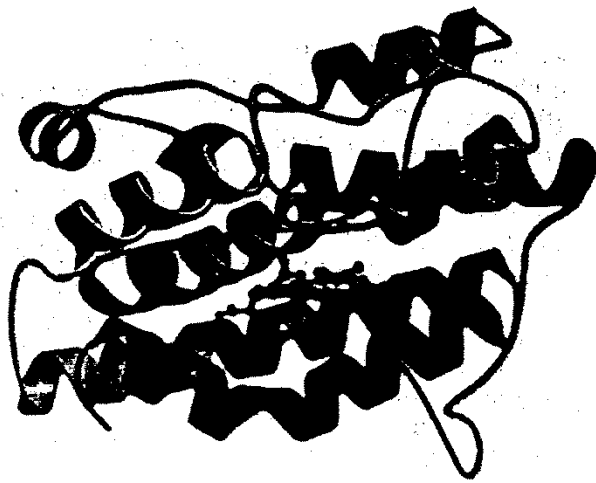


WORKSHOP

HEME-OXYGENASE AND
OXIDATIVE STRESS



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BETANIN INHIBITS MYELOPEROXIDASE/NITRITE-MEDIATED PEROXIDATION OF HUMAN LOW-DENSITY LIPOPROTEIN

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Betanin, the red pigment of the Caryophyllales order of plants, has reducing properties and behaves as lipoperoxyl radical-scavenger *in vitro* (1). In addition, it is bioavailable, accumulates in human LDL after ingestion of cactus pear fruits, and protects LDL against copper-induced oxidation *in vitro* (2,3). Nitrite, a product of nitric oxide metabolism, and myeloperoxidase (MPO) are considered mediators of the *in vivo* LDL oxidative modification and atherogenesis (4). In the presence of nitrite, the enzyme generates two oxidizing agents, the tyrosyl radical and the nitrosyl one, both of which are involved in promoting the LDL lipid oxidation (4). We then investigated whether betanin counteracted the MPO/nitrite-induced oxidation of LDL.

Betanin inhibits the LDL oxidation, in a dose-dependent manner, in the range 1 to 10 μM . The effectiveness of betanin was compared with that of α -tocopherol and ascorbic acid. In accordance with other studies (4) α -tocopherol, a very powerful lipoperoxyl radical scavenger with a scarce or no effect on the hydrophilic oxidants generated by nitrite, exhibited a very modest protection of LDL lipids. On the contrary, vitamin C, which is able to scavenge the peroxidase-generated nitrating species, was very efficient in counteracting the MPO/nitrite-sustained lipid peroxidation. Betanin was much more effective than vitamin C. The IC_{50} measured for betanin (1.4 μM) was more than 10-fold lower than that of ascorbic acid (15.6 μM).

Conclusively betanin, a phytochemical occurring in the cactus pear fruit, can protect LDL in an experimental set-up of physiological relevance, acting at micromolar concentrations, with an effectiveness higher than ascorbic acid. Our data may contribute to explain the observed beneficial effect of the cactus pear fruit consumption (2).

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