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SIGB AND AGRA REGULATION IN LISTERIA MONOCYTOGENES: EFFECT ON SURVIVAL IN SOIL/RHIZOSPHERE UNDER BIOTIC AND ABIOTIC CONDITIONS

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Backgrounds

Listeria monocytogenes is the agent of listeriosis, a life-threatening condition in at-risk people. Complex transmission routes between outdoor environments and the food chain result in foodstuff contamination. Sensing of environmental changes can trigger regulation of gene expression, allowing bacteria to adapt their physiology and survive. The Agr cell-cell communication system transcription regulator AgrA is triggered during several environmental conditions including soil, an important reservoir of *L. monocytogenes*. The RNA polymerase σ^B factor aids survival in several stress conditions and may be required for *L. monocytogenes* survival in the soil environment.

Objectives

This study aims to investigate the involvement of AgrA and σ^B in the regulatory network of *L. monocytogenes* during saprophytic life in soil and rhizosphere according to the background biotic environment.

Methods

A collection of in-frame deletion mutant strains (Δ*agrA*, $\Delta\sigma^B$ and Δ*agrA*+$\Delta\sigma^B$) was constructed from parental *L. monocytogenes* EGD-e. Strains were inoculated into clay soil mesocosms at different water holding capacities and with or without background microbiota. Kinetics of strains survival was followed during incubation for 14 days. Growth was investigated in the rhizosphere of *Festuca arundinacea* plants *in vitro*. One-week kinetics of strains survival was performed during incubation into climatic chamber.

Conclusions

Depending on the incubation conditions, the fitness of the deletion mutants were affected. During its saprophytic life in soil habitat, *L. monocytogenes* have to cope with ever-changing environmental conditions and adapt in order to sustain life. Integration of various stimuli results in a coordinated response including communication and stress response systems through AgrA- and σ^B-mediated regulation.