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Entitled

CHARACTERIZATION AND BIOACTIVE PROPERTIES OF CAMEL WHEY PROTEIN HYDROLYSATE GENERATED WITH GASTRIC AND PANCREATIC PROTEASES

by

Sabika Jafer

Faculty Advisor
Dr. Sajid Maqsood, Department of Food Science
College of Food and Agriculture

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Abstract

Camel milk has been used for its nutritional and therapeutic benefits since ancient times. Previously, whole camel milk and casein proteins have been explored for their potential bioactive properties. However, studies on camel milk whey proteins and their hydrolysates are still scarce. Hence, the aim of the proposed thesis was to evaluate camel whey proteins and their hydrolysates for potential bioactivities like antioxidant, antimicrobial, antidiabetic, antihypertensive, and anti-cholesterol properties. Production of the hydrolysates was carried out using three digestive enzymes – pepsin, trypsin and chymotrypsin for 3 and 6 h of hydrolysis time. Hydrolysates were characterized by degree of hydrolysis (DH) and reversed-phase high-performance liquid chromatography (RP-HPLC). *In vitro* experiments were performed to evaluate the bioactive properties of different camel whey protein hydrolysates (CWPHs). Results revealed that CWPHs showed DH ranging from 11 to 47.5%, with chymotrypsin (6h) and trypsin (3h) exhibiting highest and lowest DH, respectively. RP-HPLC analysis revealed that α-lactalbumin underwent complete degradation and newer shorter peptides were generated. Chymotrypsin generated CWPHs demonstrated highest 2,2-diphenyl-1-picrylhydrazy (DPPH) and 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) radical scavenging activities, while pepsin and trypsin generated CWPHs displayed highest reducing power and metal chelating activities. CWPHs showed markedly greater antimicrobial activity than unhydrolyzed whey against all pathogenic bacteria tested. Anti-cholesterol property via inhibition of cholesterol esterase and lipase, and antihypertensive property via angiotensin-converting enzyme (ACE) inhibition were found to be highest in pepsin (6h) and (3h) generated CWPHs, respectively. CWPHs displayed enhanced antidiabetic activity compared to intact whey proteins, where pepsin and chymotrypsin generated CWPHs showed higher inhibition of dipeptidyl peptidase-IV, α-glucosidase and α-amylase ($P<0.05$). Overall, CWPHs exhibited improved antioxidant, antimicrobial, antihypertensive, antidiabetic and anti-cholesterol properties compared to intact whey proteins. Therefore, camel whey protein hydrolysates could be targeted for utilization as bioactive ingredient in functional foods and nutraceuticals.

Keywords: Camel milk, whey proteins, hydrolysates, DPP-IV, ACE, cholesterol esteras