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Using Eugenol for Seed Coating Technology as Storage Fungi Controller in Soybean Seeds

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Abstract

The efficiency of an eugenol treatment of soybean seeds against some fungi during storage was determined in comparison with synthetic chemicals. The seed-coating formulation consisted of 1% eugenol, 2% chitosan, 0.01% lignosulphonic acid, 1% acetic acid and 95.99% distilled water. Four treatments i.e seeds coated with chitosan, chitosan plus eugenol, seeds mixed with captan, and untreated seeds, were performed. All seeds were kept at 15°C with 60% relative humidity for 6 months. Every month, the inhibition percentage of all treatments against fungi and the standard germination test were determined by the blotter method. The results showed that captan had the highest tendency to control all studied fungi.

The captan treated seeds were protected from the infection by *Colletotrichum* sp. for 5 months with an inhibition rate decreasing from 79.0 to 27.3% and from the infection by *Cladosporium* sp. and *Macrophomina* sp. for 4 months, with a decrease from 100.0 to 33.3 and 80.0 to 45.8 inhibition percentages, respectively. Chitosan plus eugenol showed the highest efficiency to control the growth of *Cladosporium* sp. for 4 months (decrease from 100.0 to 33.3 inhibition percentage) and the growth of *Colletotrichum* sp. and *Macrophomina* sp. for 3 months with a decrease from 70.00 to 46.2 and 83.3 to 47.4 inhibition percentages, respectively. Chitosan was effective against the growth of *Cladosporium* sp. for 3 months (decrease from 85.7 to 47.6 inhibition percentage) and controlled the growth of *A. flavus*, *Colletotrichum* sp. and *Macrophomina* sp. for 2 months, with inhibition percentages decreasing from 66.7 to 38.5, 72.0 to 42.3 and 72.2 to 36.8 respectively. Results of standard germination test showed that seed coating with chitosan, and chitosan plus eugenol could prolong the seed viability better than captan treatment. The germination percentage changed from 92 to 74%, 92 to 72% and 90 to 68%, respectively. However, during seed storage, the efficiency against the tested fungi and germination percentage of all treatments gradually decreased.

Keywords: Antifungal activity, essential oil, film-coated polymer, fungicide