Propolis as Antioxidant Formulated in Nanoemulsion

Authors : Rachmat Mauludin, Irda Fidrianny, Dita Sasri Primaviri, Okti Alifiana

Abstract : Natural products such as propolis, green tea and corncob are containing several compounds called antioxidant. Antioxidant can be used in topical application to protect skin against free radical, prevent skin cancer and skin aging. Previous study showed that the extract of propolis that has the highest antioxidant activity was ethanolic extract of propolis (EEP). It is important to make a dosage form that could keep the stability and could protect the effectiveness of antioxidant activity of the extracts. In this research, nanoemulsion (NE) was chosen to formulate those natural products. NE is a dispersion system between oil phase and water phase that formed by mechanical force with a lot amount of surfactants and has globule size below 100 nm. In pharmaceutical industries, NE was preferable for its stability, biodegradability, biocompatibility, its ease to be absorbed and eliminated, and for its use as carrier for lipophilic drugs. First, all of the natural products were extracted using reflux methods. Green tea and corncob were extracted using 96% ethanol while propolis using 70% ethanol. Then, the extracts were concentrated using rotavapor to obtain viscous extracts. The yield of EEP was 11.12%; green tea extract (GTE) was 23.37%; and corncob extract (CCE) was 17.23%. EEP contained steroid/triterpenoid, flavonoid and saponin. GTE contained flavonoid, tannin, and quinone while CCE contained flavonoid, phenol and tannin. The antioxidant activities of the extracts were then measured using DPPH scavenging capacity methods. The values of DPPH scavenging capacity were 61.14% for EEP; 97.16% for GTE; and 78.28% for CCE. The value of IC50 for EEP was 0.41629 ppm. After the extracts were evaluated, NE was prepared. Several surfactants and co-surfactants were used in many combinations and ratios in order to form a NE. Tween 80 and Kolliphor RH40 were used as surfactants while glycerin and propylene glycol were used as co-surfactants. The best NE consists of 26.25% of Kolliphor RH40; 8.75% of glycerin; 5% of rice bran oil; 3% of extracts; and 57% of water. EEP NE had globule size around 23.72 nm; polydispersity index below 0.5; and did not cause any irritation on rabbits. EEP NE was proven to be stable after passing stability test within 63 days at room temperature and 6 cycles of Freeze and Thaw test without separated. Based on TEM (Transmission Electron Microscopy) test, EEP NE had spherical structure with most of its size below 50 nm. The antioxidant activity of EEP NE was monitored for 6 weeks and showed no significant difference. The value of DPPH scavenging capacity for EEP NE was around 58%; for GTE NE was 96.75%; and for CCE NE was 55.69%.

1

Keywords : propolis, green tea, corncob, antioxidant, nanoemulsion

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020