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Inhibitory effects of the compounds isolated from Purple corn on aldose reductase and advanced glycation end-products formation

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Anthocyanins have been reported to have various potential health benefits such as antioxidant capacity, antimutagenic activity, and chemopreventive activity contributing to a reduced incidence of chronic diseases. Researchers have shown that an anthocyanin from purple corn was able to inhibit cell mutation, reduce chemically induced colorectal carcinogenesis, and may aid in the prevention of obesity and diabetes. Eight anthocyanins, cyanidin-3-glucoside (1), pelargonidin-3-glucoside (2), peonidin-3-glucoside (3), cyanidin-3-(6″-malonylglucoside) (4), pelargonidin-3-(6″-malonylglucoside) (5), cyanidin-3-(dimalonylglucoside) (6), cyanidin 3-(6-acetylglucoside) (7), and peonidin-3-(6″-malonylglucoside) (8), and five phenolic acids, protocatechuic acid (9), vanillic acid (10), 2,4,6-trihydroxybenzoic acid (11), p-hydroxycinnamic acid (12), caffeic acid (13), and two flavonoids, hirsutrin (14) and 3′-methoxy hirsutrin (15) were isolated from the EtOAc-soluble extract of the kernel of purple corn. The structures of 1-15 were identified by spectroscopic methods including NMR and MS.

Table.1 Identification of the major anthocyanins detected in the kernel of purple corn

Compound[1]	R_t (min)	UV/Vis λ max (nm)	LC-ESI-MS		Structure
			$[M]^+$ (m/z)	Fragments $[M+H]^+$ (m/z)	
1	7.45	515, 279	449	287	Cyanidin 3-glucoside
2	10.47	504, 278	433	271	Pelargonidin 3-glucoside
3	12.98	515, 279	463	301	Peonidin 3-glucoside
4	18.47	517, 280	535	449, 287	Cyanidin 3-(6"-malonylglucoside)
5	21.73	504, 350, 264	519	271	Pelargonidin 3-(6"-malonylglucoside)
6	22.02	525, 279	621	287	Cyanidin 3-(dimalonylglucoside)
7	23.38	517, 279	549	301	Peonidin 3-(6"-malonylglucoside)
8	24.13	525, 279	491	287	Cyanidin 3-(6-acetylglucoside)

1Compounds 1-8 were identified based on photo didode array absorbance and mass fragmentation pattern.

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The isolates were subjected to *in vitro* bioassays to evaluate their inhibitory effects on the rat lens aldose reductase (RLAR) and advanced glycation end-products (AGEs). Among them, cyanidin-3-(6″-malonylglucoside) (4) and hisutrin (14) showed significant inhibitory activity on RLAR and on AGEs formation, respectively. As a result, these compounds could be proposed as a leading compound for further study as a new natural products drug that could be used for anti- diabetic agent..

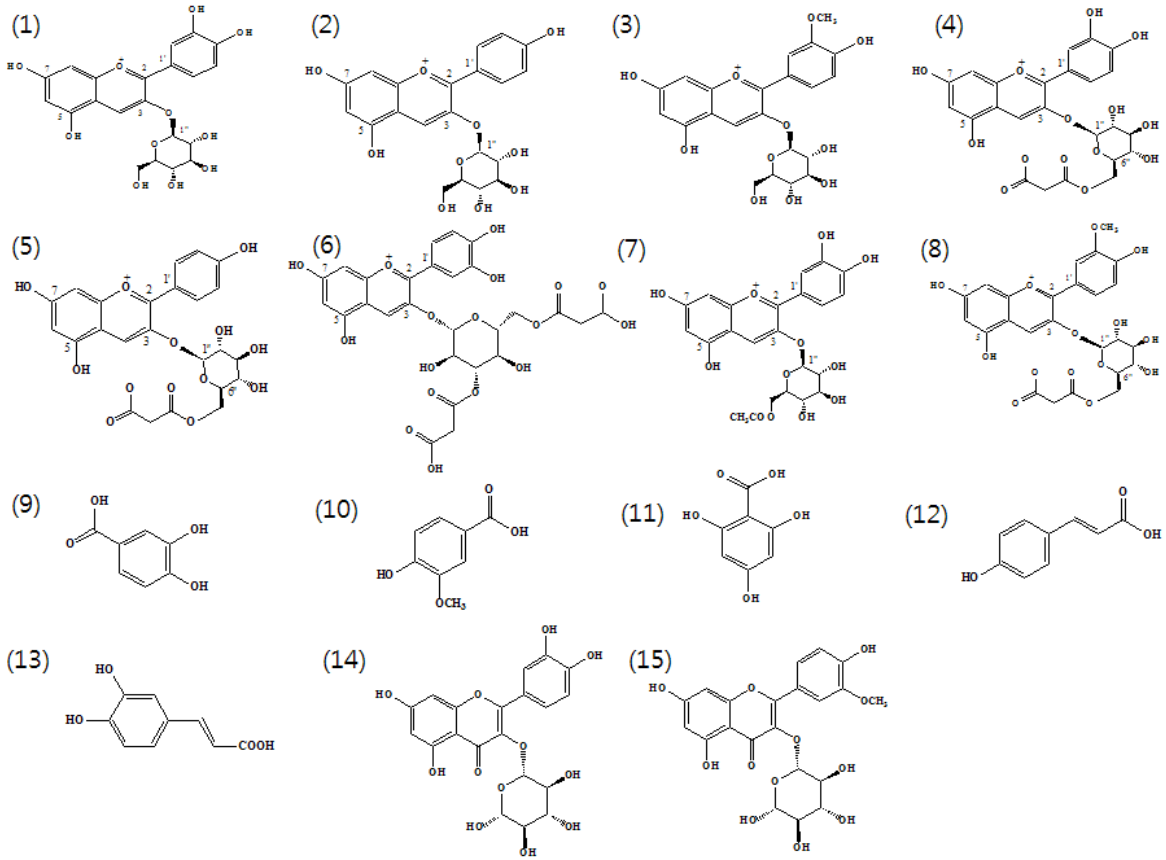

Fig.1 Structures of compounds identified from the purple corn kernel; cyanidin 3-glucoside (1), pelargonidin 3-glucoside (2), peonidin 3-glucoside (3), cyanidin 3-(6”-malonylglucoside) (4), pelargonidin 3-(6”-malonyl glucoside) (5), cyanidin-3-(dimalonylglucoside) (6), cyanidin 3-(6”-acetylglucoside) (7), peonidin 3-(6”-malonyl-glucoside) (8), protocatechuic acid (9), vanillic acid (10), 2,4,6-trihydroxybenzoic acid (11), p-hydroxycinnamic acid (12), caffeic acid (13), hirsutrin (14), 3’-methoxy hirsutrin (15)