

Oxidative Process in *Caesalpinia echinata* Seeds: Oxygen Uptake is not Totally Reliable to Measure Respiratory Metabolism

Lamarca, E.V., Barbedo, C.J.
Instituto de Botânica, São Paulo, Brazil.

The storage of seeds with high respiration rates leads to their fast deterioration, including the reduction of germination and vigor. Seed respiration is often measured by oxygen uptake. The CO₂ released: O₂ uptake ratio higher than 1.0 indicates fermentation. Water status is of great importance in this process modifying water activity and seed metabolic behavior. In this work the relation between respiration rate and the deterioration of seeds of *Caesalpinia echinata* was analyzed according to changes in their water status. Seeds presenting different deterioration levels and with distinct water content were incubated (glass flasks hermetically plugged) and analyzed as for their water content and dry mass (gravimetrically, 103°C/17h), water potential (WP4 Potentiometer, Decagon), germination (germination test, 25°C), viability (tetrazolium test), O₂ uptake and CO₂ release (Headspace oxygen/carbon dioxide analyzer, Illinois). Results showed that seeds with the highest water content presented the highest respiration rate and deterioration. However, at both the lowest and the highest water content, the CO₂:O₂ ratio was lower than 1.0, suggesting the utilization of fatty acids as substrate for respiration and/or that oxidative processes others than respiration are taking place. Therefore we concluded that the analysis of respiration in seeds needs measurements of both O₂ uptake and CO₂ release. Moreover, these results suggest that the fast deterioration of orthodox seeds of *C. echinata* stored at room temperature and at low water content can be related to the action of reactive oxygen species.

Key words: water status, respiration, deterioration, O₂, CO₂

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