

# Phenolic constituents of *Malus doumeri* var *formosana* in the application of skin care

呂思潔

Leu SJ;Lin YP;Lin RD;Wen CL;Cheng KT;Hsu FC;Lee

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摘要

## Abstract

Plant phenolic compounds isolated from a 70% aqueous acetone extract of the leaves of *Malus doumeri* A.CHEV. Var. *formosana* (KAWAK. & KOJIZ.) S.S. YINC, a type of Taiwanese indigenous plant, were evaluated for potential application in the field of skin care. A phytochemical investigation of the active fractions resulted in the isolation of seven compounds of which the structures were identified by spectroscopic characterization. In the present study, the isolated phenolic compounds were evaluated for their free radical-scavenging activities against 1,1-diphenyl-2-picrylhydrazyl (DPPH) and the superoxide radicals, anti-elastase, and for their anti-matrix metalloproteinase-1 (MMP-1) activity in human skin fibroblast cells. Of these compounds, 3-hydroxyphloridzin (2), 3-hydroxyphloretin (6), and quercetin (7) exhibited the strongest DPPH and superoxide radical-scavenging activities. The IC<sub>50</sub> values of these compounds were 9.2, 7.7, and 15.4 μM, respectively, for the DPPH radical, and 25.0, 19.6, and 42.6 μM, respectively, for the superoxide radical. 3-Hydroxyphloridzin (2) and 3-hydroxyphloretin (6) also showed xanthine oxidase inhibitory activity, with IC<sub>50</sub> values of 52.1 and 22.4 μM, respectively. In the test for elastase inhibitory activity, phloretin (5) and 3-hydroxyphloretin (6) were the most potent compounds. Phloretin (5), 3-hydroxyphloretin (6), and quercetin (7) showed better inhibition of MMP-1 production in fibroblast cells. To the best of our knowledge, this is the first time that the active phenolic compounds from *M. doumeri* var. *formosana* have been isolated, reported, and described. The above results suggest that the extract of *M. doumeri* var. *formosana* containing phenolic compounds could be suitable naturally occurring active constituents for use in anti-aging or cosmetic products.

