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RESEARCH NOTE: 2

POTENTIAL OF *OCIMUM BASILICUM* (Linn) FOR THE CONTROL OF MAIZE WEEVIL SITOPHILUS ZEAMAIS (Motsch).

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ABSTRACT

Dried leaves of *Ocimum basilicum* at 1.5g for twenty weeks of storage was used to evalu_te its control on maize weevils. During the study, changes in weight of the grains and insect occurrence were monitored. At the end of the study, the grains were subjected to viability test and proximate analysis. The results obtained showed that the botanical exhibited positive insecticidal bioactivity against *Sitophlus zeamais* in the stored grains significantly. The proximate analysis test also showed that the botanical did not have an adverse effect on the basic components of the stored produce.

INTRODUCTION

Maize (Zea mays) is an important food crop in Nigeria (Dowswell et al., 1996). It forms a major part of the cereal crop consumed by man (Cobley and Steele, 1976) and serves as a source of dietary carbohydrates (Wudiri and Fatobi, 1992). Crops are stored in order to have them available for consumption all year-round, and also to provide seeds and grains for the next planting season. Storage insects are the major agents causing considerable losses every year in Nigeria against stored products and Sitophilus zeamais motsch is a major insect pest (Gwinner et al, 1990). Insects not only consume these stored products, but also contaminate them with their fragments, faeces, webbing and metabolic products (Prakash and Rao, 1996).

Farmers have largely depended on the use of synthetic insecticides as insect pest control measures. However, these chemicals have some limitations, which include – development of resistance in the pest organism as in methl bromide and phosphine (Chapman and Dyte, 1976), hazardous effect in the environment, high persistence (Sighmony et al., 1986), highly toxic and expensive for our resource poor farmers.

This study determines the effectiveness of Ocimum basilicum in controlling the stored product pest of maize, Sitophilus zeamais and also evaluates the effect of the botanical on the food components of the stored grains.

MATERIALS AND METHODS

This study was carried out in University of Ibadan, Nigeria. Leaves of Ocimum basillicum were collected from Botany department, and sun-dried for three days. A top loading metler balance of 0.01g sensitivity was used to weight out 1.5g of 0 basilicum leaves and then milled using the Thomas milling machine. The maize variety used for the study was TZSR-Y one hundred (100) grams of clean and uninfested maize were weighted into five sterilized Kliner jars. To each of the Kliner jar containing maize was added 1.5g of powder O .bazilicum. a control experiment was set up with o.basilicum powder. Mesh corks were used to cover the

Kliner jars to ensure aeration.

The experiment was arranged in completely randomized design on laboratory table. The weight of the samples was taken periodically during the experiment. Proximate analysis was carried out from the stored grain samples to determine the moisture content, protein, carbohydrate, ash and fatty acids in the samples after the termination of the first phase of the study. The samples were ground using a micro miller and then milled to pass through a 1mm mesh for easy digestion of the samples during the proximate analysis.

RESULTS AND DISCUSSION

The mean weight fluctuation in treated and untreated maize is shown in fig.1. Highest weight was attained in maize treated O. basilicum grains at the 4th week of storage. After that, considerable decrease in weight occurred during the twenty weeks of storage.

Occurrrence of Insects on Grains

Before the storage of maize, it was ensured that no insect was present but as the experiment progressed Sitophilus zeamais was observed on the maize grains. Although he infestation was not very high, the insects were conspicuously noticed in the control than in the treated grains, as shown in figure 2.

Effects of Ocimum basilicum on food components of stored grains

To show the extent. to which the botanical affected the food components of the grains. proximate analysis was conducted at the end of the storage period. as shown in Table 1.

The results in this experiment show that the Ocimum basilicum treated grains offered significant level of proction to the stored grains when compared with the untreated grains. over a period of twenty weeks at application rate of 1.5 grams of the blended leaves. This may be attributed to the presence of repellant activities that reduced the insect infestation (Prasad et al.,1986). This could also be attributed to the possession of insecticidal properties as reported by prakash and Rao (1996). From the experiment carried out, it was noticed that the insects present in the O. basilicum

Table 1: Proximate Analysis and T-test for Food Contents of Ocimum basilicum treated maize grains.

Sample	Carbo-hydrate	Protein	Fat	Ash	Moisture Content
Control	73.22	10.80	4.01	1.27	10.70
A	73.00	10.40	4.28	1.14	11.00
B	73.04	10.30	4.27	1.24	11.10
C	73.08	9.72	4.10	1.20	11.30
D	73.76	9.81	4.00	1.23	11.20
Mean	73.38	10.06	4.16	1.203	11.15
Standard	0.3928	0.342	0.136	0.045	0.1291
T- calculated	0.4137	-2.17	1.119	-1.5	3.4857*
T tabulated	- 2.776				

N:B A B C and D= replicates.

treated grains preferred to stay on the gauze cover of the kliner jar. This also shows that the O. basilicum leaves had a bioactivity against S. zeamais (Hassanali et al., 1990) and (Nduimele, 1990).

Ocimum basilicum oil has been reported to show repellency to the red flour beetle Itribolium castaneum) under laboratory test. Jacobson reported that the whole plant extract contained clerodaus known as Juvocinine 1 and Juvocinine 11, that were found to show juvenile hormone analogue mimic activity against milkweed bug (Jacobson, 1989).

It can be deduced from the above observations that the botanical can be used to store maize at 1.5g per 100grams of stored maize grains. The proximate analysis tests carried out showed that the ocimum basilicum leaves did not have any significant effect on the food contents of maize. This shows that the food components are not altered by the botanical during storage in any significant way.

This botanical has shown promise in the successful storage of maize grains. Besides being cheap and easy availability, they may be preferred to the synthetic chemicals which are rather prohibitive, hazardous and not within easy reach of the peasant farmers.

The efficacy of the botanical on heavily infested grains will probably be ascertained using more concentration of the

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Fig. 1 Mean weight fluctuation in stored maize grains

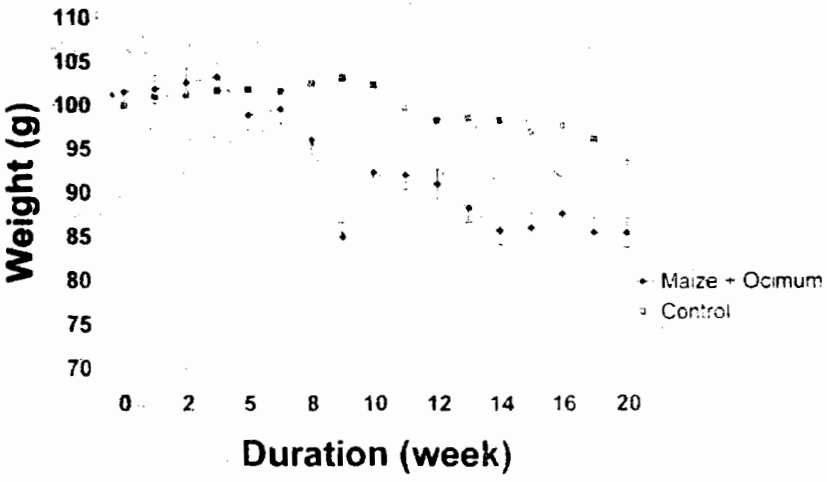

Fig. 2 Mean Insect Occurence in stored maize grains