

ASSESSING THE VIABILITY OF MAIZE AND COWPEA SEEDS STORED USING LOCAL PLANT BIOCIDES

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ABSTRACT: Investigations were conducted to assess the viability of maize and cowpea seeds stored using five local plant Biocides namely: Neem powder (*Azadiracter indica*) Black pepper (*Piper guinensis*), pepperfruit seed powder (*Denittia tripetata*), soya bean oil (*Glycine max*) and palm oil (*Eleais guinensis*). Dried seeds of maize and cowpea (12% M.c) was stored, for 12 weeks using the various plant materials in an airtight plastic containers. The experiment was run using the Randomized complete block design. Seed samples stored with the plant materials were tested for viability for twelve weeks. Results indicated that significant differences exist ($p= 0.05$) on the mean seed germination percentages for the various plant materials and seed types. Highest percentage of germinated seeds was observed in the treatment using neem powder, which gave (95%) germination for maize and (85%) germination for cowpea. This was followed by the pepper fruit seed powder, which gave (80%) germination for maize (90%) germination for cowpea. The least germination counts was obtained in the seeds stored with soya bean oil, which gave (25%) germination for maize and (15%) for cowpea at ($p= 0.05$) while seeds stored with palm oil gave (20%) germination for maize and 15% germination counts for cowpea respectively. [New York Science Journal 2010;3(5):1-3]. (ISSN: 1554-0200).

Keywords: Seed Viability, Maize, Cowpea, Plant biocides.

INTRODUCTION

The production of maize and cowpea in Nigeria is rapidly on the increase due to improved seed varieties and good cultural practices and incentives to farmers by the government (Ajibola, 1989).

A major problem facing farmers is the rapid losses of maize and cowpea due to post-harvest storage pests and diseases. *Sitophilus zea mays* is a major storage pest of maize in Nigeria and the most destructive (Comes 1973). Sighn *et al* (1990) reported various storage pests of cowpea to include *Callosobruchus maculatus*, *Bruchidius atrolineatus* etc.

The use of storage chemicals for control of these pests is known to be costly, and environmentally hazardous even to man, hence research on use of locally available plant materials for storage of grains have been very successful (Dudu, 1996). Various plant materials such as Neem (*Azadiracta indica*), Black pepper (*Piper guinensis*), pepper fruit seed (*Denittia tripetata*) and soya bean oil (*Glycine max*) have been tested and recommended for grain storage especially for maize and cowpea (Williams, 1980, Adu 1982).

These plant materials are cheap, locally available and environmentally friendly and non-toxic both to man and livestock. Jackson (1983) reported that plant materials contain naturally

occurring phytochemical that are biodegradable, non-toxic to plants and animals.

However there has been growing concern about the viability of seeds stored with some plant materials such as soyabean oil and palm oil. The objective of this study is thus to evaluate the effects of using various local plant materials for seed storage, on the viability of maize and cowpea seeds.

MATERIALS AND METHODS.

The experiment was carried out at the Federal University of Technology Laboratory under normal room temperature and relative humidity for 12 weeks in year 2000. Five local plant materials used are

1. Neem Seed powder (*Azadiracter indica*)
2. Black pepper powder (*Piper guinensis*)
3. Pepperfruit seed (*Denittia tripetata*)
4. Soyabean oil (*Glycine max*) and Palm oil (*Eleais guinensis*).

Seeds of plant materials such as Neem, black pepper and Pepper fruits were collected, washed and sundried for 3 days. The dried seeds were milled separately and kept in airtight plastic containers. Dry maize and cowpea seeds (12% m.c) were collected and placed in storage containers and treated with the

powdered plant materials at the dosage rate of one part per 100 parts of grain. (10g / kg grains).

Also palm oil and soyabean oil were used to rub on the dried seeds of maize and cowpea and placed in storage containers. The experiment was carried out using the randomized complete block Design in; 1 the laboratory for 12 weeks. Random samples of maize and cowpea were collected from the five treatments and a viability test was carried out, by planting out the seeds in well-treated soil in a seed-tray. Data on percentage seed germination, weevil damage score to maize and cowpea were collected and subjected to analysis of variance while test of means for significant differences was done using the Duncan New' multiple Range test.

RESULTS AND DISCUSSION

Highest mean percentage of germinated seeds was observed in the seed powder which gave 95% for maize and 85% germination for cowpea. The pepperfruit seed powder treatment

recorded 80% germination for maize and 90% germination for cowpea (Table I)

The least germination counts was observed in the seeds stored with soyabean oil which gave 25% germination for maize and 15% germination for cowpea ($p=0.05$) Seeds stored with palm oil gave 20% germination counts for maize and 15% germination counts for cowpea. Maize and cowpea seed germination percentages decreased significantly in the soyabean oil and palm oil treatments respectively.

The low germination percentage of seeds treated with soyabean oil and " palm oil could be attributed to impairment of respiration by the seed at the time of the test (Tindall, 1992). Also neem contains Azadiractin which has been found to be insecticidal in action. (Dudu, 1996).

The weevil damage score on a (scale 1 - 5) is presented in Table 2. The neem treatment had the least damage score of 10% for maize and 5% for cowpea. The damage score for other treatments do not differ significantly ($p=0.05$) Table 2.

TABLE I: EFFECTS OF VARIOUS PLANTS MATERIALS ON MEAN MAIZE AND COWPEA SEED GERMINATION PERCENTAGE.

TREATMENT	GERMINATION (%) MAIZE SEED	COWPEA SEED
1 Neem Seed powder	95a	85a
2 Black pepper powder	75b	80b
3 Pepperfruit seed powder	80ab	90ab
4 Soyabean oil	25c	15c
5 Palm oil	20c	15c

*Means followed by the letter in the same column are significantly difference ($p<0.05$) (DNRMT.)

TABLE 2. EFFECT OF VARIOUS PLANT MATERIALS ON MEAN PERCENTAGE DAMAGED MAIZE AND COWPEA SEEDS TREATMENTS MEAN % damaged SEEDS

	Maize Seed	Cowpea Seeds
Neem seed powder	10b	5b
Black Pepper powder	15a	15a
Pepper fruit seed powder	13a	14a
Soyabean oil	12a	11.5a
Palm oil	11a	10.0a

*Means followed by the letter in the same column are not significantly different $P<0.5$ (DNRMT)

CONCLUSION

This study have shown that the use of neem seed powder (*Azadirachta indica*) and pepperfruit seed powder *Dennittia tripetata* as well as black pepper (*Piper guinensis*) has a positive influence on protecting maize and cowpea seeds from storage pests and without any adverse effects on the viability of the seeds.

Also the study revealed that both palm oil and soyabean oil though are good protectants of maize and cowpea seeds from storage pests significantly have adverse effects on seed viability.

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