Chemical constituents of endemic species grow in Turkey: Centranthus longiflorus and its new cholesterol-lowering plant sterol ester: beta-sitosteroster

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Introduction: Beta-sitosteroster is a substance found in plants. Chemists call it a plant sterol ester. It is found in fruits, vegetables, nuts, and seeds. It is used to make medicine. Beta-sitosteroster is used for heart disease and high cholesterol. The federal Food and Drug Administration (FDA) allows manufacturers to claim that foods containing plant sterol esters such as beta-sitosteroster are for reducing the risk of coronary heart disease (CHD). Centranthus longiflorus (CL) is used in alternative medicine for sleep disorders. A plant of Turkish origin, CL used as folk medicine have remained uninvestigated for familial hypercholesterolemia, coronary artery disease and preventing colon cancer for their disorders. A plant of Turkish origin, CL used as folk medicine and Drug Administration (FDA) allows manufacturers to claim that foods containing plant sterol esters such as beta-sitosteroster are for reducing the risk of coronary heart disease (CHD). Centranthus longiflorus (CL) is used in alternative medicine for sleep disorders. A plant of Turkish origin, CL used as folk medicine have remained uninvestigated for familial hypercholesterolemia, coronary artery disease and preventing colon cancer for their disorders. A plant of Turkish origin, CL used as folk medicine.

Material and method: Aerial parts of CL were collected in Erzurum province. Hexane, ethyl acetate and ethanol extraction were done by Soxhlet extractor. The plant extracts obtained from the aerial parts of CL was analyzed using a Perkin-Elmer GC-MS system.

Results: Ten compounds were obtained and identified as Butanoic acid, hexadecanoic acid (palmitic acid), 7-Methyl-2-tetradececn-1-ol acetate, octadecanoic acid (stearic acid), 9-Octadecenamide, octacosane, nonacosane, alfa amyrin and beta sitosteroster. The latter two were obtained in all extraction (hexane, ethyl acetate and ethanol).

Discussion and conclusion: All of these compounds are isolated from Centranthus longiflorus for the first time. These findings may shed light on the design of new drugs, the cholesterol-lowering effect.

Role of lutein for the high light-induced inhibition of photosystem II related reactions in thylakoid membranes of Arabidopsis thaliana, wt and lut2

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Photosynthetic reactions taking place in thylakoid membranes of higher plants are extremely sensitive towards different environmental stress conditions such as high and low temperature, high light intensity, UV radiation etc. Carotenoids are intrinsic component of photosynthetic pigment-protein complexes and are involved in performing multiple important functions. Their role of accessory pigments in absorbing sun light, participation in photoprotection via dissipation of excess absorbed light, deactivating of stress-induced reactive oxygen species and structural role are well documented and recognized. The role of lutein in high light-induced alterations in structural organization and functional activity of the main pigment-protein complexes was evaluated using isolated thylakoid membranes of Arabidopsis thaliana, wt and mutant lut2, deficient in lutein, subjected to photoinhibitory treatment for different periods of time. Alterations in photochemical activity of photosystem I and photosystem II were determined by a Clark-type electrode in the presence of exogenous electron donors and acceptors. Activity of oxygen-evolving complex and of the grana and stroma situated photosystem II reaction centers was evaluated by determination of flash oxygen yields and initial oxygen burst under constant light without donors and acceptors. Low-temperature (77K) fluorescence was applied for unraveling of light-induced alterations in energy transfer and interaction between the main pigment-protein complexes. Maximal quantum efficiency of PSII was registered by Pulse Amplitude modulated fluorescence method. Results obtained are discussed in respect to the importance of lutein for the organization and sensitivity of photosynthetic apparatus towards high light intensity treatment.

Expression of bacterial phytase in Arabidopsis thaliana plants

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Modern agriculture relies heavily on phosphate rock fertilizer to improve phosphorus availability in many soils, but this approach is not sustainable long-term. Phytate (myo-inositol hexakisphosphate) is an organic phosphorus compound often present in many soils. However, phytate can not be utilized by most plants, and its accumulation in soil leads to substantial ecological problems. Phytases are enzymes that hydrolyze phytate and release inorganic phosphate. Many microorganisms such as bacteria and fungi synthesize highly diverse phytases which are suitable for plant biotechnology. Generation of transgenic plants expressing phytases of bacterial origin has been proposed as one option to improve plant phosphorus nutrition.

In this study, we generated and characterized transgenic Arabidopsis thaliana plants expressing a modified phytase gene PaPhyC from Pantoea sp. under strong CaMV35S promoter. Three individual transgenic A. thaliana lines expressing the bacterial phytase gene, as well as negative control plants harboring the CaMV35S promoter alone were identified. Expression of phytase in plants was verified at both transcription and translation levels.