Antibacterial Activity of a Lectin from *Punica granatum* L. (Pomegranate) Testa against Cariogenic Bacteria

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INTRODUCTION: Pomegranate, *Punica granatum* L. (Lythraceae), is a plant popularly used against infections by microorganisms and its fruits are edible. Lectins, carbohydrate recognition proteins, have shown diverse biological activities such as antibacterial activity and are detected in preparations by hemagglutinating activity (HA) assay. *Punica granatum* testa contains a lectin (PgTeL) and this work investigated PgTeL as a biomaterial against cariogenic bacteria. MATERIALS AND METHODS: Saline extract of testa (10%, v/v) was treated with ammonium sulfate (30% saturation) and after centrifugation (5,000 g, 4 °C, 15 min) the collected supernatant fraction (FS30%) was chromatographed on chitin column equilibrated with 0.15 M NaCl. PgTeL eluted with 1.0 M acetic acid and dialyzed against distilled water and 0.15 M NaCl was evaluated for HA and antimicrobial activity. Minimal inhibitory (MIC) and bactericide (MBC) concentrations were determined for extract, FS30% and PgTeL. RESULTS AND DISCUSSION: PgTeL (specific HA: 19,430; 3.5 mg of protein; purification fold: 24.9) was the most active preparation, showing antibacterial activity against *Streptococcus mutans*, *S. salivarius*, *S. mitis*, and *S. oralis* with MIC of 11, 34.2, 34.2, and 136.8 µg/mL, respectively. The MIC values determined for *S. mutans*, *S. salivarius* and *S. mitis* were below the MIC of clinical relevance (between 64 and 100 mg/mL) and thus PgTeL has potential use as antibiotic against these species. PgTeL was a bactericide agent only on *S. mutans* (MBC of 87.8 µg/mL) and *S. salivarius* (MBC of 68.4 µg/mL). The antibacterial activity of PgTeL, a chitin-binding lectin, may be related to the interaction with N-acetylglucosamine in the cell wall of Gram-positive bacteria. CONCLUSION: PgTeL, the lectin isolated from the testa of *P. granatum*, is a biomaterial of potential antimicrobial application against cariogenic bacteria. CONCLUSION: PgTeL, the lectin isolated from the testa of *P. granatum*, is a biomaterial of potential antimicrobial application against cariogenic bacteria.

Keywords: antibacterial activity, cariogenic bacteria, lectin, *Punica granatum*

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