

(268) Enzyme Activities of Chunye Pricklyash under Low Temperature and Water Stress

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Chunye pricklyash (*Zanthoxylum ailanthoides* Sieb. et Zucc.) is a deciduous tree that is harvested for special timber and collected for ornamentals from the wild. To better understand its seedling growth under cultivated conditions, 4-month-old seedlings were moved to a greenhouse with temperature at about 25 °C. Enzyme activities for temperature stress were measured after 12 hours under 4 °C and -20 °C. Enzyme activities for water stress were examined after growing 48 hours under Hoagland solution with 0, 50, 75, and 100 g·L⁻¹ PEG-6000. Nitrate reductase (NR) activity was increased 12.9% under 4 °C but reduced 49.1% under -20 °C. Plant peroxidase activity (POD) kept the similar level (18000 U·g·min⁻¹) as the control at 4 °C but 48.5% reduction at -20 °C. Superoxide dismutase (SOD) activity was 29.2% lower than the control of 450 U·mg⁻¹. For plants under different PEG-6000 concentrations, SOD decreased significantly. Malonaldehyde content (MA) greatly increased as PEG concentrations went up, 209% more than the control at 100 g·L⁻¹ PEG. High levels of MD damaged stability of cell membranes, which may lead to plant death. PEG at 50 g·L⁻¹ or lower levels did not affect POD. However, POD at 75 g·L⁻¹ PEG reached its peak and then dramatically reduced at 100 g·L⁻¹. Concentrations 75 and 100 g·L⁻¹ PEG-6000 were too high for the plant normal growth and development. Chunye pricklyash seedlings did not tolerate lower temperature at -20 °C and should be grown under relatively moist conditions. Donglin Zhang is a guest professor at the Central South University of Forestry and Technology.