Antibacterial and Anti-proliferative activity of different forms of Citrus pectin.

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Pectin is a heterogeneous polysaccharide mainly present in citrus fruits and has different biological activities. Its chemical composition and structure varies between different plant sources and even in different parts of a plant. In this study, the cytotoxicity, anti-proliferative, and antimicrobial activity of citrus pectin (high molecular weight pectin) and modified citrus pectin (MCP) were investigated.

Cytotoxicity of various concentrations of pectin and MCP was studied against HaCaT cell line (human keratinocyte cell line) using Trypan blue method and LDH-cytotoxicity assay. Anti-proliferative activity was assayed using a WST-1 proliferation kit. MCP and Pectin both reduced the viability of HaCat cells in a dose dependent manner; however MCP was found to be more cytotoxic than high molecular weight citrus pectin since it had a lower IC_{50} (300ug/ul).MCP was also more capable of inhibiting HaCat proliferation than pectin.

The antibacterial activity of citrus pectin and MCP was investigated against reference strains and clinical isolates of *Staphylococcus aureus* and extended spectrum beta-lactamase (ESBL) producing *Escherichia coli.* Broth microdilution method was used to determine the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). The antibacterial activity of pectin varied according to the source of the pectin extract, the pH used, and the molecular weight of pectin. The greatest antibacterial activity was observed with pectin at pH 6. The MIC values against *S. aureus* ranged between 0.39 – 3.125 mg/ml and the MBC values ranged between 3.125 – 12.5mg/ml. Modified Citrus Pectin (MCP) exhibited lower antibacterial activity with MICs of 25-50 mg/ml and MBCs were equal or higher than 50 mg/ml. Pectin exhibited lower antibacterial activity against *E. coli* with MICs of 25 and 50 mg/ml and MBCs ranging between 25 and 50 mg/ml.

The conclusions from this study suggest that MCP exhibit a higher anti-proliferative effect on HaCaT cell line whereas pectin showed a stronger antibacterial activity against *S. aureus*, a major Gram positive pathogen. The most probable

explanation of this observation is the different effect due to the variable length, molecular weight, and exposed side-chains of MCP and high molecular weight citrus pectin. For that they merit further investigation as a potential therapeutic agent.