

'Wise Joseph Sacks': a Hermetic Storage System for Small-scale Use

A. Murray*

Grain Security Foundation Ltd, PO Box 886, Bondi Junction, NSW 2022, Australia

The 'Wise Joseph Sack' (Fig. 1) is a sack of 50 kg nominal capacity made from a specialised, heat-sealable, plastic laminate. The laminate incorporates a metal foil component to reduce oxygen permeability.



Fig. 1. Sealing Wise Joseph Sacks in the field

Trials carried out in collaboration with Silliman University in the Philippines have shown that dry grain may be stored in Wise Joseph Sacks for long periods under humid tropical conditions, without need for pesticides or fumigation. Storage periods of at least 12 months are possible for white maize and paddy, without loss of germination or other qualities. Furthermore, insect infestation present at the time of packing is eliminated by the hermetic system and the bags themselves are resistant to reinvasion by pests. Unprotected grain in woven polypropylene sacks stored together with grain in Wise Joseph Sacks was extensively damaged by insect pests. In an extreme case, pesticide-free yellow maize (12% moisture content) lost 23%

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dry matter after 9 months storage in normal woven sacks, but samples from the same stock stored beside the normal sacks in Wise Joseph sacks lost not more than 0.5 %.

The upper moisture limit for safe storage has not been determined and, until proven otherwise, it would be prudent to use Wise Joseph Sacks to store only grain at below normally accepted safe moisture levels. However, storage trials under humid tropical conditions at 75% equilibrium relative humidity in Wise Joseph Sacks have shown no increase in aflatoxin content over 6 months storage and mould proliferation was apparently inhibited by the modified storage environment in the sacks.

The Wise Joseph Sacks are undergoing further tests to determine acceptability and further define limitations to their use. They appear to offer a system where the householders and small-scale farmers can store their own grain for consumption or seed, avoiding the need to sell during the harvest glut and buy again later at higher prices.