Moisture equilibration on germinability and seedling performance of cacao (Theobroma cacao) seed

ABSTRACT

Cacao (Theobroma cacao) produces abundant fruits regularly. Thus, little attention is given to the storing of seeds. The recalcitrant nature of cacao seeds further poses challenges to the growers in ensuring the availability of highquality seeds when required. In the scope of cacao seeds desiccation-sensitivity, the appropriate hydrated storage could minimize the loss of seed quality. This study aimed to evaluate the responses of moisture equilibration on the germinability and seedling performance of cacao seeds stored at different temperature and relative humidity (RH) conditions. Seeds from ripened cacao pods of PBC 123 clone were extracted, demucilaged and placed in zip-lock polyethylene bags to be stored at (i) 16°C, 40% RH, (ii) 16°C, 80% RH, (iii) air-conditioned room temperature, RT (25±2°C, 55±5% RH), and (iv) control (seeds freshly extracted from pods). Seeds were sampled every 24 hours over for 144 hours and evaluated for moisture content (MC), leachate conductivity (LC), germinability, and seedling performance. Seeds with higher MC had a significantly lower germination rate index (GRI) (r = -0.49). Seeds stored at RT and 16oC, 40% RH showed minimal fluctuations of MC (45 to 52%), a minimal decrease of seedling dry biomass (MASS), with higher GRI. However, seeds stored at RT germinated more and were fungi invaded during storage. Seeds stored at 16oC, 80% RH equilibrated at higher MC (49 to 56%) showed the lowest GRI and decreased of MASS after 96 hours of storage. Regardless of the RH, seeds stored at 16oC showed increase LC over time, which might enhance their deterioration. Despite the deterioration associated with seed aging, the storage condition of 16oC, 40% RH showed some promise in minimizing the loss of cacao seed quality within 144 hours of storage durations.