High angiotensin-I converting enzyme (ACE) inhibitory activity of Alcalase-digested green soybean (Glycine max) hydrolysates

ABSTRACT

As a protein-rich, underutilized crop, green soybean could be exploited to produce hydrolysates containing angiotensin-I converting enzyme (ACE) inhibitory peptides. Defatted green soybean was hydrolyzed using four different food-grade proteases (Alcalase, Papain, Flavourzyme and Bromelain) and their ACE inhibitory activities were evaluated. The Alcalase-generated green soybean hydrolysate showed the highest ACE inhibitory activity (IC_{50}: 0.14 mg/mL at 6 h hydrolysis time) followed by Papain (IC_{50}: 0.20 mg/mL at 5 h hydrolysis time), Bromelain (IC_{50}: 0.36 mg/mL at 6 h hydrolysis time) and Flavourzyme (IC_{5}: 1.14 mg/mL at 6 h hydrolysis time) hydrolysates. The Alcalase-generated hydrolysate was profiled based on its hydrophobicity and isoelectric point using reversed phase high performance liquid chromatography (RP-HPLC) and isoelectric point focusing (IEF) fractionators. The Alcalase-generated green soybean hydrolysate comprising of peptides EAQRLLF, PSLRSYLAE, PDRSIHGRQLAE, FITAFR and RGQVLS, revealed the highest ACE inhibitory activity of 94.19%, 99.31%, 92.92%, 101.51% and 90.40%, respectively, while their IC_{50} values were 878 μM, 532 μM, 1552 μM, 1342 μM and 993 μM, respectively. It can be concluded that Alcalase-digested green soybean hydrolysates could be exploited as a source of peptides to be incorporated into functional foods with antihypertensive activity.

Keyword : Green soybean; Proteolysis; Hydrolysate; Bioactive peptides; Functional food; ACE inhibitory activity