

Transcriptional analysis of nitrogen fixation in *Paenibacillus durus* during growth in nitrogen-enriched medium

ABSTRACT

Paenibacillus durus strain ATCC 35681^T is a Gram-positive diazotroph that displayed capability of fixing nitrogen even in the presence of nitrate or ammonium. However, the nitrogen fixation activity was detected only at day 1 of growth when cultured in liquid nitrogen-enriched medium. The transcripts of all the *nifH* homologues were present throughout the 9-day study. When grown in nitrogen-depleted medium, nitrogenase activities occurred from day 1 until day 6 and the *nifH* transcripts were also present during the course of the study albeit at different levels. In both studies, the absence of nitrogen fixation activity regardless of the presence of the *nifH* transcripts raised the possibility of a post-transcriptional or post-translational regulation of the system. A putative SigA box sequence was found upstream of the transcription start site of *nifB1*, the first gene in the major nitrogen fixation cluster. The upstream region of *nifB2* showed a promoter recognizable by SigE, a sigma factor normally involved in sporulation.