

Ultrastructural Analysis of Drying Damage in Coffee Endosperm Cells

F. M. BORÉM, E. R. MARQUES, E. ALVES

Departamento de Engenharia, Universidade Federal de Lavras
Campus Universitário, Lavras, 37.200-000, Minas Gerais, Brasil

SUMMARY

Biological membranes are particularly sensitive to dehydration. The ability to keep the plasma membrane as a semipermeable barrier has been associated with the seed viability and grains quality. When the cellular organization is severely damaged the seed lose considerable amount of cellular solutes. Although it is well know the rate of drying is an important factor determining the level of plasma membrane damage, ultrastructural analysis of coffee seed endosperm submitted to different conditions of drying have not been carried out before. In the present work we have analyzed and compared the structural alterations in the cell wall, in the vesicles and plasma membrane integrities in coffee endosperm after drying at 40 °C and 60 °C. Samples were prepared in ten replicates using histochemical tests with Sudan IV to light microscope and routine techniques to scanning and transmission electron microscopy. The results indicate any change in the cellular integrity of the plasma membrane and vesicles in seeds dried at 40 °C. Histochemical analysis show higher amounts of putative oil body present into the endosperm cells after drying at 40 °C. In contrast, seeds dried at 60 °C display fused oil bodies giving rise to large droplets in the intercellular space, what leads to loss of cellular integrity. Both scanning and transmission microscopy show the plasma membrane collapse and coalescence of the vesicles when the coffee beans were dried at 60 °C. Thus, we might conclude that higher temperature is detrimental to the coffee endosperm cells integrity.