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SIMPÓSIO BRASILEIRO DE MICROBIOLOGIA APLICADA

ANAIS

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TREHALOSE METABOLISM INFLUENCES IN *Escherichia coli* STRAIN MT78 Type 1 FIMBRIAE PRODUCTION

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Trehalose is a sugar present in bacteria, yeasts, and plants. In *Escherichia coli*, trehalose can be metabolized as a carbon source or be accumulated as an osmoprotectant under osmotic stress. Under hypertonic medium, *E. coli* accumulates trehalose internally by synthesizing it from two molecules of glucose, catalyzed by enzymes OtsA and OtsB. Trehalose is sent to the periplasm and is degraded by the trehalase TreA, and the two molecules of glucose are transported back to the cytoplasm. In a previous study, we showed that the Δ*treA* mutant of the extraintestinal pathogenic *E. coli* MT78 (BEN2908) strain displayed reduced levels of yeast agglutination, reduced ability to adhere and invade avian fibroblasts, and reduced bladder colonization in a murine model of urinary tract infection. Because all these events are dependent on type 1 fimbriae produced by the bacteria, we wondered if trehalose acts as a regulator of such structure. For that, we generated and characterized MT78Δ*otsAB* and MT78Δ*treA*Δ*otsBA* mutants. Both mutants had decreased type 1 fimbriae production and urinary tract colonization in murine model; in the presence of urea 0.3 M, a condition that induces type 1 fimbriae production in some ExPEC strains, MT78Δ*otsAB*, but not MT78Δ*treAΔotsBA*, displayed increased agglutination titer. Likewise, MT78Δ*otsAB*, but not MT78Δ*treAΔotsBA*, presented impaired growth in minimal medium with glycerol as carbon source in the presence of urea 0.6 M. All complemented mutants restored the wild type phenotype. According to the preliminary results, both MT78Δ*otsAB* and MT78Δ*treAΔotsBA* mutants presented a decreased association to avian fibroblasts. Our results suggest that the strain MT78 requires the osmoregulated enzymes of trehalose metabolism to fully produce type 1 fimbriae.

Keywords: *Escherichia coli, Trehalose, Type 1 fimbriae*.

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