

A preliminary study of lip moisturizer rich in antioxidants produced using coffee leaf extract

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As the body's first environmental defense, the skin is exposed to various sources of free radical damage including the sun. In addition, to maintain healthy skin, it is important to maintain the moisture content not only in the deeper dermal and epidermal layers but also at the surface. As such, there are numerous skin moisturizers commercially available specially formulated to not only moisturize the body, face and the lips but also block the harmful rays from the sun to protect the skin surface. The composition of the lip moisturizers available in the market varies from brand to brand. These products often contain castor oil, carnauba wax and chemicals/ preservatives such as *propyl paraben*, *methyl paraben*, *retinyl palmitate*, *tocopheryl acetate* etc. as well as different agents to block the harmful rays from the sun. Antioxidants can be added to these products to neutralize the free radicals that can cause damage to the skin. Plant polyphenols are known to have high antioxidant activity. In this study, we have formulated a lip moisturizer with aqueous extracts from coffee leaves rich with polyphenols in an effort to develop a product that can neutralize free radical damage on the surface skin. The product was developed using bees wax, vaseline, coffee leaves and water (1: 2: 1: 11.5) with no other additional chemicals to formulate a natural healthy cosmetic. Polyphenols in the water extract was extracted in to methanol by removing the proteins using chloroform. The polyphenol content in the aqueous extract (0.18 ± 0.01 mg/ml) was measured by *Folin-Denis* assay as Gallic acid equivalent, using water as the control. The antioxidant activity of the extract was measured by DPPH radical scavenging assay. The percentage inhibition of DPPH radical scavenging activity of the aqueous extract of the coffee leaves measured using water as the blank gave $83.46 \pm 0.11\%$ of inhibition. Each sample was assayed three times for three biological replicates. The polyphenol content and the percentage inhibition of DPPH radical scavenging activity of the aqueous extracts, extracted from the formulated lip moisturizer were 0.14 ± 0.01 mg/ml and $83.44 \pm 0.43\%$ respectively. There is no statistically significant difference in the polyphenol content and the antioxidant activity between the aqueous extracts ($p < 0.01$). Lip moisturizer produced without the addition of coffee leaf extract was used as the control. According to the DPPH assay $99.97 \pm 0.27\%$ of percentage inhibition of DPPH radical scavenging activity was retained. Therefore, the lip moisturizer formulated with the coffee leaf extract retained the antioxidant properties.

Keywords: Coffee leaves, Lip moisturizer, Antioxidants, Polyphenols