

Title Moderate electric field treatment of sugarbeet tissues
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Abstract

The effects of thermal and moderate electric field (MEF) treatment on the damage of sugarbeet tissue were discussed. The activation energy ΔU_t was estimated as 170 kJ mol^{-1} using the temperature dependences of the characteristic thermal damage time within the temperature interval $50\text{--}70 \text{ }^\circ\text{C}$. The temperature dependences of electrical conductivity were measured for the maximally damaged and intact sugarbeet tissues; these data were used for estimation of the conductivity disintegration index at different MEF treatments. The results evidenced that the electrically stimulated damage of a sugarbeet tissue occurs even at a rather small electric field strength E of 20 V cm^{-1} if treatment time is large enough ($t \approx 1 \text{ h}$). The energy consumption caused by MEF-treatment is mainly related to temperature elevation inside the tissue and noticeably decreases with increasing electric field strength E . MEF-treatment experiments in the aqueous media reveal the dependence of damage efficiency on sample orientation with respect to the external electric field.