

Extraction, Recovery and Bioactivities of Chlorogenic Acid from Unripe Green Coffee Cherry Waste of Coffee Processing Industry

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Abstract : Unripe green coffee cherry (UGCC) accounting about 5 % of total raw material weight receiving to the coffee bean production process and is, in general, sorting out and dump as waste. The UGCC is known to rich in phenolic compounds such as caffeoylquinic acids, feruloylquinic acids, chlorogenic acid (CGA), etc. CGA is one of the potent bioactive compounds using in the nutraceutical and functional food industry. Therefore, this study aimed at optimization the extraction condition of CGA from UGCC using Accelerated Solvent Extractor (ASE). The ethanol/water mixture at various ethanol concentrations (50, 60 and 70 % (v/v)) was used as an extraction solvent at elevated pressure (10.34 MPa) and temperatures (90, 120 and 150 °C). The recovery yield of UGCC crude extract, total phenolic content, CGA content and some bioactivities of UGCC extract were investigated. Using of ASE at lower temperature with higher ethanol concentration provided higher CGA content in the UGCC crude extract. The maximum CGA content was observed at the ethanol concentration of 70% ethanol and 90 °C. The further purification of UGCC crude extract gave a higher purity of CGA with a purified CGA yield of 4.28 % (w/w, of dried UGCC sample) containing 72.52 % CGA equivalent. The antioxidant activity and antimicrobial activity of purified CGA extract were determined. The purified CGA exhibited the 2,2-Diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity at 0.88 mg Trolox equivalent/mg purified CGA sample. The antibacterial activity against *Escherichia coli* was observed with the minimum inhibitory concentration (MIC) at 3.12 mg/ml and minimum bactericidal concentration (MBC) at 12.5 mg/ml. These results suggested that using of high concentration of ethanol and low temperature under elevated pressure of ASE condition could accelerate the extraction of CGA from UGCC. The purified CGA extract could be a promising alternative source of bioactive compound using for nutraceutical and functional food industry.

Keywords : bioactive, chlorogenic acid, coffee, extraction

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