

Inhibitory effects of the compounds isolated from the kernel of purple corn
(*Zea mays*. L.) on protein tyrosine phosphatase-1 β

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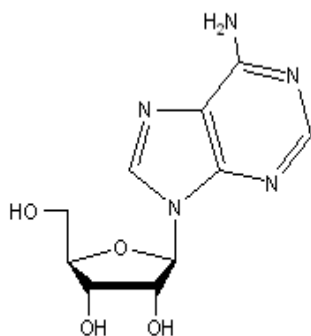
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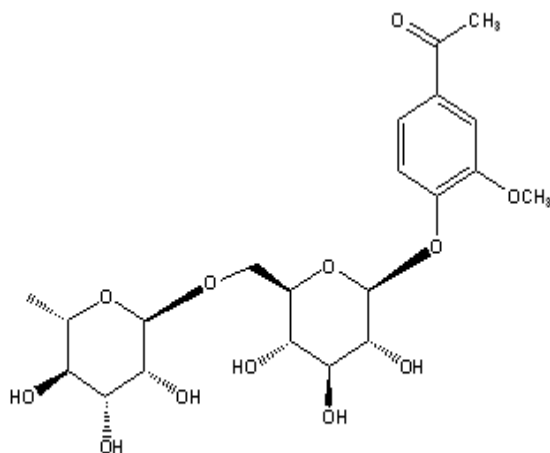
The aim of this study was to evaluate active principles for identification of anti-diabetic component from purple corn (*Zea mays*. L.). The anthocyanins of purple corn (*Zea mays* L.) have a very long history as colouring agents, apparently having been used by Inca civilisation. Anthocyanins, flavonoid pigments present in a wide range of plant products, and attaining greater prominence owing not only to their colourant potential but also to their health implications. 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.

The isolates were subjected to *in vitro* bioassays to evaluate their inhibitory effects on protein tyrosine phosphatase-1 β (PTP-1 β). Among them, cyanidin-3-(6''-malonylglucoside) (4) and 3'-methoxy hisutrin (15) showed significant inhibitory activity on PTP-1 β . 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.

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(1)



(2)

Table 1. Inhibitory effects of phenolic compounds and extracts from purple corn on PTP-1 β

| | concent ration ($\mu\text{g/mL}$) | Inhibition (%) | IC ₅₀ ($\mu\text{g/mL}$) |
|--------------------------|---|-------------------|--|
| Purple corn EtOH ext. | 100 | 19.10 | |
| ARF ^a | 100 | 39.45 | |
| ARF-MC layer | 100 | 96.06 | 44.84 |
| | 50 | 55.69 | |
| ARF-EA layer | 10 | 19.80 | 58.20 |
| | 100 | 70.89 | |
| | 50 | 45.09 | |
| ARF-BuOH layer | 10 | 26.87 | |
| | 100 | 41.03 | |
| C-3-G ^b | 100 | 32.95 | |
| P-3-G ^c | 100 | 25.76 | |
| Pg-3-G ^d | 100 | 55.05 | 224.97 |
| | 50 | 13.35 | |
| | 10 | 1.09 | |
| C-3-M-G ^e | 50 | 91.73 | 22.42 |
| | 10 | 36.24 | |
| | 5 | 18.54 | |
| P-3-M-G ^f | 100 | 34.72 | |
| 3'-methoxy- hirsutrin | 50 | 85.89 | 30.61 |
| | 25 | 36.84 | |
| | 10 | 15.02 | |
| hirsutrin | 100 | 30.30 | |
| | 5 | 64.32 | |
| | 2.5 | 46.46 | |
| Suramin | 1 | 10.69 | 3.58 |

^a Anthocyanin-rich fraction, ^b Cyanidin-3-glucoside, ^c Peonidin-3-glucoside,

^d pelargonidin-3-glucoside, ^e Cyanidin-3-(6''-malonyl-glucoside), ^f peonidin-3-(6''-malonyl-glucoside)