Study of Stress Factors on Dipicolinic Acid (DPA) Formation by Bacillus Subtilis PTCC1023 and Bacillus Cereus PTCC1015

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Background & Objectives: Dipicolinic acid (pyridne 2, 6 dicarboxylic acid) is a major component of bacterial spore and is unique in that it has been found only in bacterial endospore comprising 5-15% of the spore dry weight. The spores release DPA during germination or upon hydrolysis or heating. The biosynthetic precursor to DPA,dihydro-dipicolinic acid (DHDPA), is produced by DHDPA synthase within the lysine biosynthesis pathway. In *Bacillus subtilis*, and most other bacilli and clostridia, DHDPA is oxidized to DPA by the products of the spoVF operon, which is encoded by dapA, and disruption of this gene results in the formation of spores deficient in DPA.

Methods: In this study the effects of environmental stresses on the production of DPA by *Bacillus subtilis* PTCC 1023 and Bacillus cereus PTCC 1015 strains were evaluated. The stress responses were studied in nutrient broth medium and DPA estimation was determined by Janssen et.al Methods.

Results: Results showed that the amount of DPA in B.subtilis and B.cereus decreased upon increasing acidic condition and salt in the medium. DPA formation was more significant at alkaline pH rather than acidic pH. DPA formation decreased in the medium containing 5-55% of ethanol. DPA formation was higher in optimum temperature at 30 ºC in comparing to the reference strains. The cell concentration decreased at 90 ºC and lower level of DPA detected in this stage.

Conclusion: A comprehensive understanding of this crucial stress response is essential not only for bacterial physiology but also for applied microbiology, including pathogenicity and pathogen control.

Keywords: *Bacillus subtilis* PTCC1023 Stress Factors; Dipicolinic Acid; *Bacillus cereus* PTCC1015