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Antibacterial and Anti-Biofilm Activity of Papain Hydrolysed Camel Milk Whey and Its Fractions

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Abstract : Camel milk whey (CMW) was hydrolyzed with papain from Carica papaya and fractionated by size exclusion chromatography (SEC). The antibacterial and anti-biofilm activity of the CMW, Camel milk whey hydrolysate (CMWH) and the obtained SEC-fractions was assessed against Pseudomonas aeruginosa and Methicillin-resistant Staphylococcus aureus (MRSA). SEC-F2 (fraction 2) exhibited antibacterial effectiveness against MRSA and P. aeruginosa with the minimum inhibitory concentration of 0.31 and 0.156 mg/ml, respectively. Furthermore, SEC-F2 significantly decreased biofilm biomass by 71% and 83 % for MRSA and P. aeruginosa in a crystal violet microplate assay. Scanning electron microscopy showed that the SEC-F2 caused changes in the treated bacterial cells. Additionally, LC/MS analysis was used to characterize the peptides of SEC-F2. Two major peptides were detected in SEC-F2 having masses of 414.05 Da and 456.06 Da. In conclusion, this study has demonstrated that hydrolysis of CMW with papain generates small and extremely potent antibacterial and anti-biofilm peptides against both MRSA and P. aeruginosa.

Keywords : camel milk, whey proteins, antibacterial peptide, anti-biofilm
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