Evaluating different traditional storage methods on the shelf life of sweet potato tubers in Swaziland

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**ABSTRACT**

Sweet potato [\textit{Ipomoea batatas} (L) Lam.] is a staple, storage root crop commonly grown in Swaziland. Preserving harvested storage roots is a major problem to farmers, sellers and consumers of the crop. Though cold storage has been used to prolong the shelf life of crops in other countries, this method would not be suitable to Swaziland farmers because most of them have no access to such facilities. Readily available, traditional methods of storage would be more suitable for Swaziland farmers. This investigation was done to find out which traditional storage method would best prolong the shelf life of sweetpotato and also become acceptable to consumers.

Sweetpotato was planted sole in December 2003 as a pure crop and in association with three-grain legume crops: groundnut, field bean and cowpea. The four crops were sampled once every four weeks to find out the effects of intercropping on their growth. At final harvest, the sweetpotato storage roots were preserved under four traditional methods of storage to find out the effects of storage method on:

i. the shelf-life of harvested sweetpotato tubers

ii. the relative amounts of tuber spoilage at different times of preservation

iii. the types of spoilage that occurred under each storage condition

iv. the causes of spoilage that was observed and

v. the consumer acceptability of stored, cooked sweetpotato

The field phase of the experiment (tuber production) was monitored for 20 weeks, with destructive sampling carried out every four weeks. The storage phase was started at the end of the tuber production phase, and lasted for 12 weeks, with data taken every four weeks. The four storage methods used were perforated cartons, pits wooden platforms, and bagged sawdust. A sensory evaluation of cooked tubers was done after 12 weeks in storage. Twenty panel members evaluated samples of the cooked tubers. Results showed that all periods of storage, there were no significant differences between monocropped

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sweetpotato tubers and those that were intercropped with grain legumes. Stored sweetpotato tubers showed different characteristics, depending on the storage methods. The sawdust and pit storage was superior to the carton and platform storage methods. However, there were highly significant differences (P<0.001) obtained in the different storage methods. At four weeks in storage (WIS), tuber shrinkage was significantly lower (P<0.001) in the sawdust and pit methods (each having a score of 1.0) and highest in the platform method (score of 2.1). The standard error (Sy) of the interaction between the storage methods and cropping system was 0.06 at four WIS. By 12 WIS, tubers in the platform method (score of 6.0) had significantly (P<0.001) increased sprouting from four to 12 WAS, except in the carton and platform methods where no sprouting was recorded at any time. By 12 WIS, the pit storage method had the most sprouting (score of 3.4). By 12 WIS, the surface storage roots had formed a hard crust with variable thickness; this crust formation on the stored tubers was maximal in the platform storage method (score of 6.0 out of 6.0) but minimal in the sawdust method (score of 2.9). The presence of living organisms (fungi) on the stored tubers was maximal in platform storage method at eight WIS (score, 2.6). Dry matter in tubers at 12 WIS was higher in both carton and platform methods (0.6g each) and lower in both pit and sawdust methods (0.4g each).

The sensory evaluation showed that there were no significant differences in consumer preference between sole sweetpotato tubers stored in cartons (score of 56) and sole sweetpotato tubers stored in pits (also score of 56). However, the sole sweetpotato tubers stored in sawdust (score of 50) were the most acceptable to the sensory panel. The least acceptable tubers were the sole sweetpotato tubers stored on platforms (score of 158). Based on both storage quality and consumer preference for both the cooked tubers, it concluded that the pit storage and sawdust storage methods best prolonged the shelf life of harvested sweetpotato tubers. Since tubers from the sawdust storage method were the most acceptable to consumers, it is recommended that sweetpotato (irrespective of whether it was grown as a pure crop or intercropped with grain legumes) be stored using the bagged sawdust storage method.