Abstract

The aim of this project was to research and development of moisturizing face serum from *Camellia sinensis* var. *assamica* and *Momordica cochinchinnensis* (Lour.) Spreng (gac) which are highland plants. Fermented tea leaves was extracted with methanol by maceration and further fractionated by column chromatography. The eluted solvent was evaporated off, the semi-purified reddish brown catechin solid yield 8.21% was obtained. As for *Momordica cochinchinnensis* (Lour.) Spreng, the sarcotesta part was dried and extracted with hexane by maceration and followed by evaporation off the solvent. The gac extract obtained is dark reddish orange thick liquid with % yield of 17.58%. This two extracts were assayed for total phenolic and flavonoid content, evaluated for superoxide and nitric oxide scavenging activity, anti-metrix metalloproteinase-1 (MMP-1) or collagenase-1 enzyme activity and anti-tyrosinase activity. It was found that catechin extract has total phenolic and flavonoid content of 525.31 ± 0.34 and 417.37 ± 0.82 µg/mg respectively. The gac extract has total phenolic and flavonoid content of 154.12 ± 3.35 and 56.68 ± 1.33 µg/mg respectively. An IC_{50} of superoxide and nitric oxide scavenging activity of catechin extract are 36.52 ± 0.56 and 24.29 ± 0.42 µg/mL respectively. An IC_{50} of superoxide and nitric oxide scavenging activity of gac extract are 69.52 ± 1.32 and 78.10 ± 1.27 µg/mL respectively An IC_{50} of anti-tyrosinase enzyme activity and anti MMP-1enzyme activity of catechin extract are 39.25 ± 0.97 and 35.36 ± 0.63 µg/mL respectively. An IC_{50} of anti-tyrosinase enzyme activity and anti MMP-1enzyme activity of gac extract are 75.64 ± 1.52 and 43.27 ± 1.16 µg/mL respectively. The catechin extract shows better result than gac extract in all four assay mentioned above.

Both catechin extract and gac extract were used in the preparation of serum. Catechin extract serum obtained is light orange smooth texture gel, with light pleasant smell and pH of 5.52. Gac extract serum is light yellow smooth texture gel, with light pleasant smell and pH of 5.45. Both serums were again evaluated for anti-tyrosinase enzyme activity and anti MMP-1enzyme activity, in order to select the serum for further studies. Catechin serum formulation CS-3 shows high % anti-tyrosinase activity and anti- MMP-1 activity of 64.48 ± 3.47 and 69.37 ± 2.84 respectively. Gac extract serum formulation FS-2 also shows high % anti-tyrosinase activity and anti- MMP-1 activity of 47.52 ± 3.75 and 60.48 ± 3.24 respectively. Therefore catechin extract serum formulation CS-3 and gac extract serum formulation FS-2 were selected for further studies due to good anti-tyrosinase activity and anti MMP-1 activity.

Both formulations CS-3 and FS-2 were subjected to stability testing by storage at alternate temperature of 4°C and 45°C for 4 cycles as well as at 4 °C, room temperature and 45°C for 1 month. The result shows that the color of catechin serum slightly darker as the storage temperature increased, but the

viscosity and pH of the serum remain the same as the initial. The color of gac extract serum slightly lighter as the storage temperature increased, but the viscosity and pH of the serum did not change.

The two formulations were also tested for skin irritation in 20 female volunteers age 28-72 years and compared with the similar marketed products. The serum sample of 0.1 gm was applied on the 2 cm^2 area of an adhesive tested patch and pressed on the upper inner arm of the subject for 4 hours. The evaluation was performed at the time the patch removed as well as 24 and 48 hours after the patched removed. Both serum did not cause any skin irritation in all tested subjects. As for satisfaction evaluation, 20 female volunteers age 28-72 years were instructed to apply prepared serum and marketed serum on cleaned face twice a day for at least 2 days before answering the questionnaire. Both catechin serum and gac extract serum are well satisfied by the volunteers more than marketed serum.

Serum effectiveness evaluation was performed, who have passed skin irritation test, for each serum. Subjects were requested to apply serum twice a day for at least 3 weeks before answering the questionnaire. Most volunteers are fairly satisfied with skin whitening and anti wrinkle effect of the serums which due to short application time and the result is not clearly shown the improvement of the skin. In over all, catechin serum is well satisfied by volunteers more than gac serum.

Keywords: *Camellia sinensis*, *Momordica cochinchinnensis,* gag, highland plants, cosmeceuticals, serum