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Selected Commercial Packaging Materials Affecting Fatty Acid Deterioration During Soybean Seed Storage

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Abstract

Soybean seeds var. CM60 from Seed Centre No.7, Chiang Mai have been processed and dried to 10 % moisture content. Seeds were stored in 4 different kinds of plastic bags i.e. Metallized Polyethylene Terephthalate (MPET), Polyamide (PA), Polyethylene (PE) and Woven Polypropylene (WP) for a period of 4 months under controlled temperature (16 °C) and relative humidity (65 %) from January to April 2004. The experimental design was arranged in factorial RCB consisting of 2 factors; storage periods and various packaging materials. The seeds were sampled and assessed at the Chiang Mai University. It was found that seeds stored in WP bags increased their moisture content up to 10.44 % and the free fatty acid was found at the highest number of 1.67 % since this kind of bag is not a water and air proved bag in comparison with MPET, PA and PE bags which the number of free fatty acid were 1.08, 1.17 and 1.53 %, respectively. Increased seed moisture and oxygen in its containers are the main factors in lipid autoxidation which led to the loss of enzymatic activities, failure in protein synthesis and loss of membrane integrity which have shown direct relationship with low seed germination rate and seedling vigour. Comparison with three other packing materials: MPET, PA and PE bags showed better properties in water and air proved (0.09 cc m^{-2} h^{-1} and 63 g m^{-2} h^{-1} for MPET, 0.014 cc m^{-2} h^{-1} and 116 g m^{-2} h^{-1} for PA, and 0.25 cc m^{-2} h^{-1} and 1364 g m^{-2} h^{-1} for PE). Besides that, seed stored in MPET bags could maintain the lowest seed moisture content (9.36 %) whereas in PA it was 9.85 and in PE it was 9.90 % respectively. MPET packaging resulted in the highest number of percentage of seed germination and the most vigorous seeds when compared with the seeds from the other packaging materials. Their storability in MPET, PA and PE bags are over 4 months, whereas in WP bags seeds dropped their viability after being stored for 3 months.

Keywords: Deterioration, fatty acid, packaging material, soybean seed

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