

Abstract

Thailand is approaching the ageing society and it is likely that the direction of Alzheimer's disease increases. Furthermore, the current trend towards herbal dietary supplement consumption is obviously seen. Besides, the previous research indicated that *Camellia sinensis* var. *assamica* (known as Miang or fermented tea) and *Perilla frutescens* (Linn.) Britton (known as Perilla) restrain Alzheimer's disease. For this reason, this project aimed to develop the health product prototypes containing miang tea and perilla oil for the elderly. Miang tea was extracted with 95% ethanol by maceration whereas perilla seeds were extracted with cold pressing method. The researcher examined the anti-acetylcholinesterase, lipid peroxidation inhibition activity, and anti-amyloid beta activity of miang tea powder and extract and perilla oil. Moreover, the miang tea extract was analyzed for its total phenolic content and a method validation to determine the total phenolic content was also evaluated. The perilla oil was analyzed for amount of active compounds, its peroxide value, as well as its stability under various conditions (at room temperature and at 40 °C in clear glass and light-resistant containers). Miang tea capsules were divided into three formulations: miang tea powder capsules (formula 1), miang tea powder mixed with miang tea extract granules capsules (formula 2), and miang tea powder mixed with miang tea extract and perilla oil granules capsules (formula 3). A pre-formulation study and a study of the characteristics of all the formulations were carried out. The results showed that the percentage yield of the miang tea extract was 0.72. The total phenolic content of the extract was 59.564 mg gallic acid equivalent to 1 g of extract. The results from the method validation showed that the Folin-Ciocalteu method had a high level of accuracy and precision and was therefore an appropriate method to determine the active compounds in miang tea. The perilla oil consisted of omega-3, omega-6 and omega-9 at 69.83%, 15.83% and 8.75%, respectively. The analysis result showed that peroxide value of perilla oil was 0.78 mg equivalent per one kilogram of oil. The stability of perilla oil at the different conditions showed that after the stability test, peroxide value of the perilla oil in light-resistant container was in the standard range. Further, Omega-3, Omega-6, and Omega-9 were also found in the perilla oil as before stability test. The IC_{50} values of the miang tea extract, miang tea powder and perilla oil were 1.83 μ g/ml, 0.27 and 1.34 mg/ml, respectively, as measured by a cholinesterase inhibition assay. The IC_{50} values of miang tea extract and miang tea powder were 27.47 and 148.59 mg/ml, respectively, as tested by a lipid peroxidation inhibition assay, while the perilla oil did not show any activity. In addition, the miang

tea extract, miang tea powder and perilla oil possessed IC_{50} values of 83.18, 121 and 223.6 $\mu\text{g/ml}$, respectively, as determined by an amyloid beta inhibition assay. The results from the pre-formulation study indicated that miang tea granules had a low moisture content, low size-distribution and better flow properties than the miang tea powder. Therefore, miang tea granules had good properties for preparation into miang tea capsules. After the preparation, all the capsule formulations (formulas 1-3) had a good physical appearance, were of a uniform weight and a fast disintegration time in acceptable standard ranges. As a result, three formularies were tested the stability by storing the product at 40 °C for 3 months before assessing the external feature, total phenolic content, lipid peroxidation inhibition activity, weight variation, and disintegration time. The results showed that there was no difference in the physical quality of all three formularies from before the test. After total phenolic content analysis, it was found that the formulary of miang tea powder before and after the test were unaccountable. For miang tea powder and extract, phenolic equivalent to gallic acid was 462.82 mg/L while that in miang tea powder, extract, and perilla oil was 419.71 mg/L, which did not change after the stability test. When testing the anti-oxidation activity using lipid peroxidation inhibition assay, the result could not be defined for miang tea powder while the percentage inhibition of miang tea powder and extract and miang tea powder, extract, and perilla oil was 20.22 and 8.89 respectively. TEAC values after the stability test was 440.42 and 59.08 milligram TEAC per one gram sample, which had no difference with statistical significance from before the test. Therefore, it was concluded that the two formularies had good stability. After testing the weight variation and disintegration value of the three formularies, it was found that the weight of the capsule of each formulary qualified the standard: lower than the variance percentage, did not change from before the stability test, and fast disintegration within 30 minutes. The results showed that all three formularies qualified the standard of good capsule. Therefore, the study on the capsule persistence illustrated that the prepared miang tea capsule had good and qualified persistence and was appropriate as the dietary supplement.

Keywords: Miang tea, Perilla oil, Health product, Capsules