

Ornkanit Chantes 2014: Precipitation of Active Ingredients from Extracted *Centella asiatica* via Gas Anti-Solvent Technique Using Box-Behnken Design of Experiments. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Manop Charoenchaitrakool, Ph.D. 186 pages.

The aim of this project was to precipitate active ingredients from *Centella asiatica* using Gas Anti-Solvent (GAS) process. Main compounds, namely, madecassoside, asiaticoside, madecassic acid and asiatic acid are considered. In this research, active ingredients were extracted from *Centella asiatica* dried powder by maceration method. The extracted solution was used as a starting solution for the GAS precipitation process. The effects of % ethanol in the mixed solvent of ethanol and methanol (0-100%), carbon dioxide flow rate (3-9 mL/min) and temperature (25-45°C) were investigated. The Box–Behnken design of experiment was carried out using the MINITAB 15. The precipitated product was analyzed using HPLC and tested for antioxidant activity (via DPPH and ABTS assays). The amount of total phenolic was also determined. It was found that % ethanol in the mixed solvent was significant at 95% level on madecassoside, asiaticoside and asiatic acid. However, the operating parameters had no significant effect on the madecassic acid. Higher amounts of active ingredients could be precipitated when a lower percentage of ethanol in the mixed solvent was used in the maceration step. At the optimal conditions, the amount of madecassoside, asiaticoside, medecassic acid and asiatic acid were found to be 5,733±537, 2,948±249, 1,678±163 and 436±17 µg/5 mL of extracted solution, respectively. In the antioxidant studies, the highest Trolox equivalent found in the products using DPPH and ABTS assays were 5,622±336 and 10,729±820 µg/5 mL of extracted solution. The highest total phenolic was found to be 3,653±49 µg/5 mL of extracted solution.

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Thesis Advisor's signature