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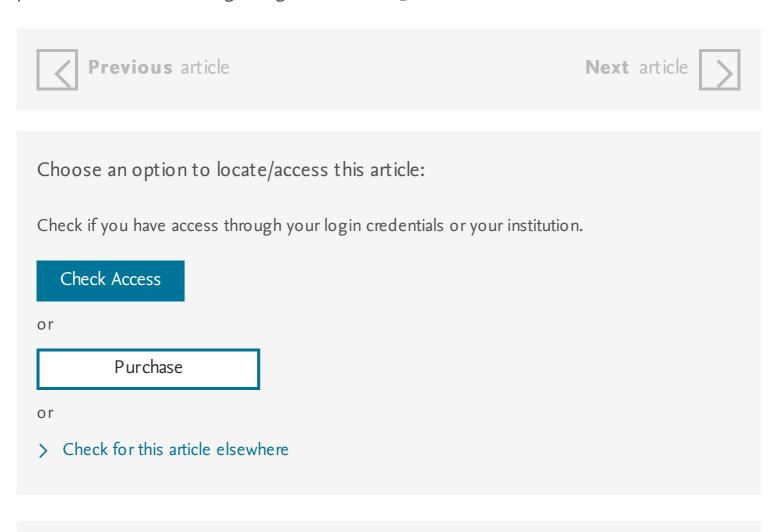
Abstract

- (1) Light-dependent changes of the Mg^{2+} content of thylakoid membranes were measured at pH 8.0 and compared with earlier measurements at pH 6.6. In a NaCl and KCl medium, the light-dependent decrease in the Mg^{2+} content of the thylakoid membranes at pH 8.0 is found to be 23 nmol Mg^{2+} per mg chlorophyll, whereas in a sorbitol medium it is 83 nmol Mg_{2+} per mg chlorophyll.
- (2) A light dependent increase in the Mg^{2+} content of the stroma was detected when chloroplasts were subjected to osmotic shock, amounting to 26 nmol/mg chlorophyll. Furthermore, a rapid and reversible light-dependent efflux of Mg^{2+} has been observed in

intact chloroplasts when the divalent cation ionophore A 23 187 was added, indicating a

intact chloroplasts when the divalent cation ionophore A 23 187 was added, indicating a light-dependent transfer of about 60 nmol of Mg²⁺ per mg chlorophyll from the thylakoid membranes to the stroma.

- (3) CO_2 fixation, but not phosphoglycerate reduction, could be completely inhibited when A 23 187 was added to intact chloroplasts in the absence of external Mg^{2+} . If Mg^{2+} was then added to the medium, CO_2 fixation was restored. Half of the maximal restoration was achieved with about 0.2 mM Mg^{2+} , which is calculated to reflect a Mg^{2+} concentration in the stroma of 1.2 mM. The further addition of Ca^{2+} strongly inhibits CO_2 fixation.
- (4) The results suggest that illumination of intact chloroplasts causes an increase in the Mg^{2+} concentration of $1\hat{a}\in "3$ mM in the stroma. Compared to the total Mg^{2+} content of chloroplasts, this increase is very low, but it appears to be high enough to have a possible function in the light regulation of CO_2 fixation.



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Stoichiometry of reduction and phosphorylation during illumination of intact chloroplasts, the location of the episodes rotates the

amphibole.

Changes in chlorophyll fluorescence in relation to light-dependent cation transfer across thylakoid membranes, as S.