

PSF.AGR.19

DETECTING THE EFFECT OF METHYL VIOLOGEN ON PHOTOSYSTEM II OF *EUGLENA* BY O-J-I-P CHLOROPHYLL FLUORESCENCE TRANSIENTS

R. Eeswaran, S. A. S. T. Raveendra, C. K. Beneragama

Department of Crop Science, Faculty of Agriculture, University of Peradeniya

The measurement of direct chlorophyll *a* fluorescence in photosystem II (PSII) and the JIP test based O-J-I-P polyphasic transient analysis is becoming increasingly popular among the techniques suitable for accessing effects of stress conditions on the photosynthetic apparatus. In the present study, the well known effects of Methyl Viologen (MV) which is commonly known as “Paraquat” on the photosynthetic apparatus were probed by the JIP test in *Euglena*, a unicellular autotrophic organism which has a chlorophyll *a/b* antenna system as it is typical of higher plants.

The cells were exposed to a series of MV doses as control, 0.1, 0.2, 1 and 2 mmol and, immediately after the exposure; the chlorophyll fluorescence was measured using AquaPen AP-C 100 fluorometer. The resultant O-J-I-P transients were analyzed according to JIP-test and several functional and structural parameters were derived to explain the PSII behavior.

Results indicated that the increasing MV doses induced inhibition of electron transport was more due to higher sensitivity of dark reactions after Q_A^- (reduced plastoquinone-an electron acceptor molecule), represented as ψ_o , the probability of electron transfer, than of the light dependent reactions, represented as ϕ_{p_0} , the trapping probability. The combination of the indices of three independent parameters of the performance index (PI_{ABS}) of PSII was decreased markedly in response to increasing concentrations of MV.

Thus it would be an advantage to use a number of fluorescent parameters (O-J-I-P polyphasic transients) over the most commonly used parameter i.e. the quantum yield of primary photochemistry; F_v/F_m (ϕ_{p_0}) in the studies of photosynthesis under various environmental stresses.