Abstract

Tea plant (*Camellia sinensis* var. assamica), fermented tea plant and horsetail plant (*Equisetum debile* Roxb.) are used as key ingredients in several products from the Royal Project Foundation, for example, facial creams, serum, toners and hair tonic. Based on the quality and benefits of those plant extracts, they have potential to be used in cosmeceutical formulations. However, there is no prototype of the specification of crude and semi-purified plant extracts to be utilized commercially. Therefore, the objective of this study was to create a specification of the characteristics of crude and semi-purified extracts of miang tea leaves, fermented tea leaves and horsetail plant extracts that will be used in the cosmeceutical products of the Royal Project Foundation. Each plant from 3 cultivated areas were collected and extracted as crude extracts by ethanol, methanol, ethyl acetate and semi-purified extraction by supercritical fluid CO_2-ethanol. The %yield and active compound as the total phenolic content of the extracts were evaluated. The quantity of catechin and epicatechin in tea leaves and fermented tea leaves extracts were determined. The active compounds in the horsetail plant extracts such as quercitin, vanillic acid, eugenol and kaempferol were also evaluated. The bioactivity studies including the inhibition of α-Amylase, α-Glucosidase, Angiotensin I-converting (ACE) enzyme, the antimicrobial activity against dental carries, the antioxidant activity against ABTS and FRAP, the inhibition of collagenase/elastase MMP-1 and MMP-2, the inhibition of tyrosinase and 5α-Reductase enzyme were then evaluated. The plant extracted by ethanol provided the highest yield. The highest total polyphenolic content was also found in ethanolic extracts. The similar trend of chemical and biological profiles was observed in each plant collected from all 3 areas. The main active compounds, catechin and epicatechin, were detected in the ethanolic extract of miang tea leaves and fermented tea leaves but not in those semi-purified extracted by supercritical fluid CO2-ethanol. While quercetin was not detected in all horsetail plant extracts, the small amount of vanillic acid was found in that crude extracted by ethanol and the high amount of eugenol in the semi-purified supercritical fluid CO2 extraction. All biological activities studied were observed in all plants extracted by ethanol. The tea leaves, fermented tea leaves and horsetail plant extracts were not stable at two condition tests (%degradation less than 50). The active compounds and bioactivity in plant ethyl acetate extracts was the highest degraded. The bioactivities of the crude and semi-purified plant extracts were decreased (except the antimicrobial activity are stable efficacy) related to the degradation of bioactive compounds after 3 months storage at 30°C and 4°C. The 4°C is appropriate temperature to store the plant extracts. These results together with the stability from the study was used for drafting a prototype of the specification of plant extracts. From the results, the specification of the extraction of fresh tea leaves, fermented tea leaves and horsetail which including crude and semi-purified extracts were set up. From

the three plant extract specifications, they can be applied use in food and/ or in cosmetics with their health properties and safety claim. The quality and safety specification of the extract indicated that the impurity heavy metal, contaminants and pathogenic bacteria were not detected.