

# 分子运动性预测麻栎种子离体胚轴适宜贮藏条件初探

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应用电子顺磁共振波谱仪和自旋标记技术,以硝基氧探针为标记物,检测了室温下麻栎种子离体胚轴脱水过程中分子运动性的变化。发现含水量0.7 g H<sub>2</sub>O/g DW至0.64 g H<sub>2</sub>O/g DW范围是细胞质粘度的转折区域,低于这个含水量区域,细胞质粘度骤然上升,推测这个区域是室温下保存离体胚轴的适宜含水量下限。通过变温电子顺磁共振波谱测定,找到离体胚轴含水量在0.43 g H<sub>2</sub>O/g DW至1.02 g H<sub>2</sub>O/g DW范围内,分子运动性的临界温度和玻璃态相变温度所在区间。根据分子运动性随温度变化的规律,预测含水量为0.69 g H<sub>2</sub>O/g DW的麻栎种子离体胚轴适宜贮藏温度约为-50℃。

## PROPER STORAGE CONDITIONS OF EXCISED AXES OF *Quercus acutissima* SEEDS PREDICTED BY MOLECULAR MOBILITY

The spin labeling-electron paramagnetic resonance (SL-EPR) method was introduced to determine the molecular mobility of excised axes of *Quercus acutissima* seeds. 3-carboxy-2,2,5,5-tetramethylpyrrolidiny1-1-oxyl (CP) was used as a spin label. At room temperature during the process of drying, the critical water content of excised axes was from 0.7 g H<sub>2</sub>O/g DW to 0.64 g H<sub>2</sub>O/g DW. Below this water content region, the cytoplasmic viscosity increased significantly. So this region was regarded as the lower limit of the proper storage water content at room temperature. The rotational correlation time was obtained under the variable temperatures to estimate the proper storage conditions of excised axes with different water contents. It was suggested that the region of glass transition temperatures and the region of critical temperatures, which was the upper limit of proper storage temperatures, could be found. The optimum storage temperature of excised axes was predicted according to the molecular mobility. For example, the optimum storage temperature of excised axes containing 0.69 g H<sub>2</sub>O/g DW was about -50℃.

### 关键词

顽拗性种子(recalcitrant seeds); 离体胚轴(excised axes); EPR; 分子运动性(molecular mobility); 贮藏(storage)