

Title Effects of storage methods, storage time and different agro-ecological zones on chemical components of stored sorghum grain in Hararghe, Ethiopia

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Abstract

Sorghum grain stored in traditional underground pits was sampled from seven districts of Hararghe, eastern Ethiopia, representing lowland, intermediate and highland zones, from February to August 2001, and was analysed at the International Livestock Research Institute (ILRI) for changes in chemical composition over time. Samples were also taken from a replicated aboveground bin and pit storage experiment at Alemaya University campus at 2-month intervals from March 2000 to August 2001 and analysed in a similar manner. The effect of geographic location on chemical composition was significant, but there were differences in the sorghum varieties grown. The organic matter (OM) content of grain samples from pits in the lowlands was lower than those from the highlands. The crude protein (CP) and OM contents of samples from the seven districts did not change in 7–9 storage months. The OM content decreased and the CP slightly increased over time in samples from soil pits without any lining material on Alemaya University campus. The OM content decreased from 97.8 to 91.6%; and CP increased from 10.1 to 11.2% in these samples over a 17-month period. Soluble carbohydrate (SCHO) content significantly decreased over time in samples from the districts (from 2.4 to 1.2% by 7 months) and in samples from soil pits on campus (from 2.4 to 1.9% after 7 months and to 0.97% after 17 months). There was no significant change in the organic matter, CP and SCHO contents in samples taken from the cemented aboveground bin, cement- and dung-lined pits at the Alemaya campus, all of which were lined with polythene sheeting. From these data, we conclude that the combination of storage methods, storage period, geographic location and/or sorghum variety affected grain quality. Grain storage in traditional underground pits for long periods does lead to grain deterioration. The use of improved grain storage structures maintains the grain quality and nutritional value of sorghum for a reasonably long period.