

Abstract

Dandruff, a condition occurs in both men and women, leads to negative effect on personality and health. According to the literature review about indigenous uses of local highland plant, there were several plants used for hair and scalp care. Therefore, the aims of the present study were to investigate the inhibitory effect against dandruff-related fungus of local highland plants and to research and develop the prototype of hair and scalp care products with anti-dandruff and anti-hair loss property.

Six local highland plants, including *E. debile*, *A. calamus*, *B. asiatica*, *C. sinensis*, *Z. rhetsa*, and *L. cubeba*, were selected for the present study. The plants were extracted by maceration and hydrodistillation. The extracts were then investigated for *M. furfur* inhibition by broth and agar dilution method. The results noted that *L. cubeba* oil possessed the highest inhibition with the MIC and MBC of 0.25 mg/mL. The other extracts possessed the lower activity with the same MBC of 0.50 mg/mL. At the concentration of 0.5 mg/mL, 4 extracts possessed the highest *M. furfur* inhibition were *A. calamus*, *E. debile*, *C. sinensis*, and *L. cubeba* oil. Therefore, the above 4 extracts were selected for the development of hair and scalp care products with anti-dandruff and anti-hair loss property, including shampoo, conditioner, hair mask, and hair tonic. The total amount of 4 extracts in the shampoo, conditioner, and hair mask were 0.85% and 1.75%, whereas, the total amount of 4 extracts in hair tonic was 1.75%. The shampoo, conditioner, hair mask, and hair tonic containing local highland plants showed good characteristics, suitable viscosity which was comparable to the commercials, and the pH value of 5 to 7, which were suitable for hair and scalp. Moreover, the prototype anti-dandruff products have good characteristic and good stability after the heating-cooling stability test. They also possessed *M. furfur* inhibition when evaluated by agar diffusion method. However, concentration of the extracts did not relate to inhibitory effect. Therefore, the suitable concentration of all extracts should be 0.85%, which composed of 0.2% *E. debile*, 0.2% *C. sinensis*, 0.2% *A. calamus*, and 0.25% *L. cubeba* oil. The satisfactory evaluation in 30 volunteers noted that the prototype anti-dandruff shampoo, conditioner, hair mask, and hair tonic containing local highland plant extracts got a good satisfactory score which was comparable with that of commercial products.

In conclusion, the prototype anti-dandruff shampoo, conditioner, hair mask, and hair tonic containing 0.85% extracts, which were *E. debile*, *C. sinensis*, *A. calamus*, and *L. cubeba* oil, showed good external appearance and good stability. All formulation possessed inhibitory effect against *M. furfur* which is the dandruff-related fungal and got a good volunteer's satisfaction. Therefore, all the prototype products got high potential for the further development into the industrial and commercial field in the future.