ABSTRACT

_Centella asiatica_ (Bao-bog) is used as a traditional drug widely in Asia. _C. asiatica_ crude extracts showed excellent potential _in-vitro_ but less or no _in-vivo_ activity due to their poor lipid solubility or improper molecular size or both, resulting in poor absorption, poor dosing and poor bioavailability. The Bovine serum albumin (BSA) can attract macromolecular and carry wide variety of molecule. So this research was aimed to develop _C. asiatica_ extract-loaded BSA nanoparticles (CBNP) to improve bioavailability. CBNP was prepared by the desolvation method using three different ratio _C. asiatica_ crude chloroform extracts: BSA (1:2, 1:3, and 1:4). The well agar diffusion method was used for evaluating antibacterial activity of CBNP with different concentration (100, 200, and 300 µg/ml) against five food borne pathogens (_Escherichia coli_ ATCC25822, _Salmonella enterica_ Typhimurium U302 (DT104b), _S. enterica_ Enteritidis (human), _S. enterica_ 4,5,12:i:- (human) US clone, and _Bacillus cereus_). The results showed that the antibacterial activity of CBNP did not show significant different on three different ratio and concentration in all food borne pathogens except _S. enterica_ Enteritidis (human) and _B. cereus_ (P < 0.05). The highest antibacterial active of CBNP was 1.07±0.46 cm against _S. enterica_ Enteritidis (human) on ratio 1:4, 200 µg/ml. The antibacterial activity of CBNP gave almost 2 times higher than free crude _C. asiatica_ chloroform extracts. The modified Folin-Ciocalteu method, Ferric reducing antioxidant potential assay and DPPH assay were used for evaluating antioxidant activity. The highest antioxidant activity represented by the amount of phenolic content of CBNP was 14.59±6.74 µgGAE/mg using ratio 1:2. The amount of phenolic content of CBNP did not show significant different between ratio 1:2 and others (P < 0.05). For Ferric reducing antioxidant potential assay and DPPH assay, crude chloroform extract showed significantly higher activity than CBNP were 1.00 ± 0.15 mmol Fe²⁺/mg and 29.44 ± 8.20 % DPPH radical scavenging respectively (P < 0.05). The entrapment efficiency and loading efficiency of CBNP showed highest
value on ratio 1.4 which were 96.94 ± 1.48% and 42.05 ± 5.68% respectively. It's also showed highest in release kinetic In Vitro approximately 12% during the whole period of 6 hours in both artificial gastric and intestinal juice. C. asiatica crude chloroform extract have higher solubility in water than CBNP but CBNP have higher stability in releasing crude chloroform extract. The results indicated that CBNP showed the promising to increase bioavailability of C. asiatica.

Keywords: Centella asiatica, Nanoparticles, Bioavailability, Antibacterial, Antioxidant