

Effect of temperature on growth, proton extrusion and membrane potential in maize coleoptile segments incubated in the presence of chlorinated auxin (4-Cl-IAA)

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The effects of temperature (5-45 °C) on growth in the presence of 4-Cl-IAA and proton extrusion in maize coleoptile segments were studied. At some temperatures the membrane potential changes were also determined. It was found that in maize coleoptile segments growth in the presence of 4-Cl-IAA shows the maximal value at 25 °C. Simultaneous measurements of growth and external medium pH showed that temperature maxima of growth and acidification correlate for 4-Cl-IAA. The addition of chlorinated auxin to the incubation medium, at 25 °C, brought about an immediate hyperpolarisation of the membrane potential, which was 4-fold greater than at 30 °C. 4-Cl-IAA at 10 °C caused additional membrane depolarization apart from the one induced by low temperature. The results presented in this paper demonstrate that the temperature-induced changes in growth of maize coleoptile segments incubated in the presence of 4-Cl-IAA are, at least in part, mediated via a PM H⁺-ATPase activity. These data also support our earlier hypotheses that chlorinated auxin induced a specific signal transduction pathway in maize coleoptile segments, which differ from one induced by IAA.