

Specification : Black Pepper Leaf Extract (Manose RM-0082)

Application : An active ingredient for hair darkening products

1. Name of the raw material : Black pepper leaf Extract
2. Active components : Alkaloids, steroids, terpenoids, flavonoids, tannins and saponins^(1,2)
3. Common and scientific name/ Family of the plant : Black pepper (*Piper nigrum* L.)/ Piperaceae
4. Physical appearance : Dark brownish semi-solid⁽³⁾
5. pH : 4.68⁽³⁾
6. Standardization : HPLC fingerprint using cubebin as a marker⁽⁴⁾
7. Solubility : Soluble in alcohol⁽³⁾
8. Microbial contamination : No pathogenic microorganism with less than 1,000 cfu/g of the total plate count of bacteria, yeast and fungi which is conformed to the Thai FDA regulation⁽³⁾
9. Biological activities :
 - Antioxidative activity by DPPH radical scavenging with the SC₅₀ value of 0.08±0.01 mg/ml (ascorbic acid = 0.10±0.01 mg/ml)⁽³⁾
 - Melanin stimulation activity in melanoma (B16F10) with melanin content relative ratio of 136.87±24.32% at 1 mg/ml 109.05±11.42% (theophylline at 0.1 mg/ml = 131.52±32.30%)⁽³⁾
 - Tyrosinase stimulation activity in melanoma (B16F10) with tyrosinase content relative ratio of 140.78±57.52% at 1 mg/ml (theophylline at 0.1 mg/ml = 116.58±41.25%)⁽³⁾

10. Animal / human performance test : -
11. Safety : No cytotoxicity on human skin fibroblasts with cell viability of $128.96 \pm 4.63\%$ at $1 \text{ mg/ml}^{(3)}$
12. Pharmaceutical, food supplement or cosmetic applications : Products for hair darkening⁽³⁾
13. Recommended concentrations in the product : $1 - 5 \%w/w^{(3)}$
14. Storage : Keep in tight and light protection container at room temperature
15. Precautions : None
16. Cost per kg : Please request

References

1. Parameswaran NK., Manjusha S. and Malar RS. (2018). Studies on qualitative phytochemical analysis and antibacterial activity of *Piper nigrum*. Indo American Journal of Pharmaceutical Science, 5(4). 2912-2918.
2. Onyesife CO., Ogugua, VN. and Anaduaka EG. (2014). Investigation of some important phytochemicals, vitamins and mineral constituents of ethanol leaves extract of *Piper Nigrum*. Annals of Biological Research, 5. 20-25.
3. Manose In-house Project “Development of serum containing extracts from Thai medicinal plants for hair darkening stimulation” Manose Health and Beauty Research Center (www.manose.co), unpublished, 2022.
4. Matsuda H., Kawaguchi Y., Yamazaki M., Hirata N., Naruto S., Asanuma Y., Kaihatsu T. and Kubo M. (2004). Melanogenesis stimulation in murine B16 melanoma cells by *Piper nigrum* leaf extract and its lignan constituents. Biol Pharm Bull., 27(10). 1611-1616.