

Nanoemulsion Formulation of Ethanolic Extracts of Propolis and Its Antioxidant Activity

Authors : Rachmat Mauludin, Dita Sasri Primaviri, Irda Fidrianny

Abstract : Propolis contains several antioxidant compounds which can be used in topical application to protect skin against free radical, prevent skin cancer and skin aging. Previous study showed that 70% ethanolic extract of propolis (EEP) provided the greatest antioxidant activity. Since EEP has very small solubility in water, the extract was prepared in nanoemulsion (NE). Nanoemulsion is chosen as cosmetic dosage forms according to its properties namely to decrease the risk of skin's irritation, increase penetration, prolong its time to remain in our skin, and improve stability. Propolis was extracted using reflux methods and concentrated using rotavapor. EEP was characterized with several tests such as phytochemical screening, density, and antioxidant activity using DPPH method. Optimization of total surfactant, co-surfactant, oil, and amount of EEP that can be included in NE were required to get the best NE formulation. The evaluations included to organoleptic observation, globul size, polydispersity index, morphology using TEM, viscosity, pH, centrifuge, stability, Freeze and Thaw test, radical scavenging activity using DPPH method, and primary irritation test. The yield extracts was 11.12% from raw propolis contained of steroid/triterpenoid, flavonoid, and saponin based on phytochemical screening. EEP had the value of DPPH scavenging activity 61.14% and IC50 0.41629 ppm. The best NE formulation consisted of 26.25% Kolliphor RH40; 8.75% glycerine; 5% rice bran oil; and 3% EEP. NE was transparant, had globul size of 21.9 nm; polydispersity index of 0.338; and pH of 5.67. Based on TEM morphology, NE was almost spherical and has particle size below 50 nm. NE propolis revealed to be physically stable after stability test within 63 days at 25oC, centrifuged for 30 mins at 13.000 rpm, and passed 6 cycles of Freeze and Thaw test without separated. NE propolis reduced 58% of free radical DPPH similar to antioxidant activity of the original extracts. Antioxidant activity of NE propolis is relatively stable after stored for 6 weeks. NE Propolis was proven to be safe by primary irritation test with the value of primary irritation index (OECD) was 0. The best formulation for NE propolis contained of 26.25% Kolliphor RH40; 8.75% glycerine; 5% rice bran oil; and 3% EEP with globul size of 21.9 nm and polydispersity index of 0.338. NE propolis was stable and had antioxidant activity similar to EEP.

Keywords : propolis, antioxidant, nanoemulsion, irritation test

Conference Title : ICPP 2014 : International Conference on Pharmacy and Pharmacology

Conference Location : Bangkok, Thailand

Conference Dates : December 18-19, 2014