

Heat Production Rate as an Indicator of the Ability of Plant Cell to Adapt to Environmental Conditions

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Abstract

The heat production rate in the suspension of unicellular alga (*Chlorella vulgaris*) was studied by the method of microcalorimetry during adaptation of the alga to stress conditions (NaCl and 45°C). The heat production rate slightly increased after the addition of 75 mM NaCl to cell suspension. A two-phase response was observed at 150 and 450 mM NaCl and at elevated temperature. The heat production rate was high during the first 3-4 h; then, it decreased and leveled off. This characteristic dramatically decreased at a high salt concentration (500 mM). Cell was unable to adapt to a high NaCl concentration (550 mM), which led to energy dissipation manifested in a high heat production rate. We conclude that the heat production rate, an integral indicator of plant cell activity can be used to assess plant cell adaptation to the impact of stress factors.

<http://dx.doi.org/10.1023/A:1023890724553>

Keywords

Adaptation, *Chlorella vulgaris*, Extreme temperature, Heat production, Salinization