# Assessment of the mechanism of growth inhibition of *Staphylococcus aureus* by a Bowman-Birk inhibitor purified from *Lutzelburgia auriculata* seeds using Scanning Electron Microscopy

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**INTRODUCTION:** *Staphylococcus aureus* has become a major global health problem and a trouble to healthcare systems mainly due to increasing hospital-acquired infection and the spread of multidrug-resistant bacteria. Therefore, new strategies of treatment are needed, either by chemical modification of existing drugs or purification of novel biomolecules with effective antibacterial activity. Plant protease inhibitors are proteins of low molecular weight that is involved in various important physiological functions like regulators of endogenous proteinases and defense mechanism. They also have received special attention due to their biological properties with potential as therapeutic agents. **OBJECTIVES:** To assess the mechanism by which a Bowman-Birk inhibitor purified from *Lutzelburgia auriculata* seeds (*Lza*BBI) inhibits *Staphyloccos aureus* growth. **MATERIAL AND METHODS:** To purify *Lza*BBI, the seed extract was boiled, centrifuged and the supernatant loaded on a Sepharose®-4B-anhydrotrypsin affinity column, followed by reverse phase chromatography of the active protein fractions. Bacteria were exposed to *Lza*BBI (10 µg) and the cells observed by Scanning Electron Microscopy (SEM) up to 5 h later to assess topological changes caused in *S. aureus* (ATCC 25923) cells induced by *Lza*BBI. **RESULTS AND DISCUSSION:** *Lza*BBI, at low concentrations, had negative impact on the *S. aureus* development. In control cells, not incubated with *Lza*BBI, the bacteria were normal. Contrary, upon incubation with *Lza*BBI, the bacterial cell surface presented dents, orifices and deformities, indicative of strong mechanical injures. **CONCLUSION:** SEM analysis reveals that *Lza*BBI hinders the *S. aureus in vitro* development by damaging the cell structure. This property could be further exploited towards using *Lza*BBI as a new antibacterial agent in human or animal therapeutics.

**Keywords:** *Luetzelburgia auriculata*, Bowman-Birk inhibitor, *Staphylococcus aureus*

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