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Study of dltx mutant in *Bacillus thuringiensis* on virulence, induction of immune system ana persistence in *Galleria mellonella*

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Bacillus cereus is a spore-forming gram positive bacterium. It causes gastrointestinal infections (emesis and diarrhea) but can also be responsible for severe opportunistic diseases. The D-alanylation is a resistance mechanism in Bacillus cereus against antimicrobial peptides (AMPs). This mechanism is based on the incorporation of D-alanine to teichoic acids (ATs) of the cell wall to reduce the negative charge. This process is encoded by a dltXABCD operon. The activities of the proteins encoded by the genes dltABCD have been widely described. The dltX gene located immediately upstream of dltA has been studied only recently. This study (Kamar et al.) has demonstrated that DltX plays a direct role in resistance to PAMs, and is essential for the incorporation of D-alanine to teichoic acids. Its absence greatly affects the surface properties and the virulence of the bacterium.

The aim of this study was to test the virulence of the mutant strain orally, to compare the level of induction of the immune system of the host and the persistence of wild and mutant strains in the host. Finally we looked at the effect of the mutation on biofilm formation. The tests were performed on Galleria mellonella as an animal model, using the *Bacillus thuringiensis* strain 407 and biofilm formation was examined in the *HCT* medium on glass and polyvinyl chloride. The results of this work indicate that, by ingestion, ΔdltX mutant is less virulent than the wild strain. Pre-immunization experiments with killed bacteria or the culture supernatant increases protection of *G. mellonella* of Bacillus cereus/ *Bacillus thuringiensis* and the dltX mutant seems unaffected the ability to induce the immune response of the host. Co-infection experiments with the wild strain reveal that dltX mutant lost the ability to persist in the gut of the insect, and is therefore unable to colonize an immunocompetent host. Finally, preliminary results show that the mutant strain is also affected in its ability to form biofilms on inert surfaces.

Biography

Ghenwa El Hariri Cherbagi has Master degree in Food Chemistry and a double degree in Biochemistry/Science from Saint Joseph University and internship Master 2 in MICALIS Institute, INRA in the team "Microbial Genetics and Environment" (Jouy-en-Josas - France). She worked on *Bacillus cereus/ thuringiensis* bacteria resistance mechanisms against the immune system. This work was particularly on the role of dltX unknown gene. She also has experience in extraction of polyphenolic compounds in vine shoots, and aflatoxin in milk products.

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