

Title Quality change and mass loss of paddy during airtight storage in a ferro-cement bin in Sri Lanka
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Citation Journal of Stored Products Research Volume 42, Issue 3, 2006, Pages 377-390
Keyword Hermetic storage; Sealed storage; Modified atmospheres; *Ephestia cautella*; *Sitophilus*; *Rhyzopertha dominica*

Abstract

In Sri Lanka, prices for paddy fluctuate severely showing a minimum price at harvest. To benefit from higher prices, farmers strive to store paddy, but lack of facilities and poor storage management cause quantitative and qualitative losses by rodents, insects and microbial deterioration. To overcome these problems an airtight storage system, based on a ferro-cement bin, has been developed. The objective of this study was to evaluate the storage system in terms of paddy quality and mass loss. Before and after storage, samples were drawn from this bin and a control to analyse moisture content, thousand-grain mass, insect infestation, mould, germination rate and head rice yield. Additional samples were taken from different regions in the bin.

Oxygen concentration dropped to 2.7% within 30 days and carbon dioxide rose to 9.1%. The change in gas composition was caused mainly by insect respiration. *Ephestia cautella* were found on the top layer in the bin and *Sitophilus* spp. and *Rhyzopertha dominica* in the bottom layer. The average infestation rate was 4.8 insects/kg. Most of the insects were dead at unloading. After 6 months storage, mass loss was 0.4% in the bin and 2.1% in the control. Head rice yield was 35.8% in the bin and 27.3% in the control. A significant amount of mould was found only in the control (0.85%). Germination rate, however, decreased from 85% to 0% in the airtight bin, whereas it was still 38% in the control. The study has shown that airtight ferro-cement bins provide a safe and convenient method for farmers in the tropics to preserve their harvest for later sale at a higher price. Further work is necessary to develop strategies for avoiding the decrease in germination capacity.