

Composition, degradation and utilization of endosperm during germination in the oil palm (*Elaeis guineensis* Jacq.)

ABSTRACT

The insoluble carbohydrate and lipid fractions, and α -D-galactosidase, α -D-mannosidase and isocitrate lyase activities were studied in the various tissues of oil palm (*Elaeis guineensis* Jacq.) kernels prior to and during germination. In ungerminated kernels insoluble carbohydrate and lipid constituted 36 and 47% of endosperm dry weight respectively. During germination the thick endosperm cell walls became markedly thinner, concurrent with a significant decrease in the percentage of insoluble carbohydrate and an increase in α -galactosidase and α -mannosidase activity in both degraded and residual endosperm. The proportion of lipid in degraded endosperm also increased significantly. The insoluble carbohydrate appears to be a galactomannan located in the secondary walls of the endosperm. No galactomannan was detected in oil palm embryos or haustoria. Isocitrate lyase was present in, and confined to, tissues of the haustorium of germinating kernels. The enzyme was not active in endosperm at any stage of germination, nor was it active in embryos before or at the end of imbibition. The results suggest that galactomannan is the second largest component of oil palm endosperm and that it is utilized more rapidly than lipid during the early stages of germination. The fact that isocitrate lyase activity is confined to the haustorium suggests that in *Elaeis* gluconeogenesis, the conversion of triglyceride to carbohydrate, takes place entirely within the cotyledon of the seed.

Keyword: *Elaeis guineensis*; Galactomannan; Galactosidase; Germination; Isocitrate lyase; Mannosidase; Oil palm