

Chemical Constituents of Rice (*Oryza sativa*) Hulls and Their Inhibitory Activity against Radish Seeds

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Objective

Isolation and identification of Rice (*Oryza sativa*) hulls constituents having herbicidal (inhibitory) activity. To comply with these objective in this study isolate and identify such constituents.

Materials and Methods

Rice Varieties

The rice hulls of *O. sativa* were collected at Konkuk University experimental field in Korea.

Methods

Extraction of Rice hulls. The powdered hulls of *O. sativa* were immersed in MeOH for a week at room temperature and then concentrated in vacuo to yield extract. This material was suspended in water and extracted with EtOAc and *n*-BuOH successively to produce ethyl acetate and butanol extract.

Results and Discussion

Rice (*Oryza sativa* L.) is the principal cereal food in Asia and the major staple food of the majority of the population. It generally consists of two types: white and colored hulled, but the most common is white (85%). The germination of rice is of great agricultural importance and it has long been known that it is influenced by compounds present in the seed coat (hull). During investigations of rice hulls we have found six more compounds as 4-methyl stigmast-9(11)-en-3 α -ol-3 β -D-glucopyranoside (1), cholest-11-en-3 β , 6 β , 7 α , 22 β -tetraol-24-one-3 β -palmitoleate (2), β -sitosteryl-3 β -D-glucopyranosyl-6'-linoleate (3) 1-methoxy-2-hydroxyanthracene (4), 1-Hydroxy-7-(3', 7'-dimethyl-octanoic acid)-anthracenyl ester 2-O- β -D-glucopyranoside (5), and 1-Hydroxy-7-(3', 7', 11', 15', 19'-pentamethyl-tricosanoic acid)-anthracenyl ester-2-O- β -D-glucopyranoside (6). The structures of 1-6 determined by spectral methods, viz., ^1H - and ^{13}C -NMR and 2D-NMR aided by EI/MS, FAB/MS, high resolution mass, IR and the evaluation of their inhibitory (herbicidal) activities against radish seeds and compounds 3, 4 showed good inhibition to radish germination, growth of shoot and root length, whilst compounds 1, 2, 5, 6 exhibited weak inhibition than compounds 3, 4.

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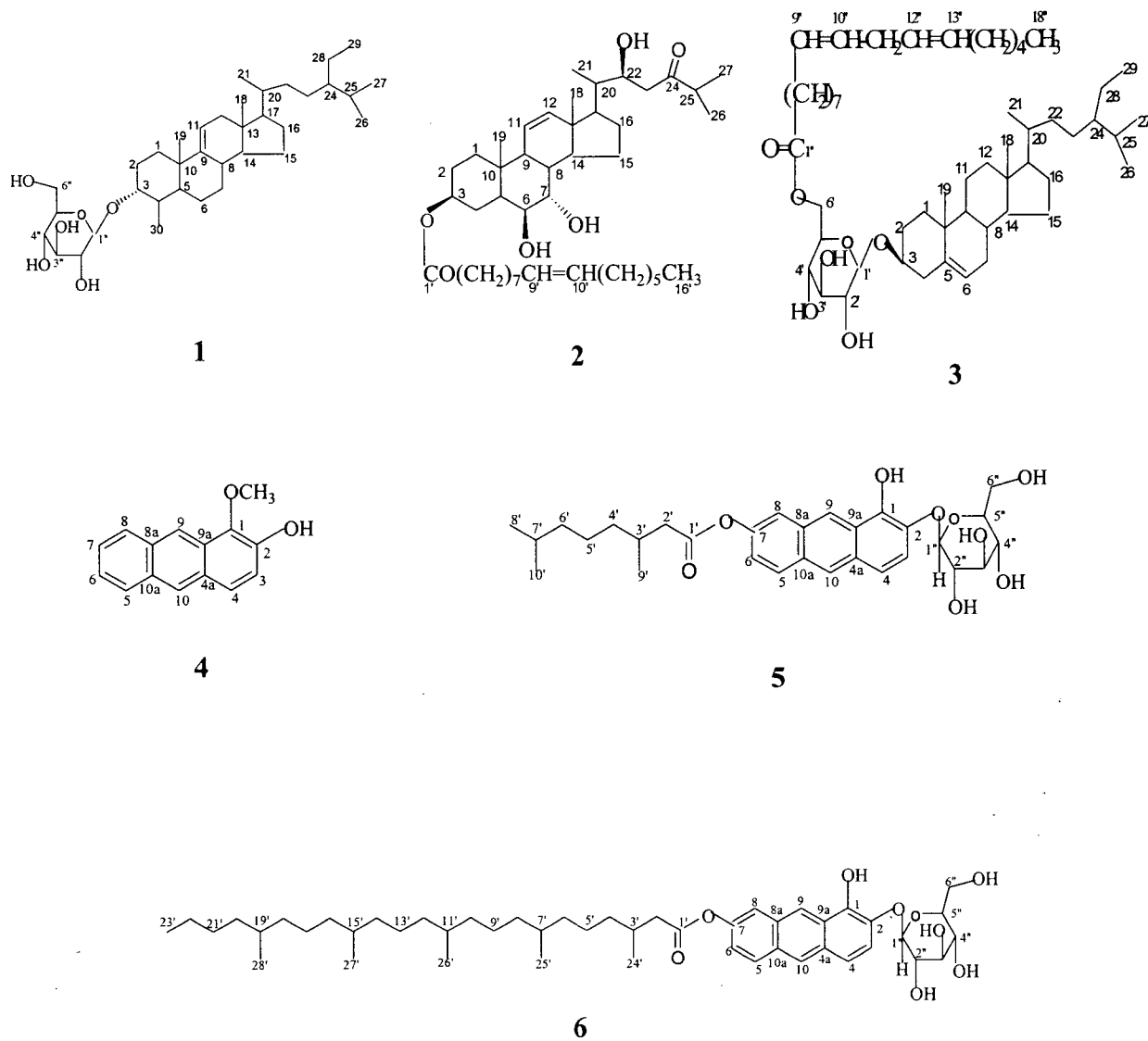


Figure 1. Chemical structures of new compounds 1-6