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Biological Activities of Protease Inhibitors from Cajanus cajan and Phaseolus limensis

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Abstract : Protease Inhibitors (PIs) are widespread in nature, produced by animals, plants and microorganisms. They play vital role in various biological activities by keeping a check on activity of proteases. Present study aims to investigate antioxidant and anti-inflammatory properties of PPI from Cajanus cajan (CCTI) and Phaseolus limensis (LBTI). PPI was purified from C. cajan (PUSA-992) by ammonium sulfate precipitation followed by ion exchange chromatography. The anti-oxidant activity was analyzed by two most common radical scavenging assays of FRAP (ferric reducing antioxidant power) and DPPH (1,1-diphenyl-2-picrylhydrazyl). Also, in-vitro anti-inflammatory activity was evaluated using albumin denaturation assay and membrane stabilization assay at different concentrations. Ascorbic acid and aspirin were used as a standards for antioxidant and anti-inflammatory assays respectively. The PPIs were also checked for antimicrobial activity against a number of bacterial strains. The CCTI and LBTI showed DPPH radical scavenging activity in a concentration–dependent manner with IC50 values 544 µg/ml and 506 µg/ml respectively comparative to ascorbic acid which was 258 µg/ml. Following FRAP assay, it was evaluated that LBTI had 87.5% and CCTI showed 84.4% antioxidant activity, taking value of standard ascorbic acid to be 100%. The PPIs also showed in-vitro anti-inflammatory activity by inhibiting the heat induced albumin denaturation with IC50 values of 686 µg/ml and 615 µg/ml for CCTI and LBTI respectively compared to the standard (aspirin) which was 70.8 µg/ml. Red blood cells membrane stabilization with IC50 values of 641 µg/ml and 587 µg/ml for CCTI and LBTI respectively against aspirin which showed IC50 value of 70.4 µg/ml. PPIs showed antibacterial activity against 7 known strains while there was apparently no action against fungi.

Keywords : Cajanus cajan, Phaseolus limensis, Lima beans, protein protease inhibitor, antioxidant, anti-inflammatory, antimicrobial activity
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