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CHARACTERIZATION AND BIOACTIVE PROPERTIES OF YOUNG AND MATURE SOYBEAN AND THEIR PROTEIN HYDROLYSATES

by

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Abstract

Soybeans are known for its high protein content that could be substituted to the animal proteins. The potential bioactive properties of mature soybean (MS) proteins and their hydrolysates has been widely explored. The aim of this study was to investigate and compare various *in-vitro* bioactive properties (antioxidant, anti-diabetic, anti-obesity, and anti-inflammatory) of YS and MS flour and their protein hydrolysates when subjected to *in-vitro* simulated gastrointestinal digestion (SGID) and enzymatic hydrolysis, respectively. In the first phase, SGID of YS and MS flour was carried out to mimic the human digestion, while in the second phase, enzymatic hydrolysis of the soybean protein isolate was carried out by alcalase, bromelain, and flavourzyme for 2, 4, and 6 h in order to produce different protein hydrolysates. The results showed that upon *in vitro* SGID, the total phenolic content (TPC) significantly increased, and was higher in YS compared to MS ($P<0.05$). YS and MS flours varied in their inhibitory activity against α-amylase (AA), dipeptidyl peptidase IV (DPP-IV), pancreatic lipase (LIP), and cholesterol esterase (CE) enzymes when subjected to simulated gastric digestion ($P<0.05$) followed by a decrease in the inhibitory activity upon simulated intestinal digestion stage. Furthermore, MS flour exhibited higher antioxidant and anti-inflammatory (AI) activities than YS when subjected to SGID ($P<0.05$). The results of the enzymatic hydrolysis in the second phase revealed that the YS and MS protein hydrolysates displayed enhanced inhibitory activity against AA, DPP-IV, LIP, and CE enzymes when hydrolyzed by different enzymes for different time periods ($P<0.05$). Antioxidant and AI activities were also found to be higher in hydrolysates compared to intact proteins for both YS and MS proteins ($P<0.05$). In conclusion, the bioactive properties of YS and MS flour upon SGID and proteins upon enzymatic hydrolysis were enhanced compared to unhydrolyzed samples. Further research is needed to identify the sequence of bioactive peptides responsible for different bioactive properties of YS and MS proteins.

Keywords: Soybean, young soybean, proteins, hydrolysates, SGID, enzymatic hydrolysis, bioactive proprieties.