

## Efficacy of cocoa pod extract as antiwrinkle gel on human skin surface

### ABSTRACT

**Objective:** Cocoa pods are abundant waste materials of cocoa plantation, which are usually discarded onto plantation floors. However, due to poor plantation management, the discarded cocoa pods can create suitable breeding ground for *Phytophthora palmivora*, which is regarded as the causal agent of the black pod disease. On the other hand, cocoa pods potentially contain antioxidant compounds. Antioxidant compounds are related to the protection of skin from wrinkles and can be used as functional cosmetic ingredients. Therefore, in this study, cocoa pods were extracted and to be used as active ingredients for antiwrinkles. **Methods:** The active compounds in cocoa pod extracts (CPE) were screened using liquid chromatography-mass spectrometry (LC-MS). Fibroblast cells were used to determine the effective concentration of CPE to maintain the viability for at least 50% of the cells (EC<sub>50</sub>). The gel was tested by 12 panelists to determine the efficacy of CPE in gel form using Visioscan to reduce skin wrinkles and improve skin condition. **Results:** CPE was detected to contain malic acid, procyanidin B1, rosmarinic acid, procyanidin C1, apigenin, and ellagic acid, all of which may contribute to functional cosmetic properties of CPE. The EC<sub>50</sub> value of cocoa pod extracts was used to calculate the amount of CPE to be incorporated into gel so that the formulated product could reach an effective concentration of extract while being nonintoxicant to the skin cell. The results showed that CPE is potential ingredient to reduce wrinkles. Skin wrinkles reduced at  $6.38 \pm 1.23\%$  with the application of the CPE gel within 3 weeks and significantly improved further ( $12.39 \pm 1.59\%$ ) after 5 weeks. The skin hydration increased ( $3.181 \pm 1.06\%$ ) after 3 weeks of the CPE gel application. **Conclusion:** Flavonoid compounds in CPE contributed to the functional cosmetic properties of CPE. The CPE which is nontoxic to skin cells help to reduce wrinkles on skin after 3 weeks of application. CPE can be used as the active ingredients in antiwrinkle products, and prolonged application may result in significant visual changes to the naked eyes.

**Keyword:** Antiwrinkles; Cell culture; Cocoa pod extracts; Efficacy; Formulation; Functional cosmetics