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Antimicrobial Constituents of *Vitis amurensis* against Selected Oral Pathogens

Do Thi Ha[1], Nam-Hui Yim[1], Tran Minh Ngoc[1], Iksoo Lee[1], Trinh Nam Trung[1], Jin Pyo Kim[1], and KiHwan Bae[1]

[1] College of Pharmacy, Chungnam National University, Daejeon 305 - 764, Korea;

머루나무의 항충치균 성분

도티하[1], 임남희[1], 잔민넉[1], 이익수[1], 친남충[1], 김진표[1], 배기환[1,*]

충남대학교 약학대학

Purpose

Vitis amurensis Rupr. (Vitaceae), a wild-growing grape, is widely distributed in Korea, China, and Japan. The root and stem have been used to relieve pain from injury, rheumatalgia, stomachache, neuralgic pain, and abdominal pain. Recently studies reported that the root possesses anti-inflammatory and anti-tumor activity and contains a richness of structurally diverse resveratrol oligomers. However, no study related to the potence antimicrobial of the plant and it isolated compounds. This research deal with the evaluation on the antimicrobial activity of crude extract and it isolated compounds.

Materials and Methods

The leaf and stem of V. amurensis were collected in Keryong Mountain, Daejeon, Korea, in July 2007. Botanical identification was performed by Professor KiHwan Bae, and the voucher specimen (CNU-1552) was deposited at the herbarium of the College of Pharmacy, Chungnam National University, Daejeon, Korea.

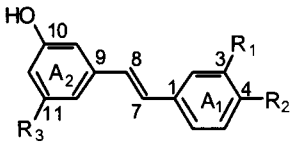
The bacteria strains, Streptococcus mutans and Streptococcus sanguis, were suspended in Todd-Hewitt broth (Difco, USA) and incubated at 37℃ for 20 h. Todd-Hewitt agar(Difco, USA) was used for the agar diffusion method. Determination of antibacterial activity were checked to agar diffusion method. Steriled filter paper disk (8 mm) were soaked with 10 $\mu\ell$ of extract residue and isolated active compounds from V. amurensis. The plates were then incubated for 20 h at 37℃. The antibacterial activity was evaluated by measuring the diameter (mm) of the inhibition zone.

Result and Discussion

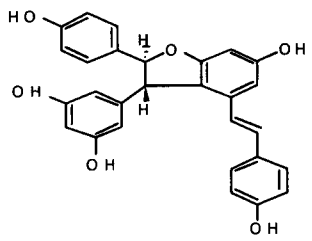
A part of a project directed toward the discovery of oral antimicrobial plants, methanol extract of leaf and stem of Vitis amurensis showed significant activity against Streptococcus mutans (S.mutans) and Steptococcus sanguis (S. sanguis). Further phytochemical study led to isolate nine known resveratrol derivatives

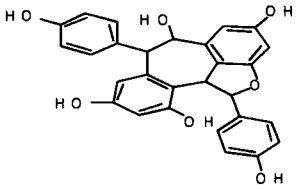
Coresponding author: (Phone) +82-42-821-5925 (E-mail) baekh@cnu.ac.kr)

(i.e., trans-resveratrol (1), piceatannol (2), trans-ε-viniferin (3), (+)-ampelopsin A (4), (+)-ampelopsin F (5), amurensin G (6), r-2-viniferin (7), (+)-trans-piceid (8), and piceatannol-3-O-D-glucoside (9)). All the isolated compounds were evaluated the antimicrobial efficacy against two oral pathogens, S. mutans and S. sanguis associated with carries, periodontal and bacterial endocarditic diseases, respectively. Compounds 1 - 9 inhibited the growth of test bacterial with concentrations ranging from 25 to 400 μg/mL. Except for compound 3, resveratrol monomer (1,2) showed greatly enhanced antimicrobial activity when compared with their glycosides (8,9) and resveratrol dimers (4,5), trimers (6), and tetramers (7).

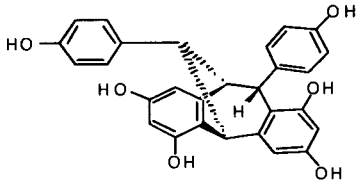


	R1	R2	R3
Resveratrol (**1**)	H	OH	H
Piceatannol (**2**)	OH	OH	OH
Piceid (**8**)	H	OH	OGlc
Piceatannol-3-O-D-Glc (**9**)	OGlc	OH	OH

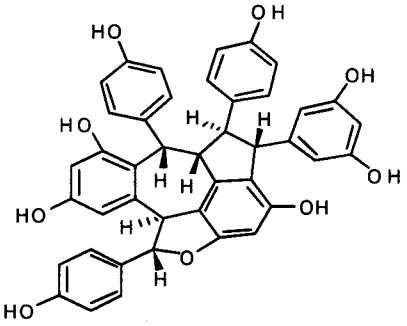




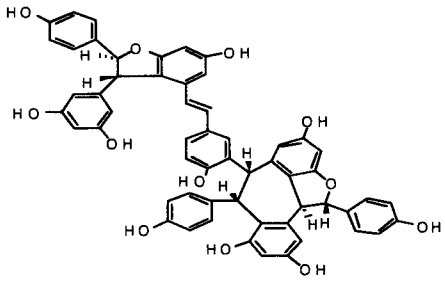
trans-ε-Viniferin (**3**)



(+)-Ampelopsin A (**4**)



(+)-Ampelopsin F (**5**)



Amurensin G (**6**)

Viniferin (**7**)

Structures of isolated compounds from the leaf and stem of *Vitis amurensis*