Effect of inactivation of uncharacterized protein Lmo0946 on expression of Hfq chaperone of Listeria monocytogenes

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Listeria monocytogenes (*Lm*) is a Gram-positive pathogen which is able to survive exposure to highly stress conditions. One of the bacterial proteins which plays a crucial role in response to adverse conditions is Hfq - the RNA chaperone. Hfq of *Lm* is involved in the ability to tolerate osmotic and ethanol stress as well as contributes to long-term survival under starvation and pathogenesis process. Recent research led us to identification of *lmo0946* as an important gene in a stress response of *Lm*. Interestingly, Lmo0946 is small protein with unknown function, and the function of its homologs, found mainly in the Firmicutes phylum, has not been established yet. Based on the convergent phenotype of mutants in *hfq* and *lmo0946* genes, it was hypothesized that effects of the *lmo0946* inactivation may result from the influence on *hfq* expression. Therefore, the aim of the study was to determine the effect of inactivation of *lmo0946* on transcription and translation of the *hfq* gene. At first transcriptional and translational fusions of the *hfq* promoter and *lacZ* reporter gene were constructed and introduced into wild-type *Lm* and *lmo0946* mutant strain. The results of β-galactosidase assay revealed decrease in the reporter activities in *lmo0946* mutant strain as compared to the wild-type strain, both in transcriptional and translational fusions in most of selected culture conditions. However, due to overall low level of reporter activities, further analysis was performed using direct methods i.e. Northern blot and Western blot. The results of these studies revealed that the transcript and protein Hfq were present only in *lmo0946* mutant strain, while in the wild-type strain were below the detection threshold. The obtained results imply that the lack of Lmo0946 affects expression of Hfq chaperone. Further studies are required to elucidate the exact nature of the observed phenomenon. This work was supported by a grant no. 2016/21/B/NZ6/00963 from the National Science Center, Poland.