

Optimization of ultrasonic-assisted extraction of phenolic compound from golden chicken fern (*Cibotium barometz*) rhizome via response surface methodology

ABSTRACT

There are a lot of medical potentials from *Cibotium Barometz* that can be exploited due to its secondary metabolites, specifically the phenolic compounds. Therefore, numerous studies have been employed to study the optimization of phenolic compounds extraction from other medical beneficial plants. However, until today there are no definite experiment has been conducted to study the optimization of phenolic compounds extraction of *C. Barometz*. Hence, this study was designed to systemically optimize the extraction process of phenolic compounds from *C. Barometz* by using response surface methodology (RSM). The variables were evaluated by using three-factor Box-Behnken experimental design. The three process variables were; ethanol concentration (20-100%), extraction time (10-60 min) and solid-to-liquid ratio (1:20 - 1:100; g: mL) while the independent variable is the total phenolic content (TPC). The optimum extraction condition obtained from RSM are 38.99% ethanol concentration, 47.51 min extraction time, and 1:59.68 (g: mL) ratio under ultrasonic assisted extraction (UAE). Net antioxidant activity was determined by scavenging activity of 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical, where the lowest IC₅₀ obtained was from ethanol extract via RSM approach (IC₅₀ value 817.87±23.75 µg/mL) which values lie within the range of standard error of the standard (IC₅₀ value 242.53±22.76 µg/mL). The results show that the extraction of *C. Barometz* can be systemically optimized by using the variables obtained from the RSM method.

Keyword: *Cibotium barometz*; free radicals; phenolic compounds; Response Surface Methodology (RSM); 1,1-diphenyl-2- picrylhydrazyl (DPPH)