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Phytochemical Constituents from the Fruits of Bitter Melon

Department of Integrative Plant Science, Chung-Ang University, Anseong 456-756, Korea : So-Youn Mok, Hye Min Kim, Jeong Min Lee, Dong Gu Lee, Sanghyun Lee*
Department of Food Science and Nutrition, Pusan National University, Busan 609-735, Korea : Eun Joo Cho
Department of Food Science, Gyeongnam National University of Science and Technology, Jinju 660-758, Korea : Hyun Young Kim

여주의 식물성분

중앙대학교 : 목소연, 김혜민, 이정민, 이동구, 이상현*
부산대학교 : 조은주
경남과학기술대학교 : 김현영

Objective

Isolation of phytochemical constituents from the fruits of bitter melon (*Momordica charantia*) and their structure elucidation.

Materials and Methods

○ Plant materials : The fruits of bitter melon

○ Methods : The dried and finely powdered fruit part of bitter melon (*Momodica charantia*) which was extracted with MeOH under reflux and solvent was evaporated *in vacuo* to give brown residue. The residue was suspended in H_2O and partitioned with *n*-hexane, CH_2Cl_2, ethyl acetate, and *n*-butanol, successively. A section of the *n*-hexane fraction was chromatographed on a Si gel (6 × 80 cm, No. 7734) column, packed in *n*-hexane, eluting with a step gradient of *n*-hexane/EtOAc followed by EtOAc, all fractions being monitored by TLC. Elution of the Si gel column with *n*-hexane/EtOAc (9:1) afforded compound **1**. A section of the *n*-butanol fraction (9.5 g) was chromatographed on a Si gel (6×80 cm, No. 7734) column, packed in CH_2Cl_2, eluting with a step gradient of CH_2Cl_2/MeOH followed by MeOH, all fractions being monitored by TLC. Elution of the Si gel column with CH_2Cl_2/MeOH (1:9) and CH_2Cl_2/MeOH (2:8) afforded compounds **2** and **3**.

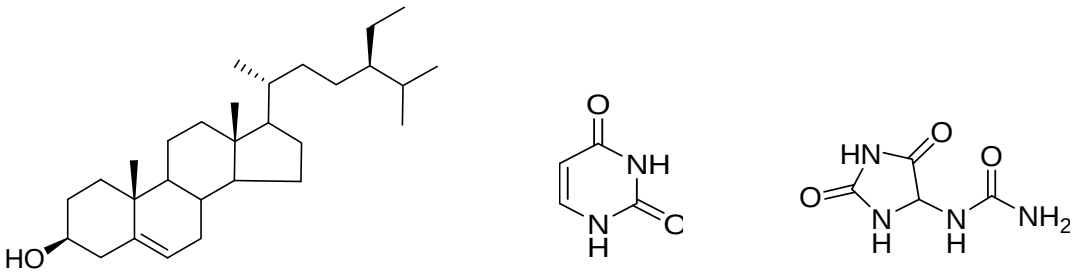
Corresponding author: Sannhyun Lee Tel: 031-670-4688 e-mail: slee@cau.ac.kr

Results

○ Compound **1** showed a molecular ion peak at *m/z* 414 $[M]^+$ in the EI-MS. The ^{1}H-NMR spectrum of **1** showed existence of sterol skeleton. The two angular methyl singlets of 18- and 19-Me at δ 0.68 and 1.01 ,and the three doublets of 21-, 26-, and 27-Me at δ 0.96, 0.83 and 0.80, and the one triplet of 29-Me at δ 0.91 were observed, respectively. The olefinic proton broad doublet one signal at δ 5.35 was showed H-6. The ^{13}C-NMR spectrum of **1** showed 27 resonances, and C-5 and -6 signals were noticed at δ 141.1 and 122.2, respectively. Accordingly, the structure of **1** was elucidated as β-sitosterol.

○ Compound **2** was showed a molecular ion peak at *m/z* 112 $[M]^+$ in the EI-MS, which corresponds to a molecular formula of $C_4H_4N_2O_2$. In the ^{1}H-NMR spectrum of **2**, doublets at δ 7.51 (J = 7.5 Hz) and 5.80 (J = 7.5 Hz) assigned H-6 and -5 of pyrimidine, respectively. Accordingly, the structure of **2** was elucidated as uracil.

○ In the EI-MS spectrum of **3**, molecular peak showed at *m/z* 158 $[M]^+$corresponding to the molecular formula $C_4H_6N_4O_3$. In the ^{1}H-NMR spectrum of **3** showed alkaloid compound. It curve was obtained relating the peak height of the down-field proton atδ 10.53. The broad amino signal at δ 5.77 gradually disappeared and was replaces by a sharp singlet, presumably -NHC<u>H</u>NH- further down-field at δ 5.23. Accordingly, the structure of **3** was elucidated as a alkaloid, named allantoin.



1 2 3

Fig. 1. Chemical structures of a sterol (**1**) and two alkaloids (**2** and **3**) isolated from the fruits of bitter melon.