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Proteomic investigation on the effect of Tween 80 on growth of *Lactobacillus casei* (GCRL 163)

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Our aim was to investigate bacterial growth patterns and corresponding proteomes of *Lactobacillus casei* GCRL 163 (a cheddar cheese isolate) when cultured in modified MRS broths without glucose and acetate as carbon sources (fermenters operated anaerobically, pH 6.5). Growth in the basal medium (peptone, yeast extract and MRS salts) was minimal but was significantly improved by addition of 0.1% Tween 80 or 0.2% triammonium citrate with highest growth rate and extent observed for citrate plus Tween 80. Stationary-phase cells were lysed then protein trypsin digested and analyzed by nano LC-MS/MS. Differentially expressed proteins were identified using two-sided t-test (Perseus software version 1.5.031) with a permutation based FDR of 0.05. In the presence of Tween 80, proteins related to carbohydrate metabolism (aldehyde-alcohol dehydrogenase and glucosamine-6-phosphate deaminase), tricarboxylic acid pathway (pyruvate carboxylase subunit B) and phosphotransferases were significantly up-regulated whereas lipid-related metabolism proteins were significantly depressed compared to the basal medium control or citrate grown cells. Tween 80 plus citrate cultures showed abundant levels of lipid related metabolism proteins and ABC type transporter substrate binding proteins (absent in cells grown in Tween 80 alone) that facilitated co-metabolism of substrates, producing higher growth rates. Comparison across proteomes identified the involvement of several uncharacterized proteins related to MerR transcriptional regulation of growth during starvation and involvement of autoinducer-2 kinase in sensing or phosphotransport of normally poorly-utilized substrates. These data suggest that *Lb. casei* GCRL 163 can use Tween 80 and citrate alone or Tween 80 in combination with citrate as a carbon source, sustaining growth in absence of sugars.

Biography

Syed Shahzad Shah is currently pursuing his PhD degree and is working on a project entitled "Probiotics survival in food products and retention of probiotics traits" based at the Food Safety Centre, Tasmanian Institute of Agriculture, University of Tasmania, Australia. He is the winner of Endeavour Executive Award (2010) and completed a professional developed course at UTAS. Previously he has served in food industry sector for 8 years and as a Lecturer in Food Technology at Allama Iqbal Open University Islamabad, Pakistan for 12 years. He has delivered nine research presentations at international conferences with publications in conference proceedings and one research paper publication.

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