Abstract

We have previously characterized a *Bacillus subtilis* mutant defective in growth and osmoadaptation under limited K^+ concentrations. In this mutant, the *yxkO* gene encoding a putative ribokinase is disrupted. This gene is supposed to belong to the sigma B operon and its expression is induced after osmotic, heat and ethanol shock. In comparison to the wild type, this mutation causes pleiotropic changes in host phenotype. In addition to its osmosensitivity, the mutant differs in cell shape, motility and ability to produce endospores.

Our goal was to focus on manifestations of the mutation in the *yxkO* gene in other bacteria of the genus *Bacillus*. Using plasmid pMUTIN4 we have prepared mutants with disruptions of this gene derived from *Bacillus amyloliquefaciens* and *Bacillus subtilis subsp. spizizenii* strains differing in the *yxkO* surroundings and in the level of laboratory domestication.

As in the previous study (with laboratory strain *Bacillus subtilis* 168) we demonstrate impaired ability of the mutant strain derived from *Bacillus amyloliquefaciens* to grow in potassium limitation and osmotic shock.

We have studied this phenomenon at the level of the growth dynamics of the bacterial culture. We have also detected an increased sensitivity of the strain derived from *Bacillus amyloliquefaciens* to tetracycline, changes in cell morphology and motility. The same mutation natural isolate of *Bacillus subtilis subsp. spizizenii* caused significantly lower phenotypic manifestation than the laboratory strain.

New contribution to describe the complex role of *yxkO* gene in motility was the study of the swarming ability of these mutant strains. It was shown that this type of movement was affected just in mutant strains derived from *Bacillus amyloliquefaciens.*

Furthermore, in order to study the impact of *yxkO* gene disruption on the general stress response of *Bacillus subtilis* 168 we have prepared a strain with detectable expression of *ctc* gene, which belongs to the general stress response. Our results show a significant reduction in expression of the general stress response genes in strains with mutation in *yxkO* gene.

Key words*: Bacillus subtilis, Bacillus amyloliquefaciens, Bacillus subtilis subsp. spizizenii,* osmoadaptation, general stress response, motility*, yxkO.*