

# **Chlorophyll fluorescence as a tool for the identification of mineral deficiency in plants**

Fluorescencja chlorofilu jako narzędzie do identyfikacji niedoboru składników mineralnych w roślinach

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Mineral deficiencies in plants are diagnosed on the basis of visible symptoms, meaning a reduction in yield, or by destructive methods such as chemical analysis. There is a strong demand from gardening and agricultural market to find a method for the early detection of nutrients deficiency in plants and optimization of fertilization. The aim of the project is to develop methods for rapid and non-invasive detection of early shortages of selected macroelements in plants by measuring the signals of fluorescence of chlorophyll. The collected data are analyzed by the use of advanced mathematical model such as artificial neural network (ANN). The result of the research distinguished a group of chlorophyll fluorescence parameters, indicating a deficiency of a specific nutrient. Early diagnosis of deficiency will enable manufacturers to secure high yield and optimization of fertilization. Our research is pioneering, and the results should allow the implementation in practice of gardening and farming.