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Effect of modified atmospheric conditions of hermetically sealed large capacity cocoons for storage of paddy (*Oryza sativa*)

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Studies conducted in Sri Lanka have shown that nearly 10% - 15% of paddy is lost during postproduction operations due to improper post harvest techniques. These studies also found, that a major component of these losses occurred during storage practices. Hermetically sealed cocoon storage can be used as an alternative method for commercial scale paddy storage with a view to cutting down post-harvest losses. However, it has been found that very few studies have been conducted in Sri Lanka to evaluate its impact in altering the physical properties and quality parameters of paddy under commercial scale hermetic (modified atmospheric) storage under local climatic conditions. Therefore, a study was conducted by storing paddy in commercial scale hermetic storage conditions for 9 months and comparing quality change occurrence in paddy such as physical properties, milling characteristics and other quality parameters as against, paddy stored in a conventional warehouse. Moreover, oxygen level, temperature inside the hermetically sealed cocoon and warehouse were also measured. It was observed that the hermetically sealed cocoon took 6 weeks to reduce the oxygen level from 20.5% to 3.2%. Temperature fluctuation inside the hermetic cocoon was very low in comparison to the warehouse. Moisture content of initial paddy samples, warehouse samples and cocoon samples were not significantly different. Hermetically sealed cocoon paddy samples reported values similar to its initial values in terms of quality parameters such as impurities %, immature seed (*Bol*) % and damaged seed % after 9 months of storage, whereas these parameters changed significantly in the warehouse sample. Weight / mass loss of grain during storage period was significantly low in cocoon sample. Bulk density and paddy kernel hardness values were significantly reduced in both storage methods against its initial values. Rice kernel whiteness was preserved by sealed cocoon storage in comparison to conventional warehouse paddy storage. Germination percentage of paddy was significantly reduced from its initial value in both storage methods. Paddy kernel resistance against milling stress increased in hermetically sealed storage. Finally, it can be concluded that hermetically sealed cocoon storage has more advantages in comparison to conventional warehouse storage for large quantity commercial grain storage. However, hermetically sealed conditions must be maintained throughout the storage period to gain these advantages.

Keywords: Commercial paddy storage, hermetically sealed cocoon, paddy quality, weight loss