in VIT University. She is a Research Associate in School of Biosciences and Technology, VIT University. She has given research presentations in national and international conferences.

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