

Possibility of surveying the physiological condition of trees growing in urban areas by means of total phenol content and antioxidant capacity determined from the leaves

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The goal of the present research was to investigate how some specific chemical parameters of the leaves could reflect the physiological and health state of individuals of a given tree species (Norway Maple, *Acer platanoides* L.) growing in an urban area. Two trees were considered for research, from which leaves were collected and analysed. The trees originated not only from different parts of Sopron, Hungary but they can also be characterized with different living environments in terms of environmental load. The control tree is located in the botanical garden of the University of West Hungary while the sample tree can be found at Csengery street. The latter location can be characterized with heavy traffic and associated environmental load. Leaves were collected during the growth season between May and September at altogether nine occasions. At one sampling occasion seven leaves were collected from one tree from different parts of the foliage.

From all of the leaves total phenol content has been determined which gives information on the total phenolic extractive content of the leaf tissues. Plant phenols are significantly involved in the response to both biotic and abiotic stress and play a major part in the defense processes of plant tissues. Besides antioxidant capacity (AO) has also been determined from the same leaves using the DPPH assay. AO reflects the specific amount of antioxidative and radical scavenging compounds found in plant tissues and can directly be related to the protective ability of the living cells, which provides a basis for the characterisation of the physiological state of the tissue. As plant phenols are also important antioxidants on the basis of previous findings and assumptions a close correlation between the two measured parameters can be presumed.

Different types of environmental impacts could trigger biochemical processes of various type and extent which will result in the change of the level of the measured parameters as well as the parameters of the correlations between them. Comparing the two parameters and investigating the environmental-load-sensitivity of the correlations new possibilities could open up for the characterization of the physiological state of the plant as whole and for the characterization and quantitation of the differences between control and sample individuals.

By the further involvement of environmental parameters (e.g. sunshine duration, temperature, humidity, etc.) into the evaluation of the measured data the relations between the biochemical variables (state dependent linear regressions) and model establishment can be refined further, resulting possible indicators for characterizing the relation between plant and its environment.