

VACUOLAR pH LEVEL IS RELATED TO PHOTOSYNTHESIS
IN ISOLATED MESOPHYLL PROTOPLASTS OF MELILOTUS ALBA

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Freshly isolated protoplasts of Melilotus alba were kept in dark conditions during two hours, then transferred under light and the vacuolar pH change of the protoplasts was monitored during the next hours using benzylamine as a radiochemical probe.

The vacuolar pH decreases steadily of about 0.5 pH unit during the first 90 min of illumination and then stabilizes at this value. Returning back the protoplasts in dark induces an increase of the vacuolar pH until the initial value was recovered (this took about 60 min). Moreover :

- the vacuolar acidification is related to the light intensity,
- vacuolar pH and $^{14}\text{CO}_2$ fixation by the protoplasts follow the same pattern of variation when the protoplasts are transferred from dark to light,
- DCMU and cyanid inhibit both photosynthesis and light-dependent acidification of the vacuole,
- photosynthesis and pH variations show the same dependence upon the external pH medium.

Thus, the light-induced variations of the vacuolar pH appears to be linked to photosynthesis.

Additional works indicated that during photosynthesis, anionic compounds are synthesized from CO_2 and rapidly transferred into the vacuole. However these compounds are not released from the vacuoles in dark while the vacuolar pH is modified as stated before. Thus the vacuolar acidification cannot be attributed to the transfer of photosynthetats into the organelle but may be rather found in an increase in the disponibility of photosynthetic ATP, fueling a tonoplastic proton pump. Works are in progress to test this hypothesis.

Nef Claudine, Alibert G., Boudet A.M. (1986)

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