



Deutscher Tropentag, October 11-13, 2005, Hohenheim

“The Global Food & Product Chain—
Dynamics, Innovations, Conflicts, Strategies”

Influence of Packaging Material and Storage Time on Seed Viability and Chemical Compounds of Rice Seed

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Abstract

This research aimed to study the effects of packaging materials and storage time on seed viability and chemical compounds changes during storage. Seeds of rice var. Khao Dawk Mali 105 were processed and dried to 9.6 % moisture. Seeds were stored in 4 different kinds of plastic bags i.e. Polyamide (PA), Polyethylene (PE), Metallized Polyethylene Terephthalate (MPET) and Woven Polypropylene (WP) bags for a period of 5 months under controlled temperature (16°C) and relative humidity (65 %) at seed centre No.7, Chiang Mai. The experiments were designed in 4 × 6 factorial RCB consisting of 2 factors; packaging material and storage period. Changes in seed moisture content, standard germination, vigour and chemical composition (crude carbohydrate, protein and fat) were monthly determined. The experiment was conducted from February to July 2004 at the Postharvest Technology Institute and Department of Agronomy, Faculty of Agriculture, Chiang Mai University. The results were: seeds in WP bags had higher moisture content (10.4 %) than seeds in PA (9.8 %), PE (9.8 %) and MPET (9.9 %) bags throughout the storage periods. All treatments showed that rice seeds could maintain their germinability on average 95 % after 5 months. Rice seeds vigour showed by accelerated aging technique and the electrical conductivity from seed exudates was no significantly different after 5 months storage. The analysis of seed chemical composition showed that all the plastic bag types did not significantly affect the carbohydrate (approximately 85.56 %) and protein contents (approximately 7.07 %). However, the fat contents were significantly different. After 5 months, the fat contents in seeds stored in WP bag were lower than MPET, PE and PA bags (1.86, 1.90, 1.97 and 2.01 %) respectively. The fat contents decreased because of the activity of the enzyme lipase in rice seed and the oxygen in the packages which is the main cause of the seed deterioration. It was concluded that rice seeds stored in PA bags which prevented water vapour and oxygen transmission could delay seed quality deterioration followed by PE, MPET, and WP bags. Fat was the only chemical compound which changed during storage. A five month storage period did not showed any influence on the rice seed quality.

Keywords: Packaging material, rice, seed quality, seed storage