

Extract of *Neonauclea reticulata* Merr attenuates UVB-induced skin photoaging by inhibiting ROS, MMPs and MAP kinase expression

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Objective:

UV irradiation of skin not only decreases antioxidant defensive system, but also increases reactive oxygen species (ROS) which form oxidative stress. Increased ROS production alters gene and protein structure and function leading to skin damage. UV radiation also stimulates the expressions of matrix metalloproteinases-1, -3 and -9 (MMP-1, -3 and -9) in dermis, which degrades the extracellular matrix (ECM). Polyphenols and flavonoids possessed a variety of biological activities including anti-oxidation and inhibitory effects on MMP-1, -3 or -9 in dermis. *Neonauclea reticulata* belongs to Rubiaceae and flavonoids are widely distributed in these plants. The aim of this study is to investigate the antioxidant and anti-photoaging effects of *Neonauclea reticulata*.

Materials and methods:

The antioxidant effect was examined by DPPH scavenging and AAPH-induced haemolysis assay. The effects and mechanisms of the extract will be investigated by gelatin digestion, fluorescence-substrate assay, type I procollagen assay and MTT assay in human fibroblasts (Hs68) after UV exposure.

Results:

The result of gelatin digestion assay showed that the *Neonauclea reticulata* extract (NRW) inhibited bacterial collagenase-1 activity at 1 mg/mL. In fluorescence-substrate assay, the inhibition of the NRW on bacterial collagenase-1 activity showed a dose-dependent manner within 10-500 µg/mL. Furthermore, the NRW for the DPPH radical-scavenging activity at the concentration of 50 µg/mL was similar to that of ascorbic acid. The NRW also possessed inhibitory activity against AAPH-induced haemolysis of erythrocytes in dose- and time-dependent manner at concentrations of 50 to 500 µg/mL from 1 to 4 h. The results shown that pretreated with the NRW at the concentration of 25, 10 and 50 µg/mL could decrease the expression of MMP-1, -3 and -9, respectively. In addition, the NRW has no cytotoxicity.

Conclusion:

NRW attenuated MMP-1, -3, -9 expression in fibroblast induced by UVB irradiation, and that these effects of the extract were mediated by the antioxidant activity and inhibition of UVB-induced MAP kinases activation. They could be a potential cosmeceutical material to improve wrinkle of intrinsic aging and photoaging skin.

Reference:

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2. Chiang, H. M., T. J. Lin, C. Y. Chiu, C. W. Chang, K. C. Hsu, P. C. Fan, and K. C. Wen (2011), *Coffea arabica* extract and its constituents prevent photoaging by suppressing MMPs expression and MAP kinase pathway, *Food Chem Toxicol*, 49(1), 309-318.