

Abstract

Sirtuin has been associated in prolonging lifespan of different model organisms. It has been shown to have an enzymatic activity of NAD⁺-dependent protein deacetylation targeting acetylated proteins. To determine targets and possible roles of sirtuin (LpSirA) in the *Lactobacillus paracasei* BL23, deletion ($\Delta sirA$), sirtuin overexpressor (*highsirA*) and GFP fusion (*highsirA*-Venus) strains were generated, and microscopic localization and cell length analysis were done. Microscopic analysis revealed localization of LpSirA at cell division plates, at cell poles and all throughout the cell length in a spiral manner. Cell length analysis revealed that 46.9% of the $\Delta sirA$ cells were observed to be shorter (<2 μm), whereas 12.6% of the *highsirA* cells were observed to be longer (>4 μm) in comparison with the wild-type with only 17.1% short cells and 5.3% long cells. Our results suggest that sirtuin may have an essential role in cell division and cell shape regulation.

Sirtuin working together with cell division/ cell shape regulation proteins which are localized spirally, in cell poles and in division plates.