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**DETERIORATION OF PEANUT
DURING STORAGE BY FUNGI**

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INTRODUCTION

Groundnut , Peanut , (Arachis hypogaea L.) ranks the Thirteenth in importance among crop plants in the world standing between mankind and starvation (McGill , 1973) and becomes the third exporting crop after cotton and rice in Egypt (Anonymous , 1984).

Although peanut today is used primarily as a vegetable oil crops , its importance as a food crop in the world trade has increase substantially in recent years. Due to its high content of digestible protein, its use , as an edible food crop , is expected to increase further because of an increased awareness of the protein storage existing in the world.

In Egypt , the cultivated area of peanut is increasing to 30.000 Feddans , yielding approximately 25.000 Tons (Anonymous , 1984). It is sown during April and May and stay 5 - 6 months in soil. The commercial production of peanut is concentrated in Asmailia , Sharkyia , Beherea and Giza governorates of Egypt.

Nowadays , its cultivation is largely confined to sandy , light and new reclaimed soil.

Soil-borne fungi attack groundnut pods and kernels during their development in the soil , and after harvesting , during drying and storage , whenever , environmental conditions are favourable for their growth and infection.

In the last few years the yield and quality of the nuts began to decrease , mainly due to the previous problem which subjected this crop to lose its good reputation in the foreign

markets.

Although certain control measures had been tried against this problem , it is still widely present threatening the groundnut cultivations in Egypt and other countries.

Many seed crops are subject to contamination by fungal metabolites , such as aflatoxin and constitute serious problems for food and feed for human - beings and animals. For instances , Sargeant et al. (1961) were the first to observe that large numbers of turkeys and ducklings died on Britis farms in 1960 as a result of consuming contaminated groundnut meals imported from Brasil. Butler (1969) Found that many animal species were adversely affected if they consumed rations containing oil seed meals having sufficiently high levels of aflatoxin. Thereafter, numerous studies have been published , dealing with the biological effects of aflatoxins on vertebrates , invertebrates , and microorganisms. Also aflatoxin contamination and factors affecting the accumulation of the toxins in peanut and other agricultural commodities have become a problem and recieved attention in many partes of the world. However , in Egypt few papers were published dealing with aflatoxin problem in agriculturél commodities.

The problem of the using infected seeds resulted with problem in feeding and industries feed purposes , Thus , the physical and chemical changes in the seed oil content were studied.

The present study was designed to the problem of fungal deterioration of peanut pods , at the field and during storage. Special emphasis were cited toward the ex~~is~~tance and the production of the aflatoxin in the fruits.

REVIEW OF LITERATURE

1. Geocarposphere mycoflora :

Geocarposphere is the thin layer of the soil surrounding the groundnut fruits. Several workers isolated various fungi from the geocarposphere and soil of groundnut crop. Soil mycoflora of groundnut of different climatic condition were reported.

Joffe and Borut (1966), found that the greatest number of fungi in one gram soil was obtained as 271,000 in one location and 20,000-80,000 in other locations. They listed 95 fungal species. The most prevalent fungi were Mucor racemosus, Rhizopus oryzae, Aspergillus amstelodami, A. flavus, A. nidulans, A. sulphureus, A. ustus, A. versicolor, A. wentii, Penicillium funiculosum, P. litacinum, Cephalosporium curtipes, Fusarium equiseti, F. oxysporium, F. solani, Homodendrum nigrescens, Myrothecium verrucaria, Pacilomyces flavescens and Trichoderma lighorum.

Bell and Crawford (1967), demonstrated that addition of Botran to rose bengal-streptomycin agar in concentrations of 5 and 10 ppm. facilitated the isolation of Aspergillus flavus recovered from peanut pod, soil and kernels. Colony formation by other fungi was reduced.

Mycelial development of Rhizopus stolonifer was restricted on the Botran amended medium.

Joffe (1968), studied the effect of the presence of A. flavus on total number of fungal mycoflora. He mentioned that the presence of A. flavus in large number had no effect on the frequency of other dominant species in geocarposphere as well as rhizosphere and soil.

McDonald (1968), in Nigeria, listed 101 fungal species isolated from the surface of the plants and fruits and from neighbouring soil.

Joffe (1969-a), isolated a total of 157 fungal species, 133 occurred in the rhizosphere, 96 in the soil and 86 in the geocarposphere. Penicillium spp. were the most common in light soils, Fusarium spp. in medium soils and Aspergillus spp. in heavy soils. Species of Penicillium were the most prevalent, being equally common in rhizosphere, soil and geocarposphere of light and medium soils. Soil inoculation with A. flavus depressed the number of species in the mycoflora of rhizosphere and soil. Quantitative comparison showed that in all soils number of Penicillium funiculosum and P. rubrum were greater in the rhizosphere than in soil and geocarposphere.

On the other hand, Aspergillus spp. was most common in heavy soil. A. flavus was most prevalent in the soil than in the rhizosphere and geocarposphere, in both medium and heavy soils.

Joffe (1969-b), found that no consistent damages to plants were obtained with toxic isolates of A. flavus.

McDonald (1969), indicated that the number of fungal propagules being much higher in fruit and geocarposphere soils than in field soil. Aspergillus niger was the most prevalent species on pods, followed by Penicillium funiculosum and P. rubrum. Further studies showed that the developing fruits had quantitative and qualitative influences on the soil mycoflora. The number of fungal propagules being much higher in fruits and geocarposphere soils than field soil.

Joffe and Lisker (1970), stated that Aspergillus niger reached 50-60 % of the total mycoflora. Penicillium spp. were considerably more prevalent, whereas A. flavus was always low. A. niger was found in higher number in medium and light soils.

Griffin (1972), mentioned that geocarposphere soil of pegs and mature fruits had population of

Aspergillus flavus little different from non geocarposphere soils. On the other hand, the population of total fungi was greater in geocarposphere.

Joffe (1972), reported that Aspergillus niger constituted 30-60 % of the total mycoflora, concentrated in rhizosphere, specially the geocarposphere. A. niger had an advantage, under the low moisture conditions, over fungi requiring high moisture.

Joffe (1973), isolated 17 isolates of Fusarium spp., and counted for 16.2-23 % of total mycoflora of kernels, soil and geocarposphere.

2. Fungi associated with fresh pods :

Clinion (1960), indicated that Rhizopus spp. were active in the distruction of ungerminated seeds, Aspergillus niger and A. flavus mostly attacked germ-inated seed, while A. niger also caused a crown rot after emergence. Damage to the coat or cotyledon was found to increase the liability to attach by these fungi.

Simmonds (1960), demonstrated that stem, peg and pod rot diseases in groundnut are caused by Sclerotium rolfsii and increased by common cultural practice, i.e. "hilling".

Ashworth et al. (1961), reported that Rhizoctonia solani reduced yield by 25 %, while Sclerotium rolfsii attacked the branches and 10 % of infected plants beared diseased fruits.

Pure cultures of Diplodia sp. when inoculated in the field caused only pod and seed infection, (Chorin and Frank, 1961).

McGuire (1960), emphasized that Diplodia gossypina extensive and apparent kernels damage and no resistance to this damage or collar rot was noted in Virginia Bunch groundnuts. Moreover, groundnut isolate caused

decay in apple, cotton and orange fruits and stored sweet potato, The susceptibility of the groundnut fruits increased by temperature up to 40°C.

Purss (1962), reported that beg and pod rots associated with Sclerotium rolfsii and Rhizoctonia solani caused minor shell rots. Various rots affect yield quantity and quality.

Jackson (1963a), believed that Aspergillus niger group, A. flavus, Rhizopus spp., and Sclerotium butaticola (Macrophomina phaseoli) were the most prevalent pathogens in seeds of commercial lots.

Kranz and Pucci (1963), mentioned that pod and kernels rots were reproduced by Rhizoctonia solani, Cephalosporium acremonium, Fusarium oxysporum and F. solani.

Ashworth and Langley (1964), found that the entry of the fungi, such as Aspergillus niger and A. flavus, into the kernels is associated with the break-down in pod structure, primarily by Rhizoctonia solani.

Diener et al. (1965), indicated that shell and kernel invasion by Aspergillus flavus and other fungi was determined in peanut fields. Pods were surface