



Editorial

PLANTS AS BIOMARKERS, BIOSENSORS AND BIOMONITORS

At present, the impact of toxic compounds on biosphere represents an important subject for a lot of scientists. It is known that the elaboration of a strategy is a necessity to avoid or to minimize the effects determined by pollutants. From 60,000 of chemical compounds, some produced at industrial level, only few of them are studied from the point of view of their impact on environment. In this context the plant response to environment has been a paradigm for millennia. But the total ecosystem influencing plant growth and development is a multiparameter one. Science has attempted to isolate individual environmental factors, so that the plant answer to a single stimulus can be quantified. The success of this attack on apparently insoluble problems can best be evaluated by the increased understanding of plant growth and development that has accumulated in the last century.

But, evidence has increasingly shown that the plant response to a single stimulus is not uniform during the life of plant and that a plant is an integrated whole biological entity whereby a change at one level can have a profound influence at a second tissue, organ or process, separated in time or location by some distance from the original stimulus.

Basically, a large percentage of the interactions that were reported as being studied belong to agricultural systems. Since agriculture is the only applied ecology, the relationships between mineral nutrition, plant growth and development, plant-water relations, photoperiod, light intensity, temperature, pesticides, and plant biochemistry are closely interwoven. Having in mind the experience gained in this field in the last years and the existence of a huge volume of information on the influence of chemicals on bacteria, fungi, plants and animals, new directions of studies have been proposed. These are devoted to investigation of environment pollution using living organisms, especially both trees and annual plants. Thus, there is a natural progress of study and understanding that proceeds from (a) description of biological answers to (b) biochemical and biophysical mechanisms that produce the responses, to (c) genetic manipulation of DNA to understand and create new biological responses.

It is known that the action of pollutants is aggressively manifested on terrestrial and aquatic flora and fauna and also, on those developed on soils contaminated with toxic chemical compounds. In these conditions the establishing of both tolerable and lethal dose of toxic compounds for different plants have been established; also, in some cases the modification of chemical composition of the plants under the action of pollutants has been observed.

Thus the systematic studies allowed to identify the following categories of plant species: (1) **biomarkers** are those plants, which are used to determine some biological parameters (genetically, enzymatic, physiological and morphological) that by structural and/or functional modification indicate exactly the influence of the environment and pollutants from qualitative and quantitative aspects point of view (e.g. enzymatic inducer of cytochrome P-450 by different halogens containing compounds); (2) **biosensors** represents organisms having a possibility to measure a signal proportional to concentration characteristic to some definite groups of chemical compounds by association of a selective biological system (enzyme, antibody, membrane, organite, cell or tissue) with a physical instruments of transmission (e.g. potentiometric and amperometric electrode); (3) **biomonitors - bioassays** are toxicological-pharmacological procedures used to evaluate the effects of different pollutants on living organisms usually carried out at lab scale and sometimes in field in standard conditions. By knowledge of the interactions between plants and environment we can identify and select different species, which can be used both in the monitoring the influence of pollutants on vegetation and bio (phyto) remediation of polluted soils with toxic chemical compounds.

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