



Hepatoprotective and Antioxidant Activity of the Total Flavonoids Extraction from *Hypericum japonicum* by Response Surface Methodology

Yuqin ZHANG ¹, Mingqing HUANG ¹, Huang LI ¹, Wei XU ¹,
Kedan CHU ¹, Haiyin ZHENG ³, Mei SHA ¹ & Lidian CHEN ^{2*}

¹ Pharmacy College, ² Faculty of Rehabilitation Medicine and

³ Integrative Medicine College of Fujian University of Traditional Chinese Medicine, Fuzhou, China

SUMMARY. *Hypericum japonicum* was usually used to treat hepatitis in folk medicine. The aim of this study is to evaluate the hepatoprotective and antioxidant activities of *Hypericum japonicum* against CCl₄-induced liver injury. Box-Behnken design (BBD) was used to optimize the extraction conditions (time: 60 min, power: 300W, ethanol concentration: 80 % and ratio of solid to liquid: 20 g/mL) of high antioxidant total flavonoids content (TFC). Total flavonoids were analyzed for its hepatoprotective effects against CCl₄-induced liver injury in mice. Activities were measured by monitoring levels of superoxide dismutase (SOD) activity, malondialdehyde (MDA) and reduced glutathione (GSH) in the liver tissue and HE staining was applied to evaluate anti-hepatic injury. It was found significantly positive in a dose-dependent manner. Finally, HPLC-MS/MS was achieved to analyze the chemical composition of the active flavonoids (quercitrin, isoquercitrin, quercetin, kaempferol, hyperin and quercetin-7-O-rhamnoside). This study suggests that *Hypericum japonicum* have a potent hepatoprotective activity against CCl₄-induced hepatic damage.

KEY WORDS: Antioxidant activity, Box-Behnken design, Hepatoprotective activity, *Hypericum japonicum*, Total flavonoids.

* Author to whom correspondence should be addressed. *E-mail:* clidianlab@gmail.com