

**CYCLIC ELECTRON FLOW IN PLANTS**

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Rate of the cyclic electron flow of  $\sim 125 \text{ s}^{-1}$  has been determined in dark-adapted leaves submitted to saturating illumination by measuring the transmembrane potential changes induced by light to dark transfer. When PS II is inhibited by DCMU, the cyclic flow operates transiently at a similar rate but this rate decreases to a value close to zero after  $\sim 8 \text{ s}$  illumination owing to the progressive oxidation of all carriers, including P700, involved in the cyclic chain.

Redox changes of P700, plastocyanin (PC) and cyt *f* have been measured in dark-adapted leaves submitted to subsaturating illumination in the presence of DCMU. In these conditions, the rate of the cyclic electron flow is proportional to the concentration of reduced P700. Similar rates have been obtained by measuring the transmembrane potential changes induced by light to dark transfer. These experiments permit to estimate the apparent equilibrium constant between P700, PC, cyt *f* and the Rieske protein. In addition, an absorption increase associated with scattering changes has been characterized. This absorption change very likely reflects the formation of a proton gradient induced by the cyclic electron flow.

On this basis, it is concluded that, in dark-adapted leaves, most of PS I centers contribute to cyclic electron flow. Electrons that appear on PS I acceptor side are transferred to ferredoxin and then to the stromal side of the cyt *b/f* complex. On the other hand, electron transfer from ferredoxin to NADP is unpaired, very likely because of the binding of FNR to the cyt *b/f* complex.