

## Cream formulation and *in vitro* evaluation of depigmenting and cytotoxic effect of *Musa sapientum* pericarp and *Spinacia oleracea* folium

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**Background and Aims:** Since melanin formation is the most important determinant of the color of skin, the inhibition of melanin formation may result in reduction in skin darkness. Melanin is biosynthesized from tyrosine by enzymatic oxidation. Tyrosinase, rate-limiting enzyme, catalyzes tyrosine to L-DOPA and then to dopaquinone, which is used for the ultimate formation of melanin. Therefore, tyrosinase inhibitors can have a main role to treat abnormal pigmentation disorders and can be as skin-whitening agents in the cosmetic industry. Several tyrosinase inhibitors including hydroquinone, arbutin and kojic acid have been widely used for this purpose. Considering the adverse effects of synthetic drugs and public desire to natural product, and according to traditional medicine that mentioned *Musa sapientum* pericarp and *Spinacia oleracea* folium as brightener, the current research was designed and carried out.

**Methods:** In the present study, banana peel (*Musa sapientum* pericarp) and spinach leaves (*Spinacia oleracea* folium) were extracted with methanol, then freeze dried and following experiments were carried out: 1) Evaluation of tyrosinase inhibition with L-tyrosine substrate; 2) Inhibitory effects of extracts on melanogenesis in mouse B16 melanoma cells and evaluation of cytotoxicity effects on these cells. Each experiment was done three times and results reported as mean $\pm$ SEM. Based on the results, the best concentration of each extract was selected and used for preparation of cream formulation.

**Results:** Tyrosinase test showed none of the extracts were affected. In melanogenesis test, *Spinacia oleracea* folium at concentration of 1mg/ml had inhibitory effect and did not show any cytotoxic effect. But *Musa sapientum* pericarp at concentration 1 mg/ml had cytotoxic effect.

**Conclusions:** Considering inhibitory effect of *Spinacia oleracea* folium and the lack of cytotoxicity effect, this is a good choice to prepare topical formulation for inhibiting melanogenesis. It seems polyphenols, such as flavonoids, may cause this effect.

**Keywords:** Tyrosinase; Melanin; *Musa sapientum* L; *Spinacia oleracea* L.