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CHARACTERIZATION OF THE FUNGI AND AFLATOXINS ISOLATED FROM FROZEN MEAT

THESIS PRESENTED BY

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1. INTRODUCTION

Moulds are regarded more or less as contaminants of meat and its products which may lead to spoilage and/or food poisoning. The environment inside the slaughtery halls including air, walls, floors, utensils, hide and intestinal contents of slaughtered animals are considered the main sources for such fungal contamination (Mansour, 1986).

Mould growth on meat is a common occurrence which may result in adverse changes in freshness of food leading to highly economic losses due to condemnation of such food. This type of mould spoilage is attributed to the biochemical ability of different types of mould species to excrete fermentable enzymes which attack protein and fat (Abdel-Rahman *et al.*, 1989).

Aspergillus is the most frequent genus isolated from frozen meat followed by *Penicillium*, *Cladosporium*, *Alternaia*, *Mucor*, *Rhizopus* and *Phoma* (El-Razzas *et al.*, 1984).

The term aflatoxins refers to a group of bisfuranocoumarin metabolites produced by strains of *Aspergillus flavus* Link. The major members are disignated as B_1, B_2, G_1 and G_2 (Hartley *et al.*, 1963).

Aflatoxicosis susceptibility in animals were divided into three categories: (a) Those with an LD50 of 1 mg/kg or less which includes ducklings, rainbow trout, guinea pigs, rabbits, dogs, young

rats and young turkeys; (b) those requiring a tenfold increase in aflatoxin dosage, such as pigs, monkeys, rats, calves, pheasant, chicks, ferrets, hamsters, cows, mink, quail and certain breeds of chickens, and (c) the resistant animals are mice and sheep. In addition to this scale of susceptibility to aflatoxin poisoning, biological factors as age, sex, hormonal balance and diet must be considered (Schoental, 1967).

Mycotoxin problem is like an iceberg. We see only the portion above the surface, the acute, dramatic effects and death. The major part of the problem is beneath the surface and remains obscure because of the variable and undramatic nature of the effects of contained low level toxin consumption. The economic effects on livestock production appear to be considerable but their assessment awaits the development of better diagnostic techniques and wider recognition of these conditions (Pier, 1973).

The consumption of imported frozen meat has steadily increased in Egypt during the recent years, so this study was planned to study the following points:

(1) Mycoflora in certain frozen meat, frozen liver and frozen minced meat with special reference to *Aspergillus species*.

(2) Aflatoxin producing *Aspergillus species*.

(3) Mycotoxin residues in meat and its products.

(4) Experimental toxicosis of rabbits with aflatoxin B_1.

(5) Action of some food processing on aflatoxin.

2. REVIEW OF LITERATURE

2.1. Sources of mould contamination:

Pady (1951) studied fungi isolated from aractic air. He mentioned that *Cladosporium* was the most frequently isolated mould, particularly *Cladosporium herbarum*. Other isolated mould species were: *Streptomyces, Sporormia, Penicillium, Pullularia, Phoma, Alternaria, Phialophora Fusarium* and *Sphaeronema*.

Pady and Kapica (1956) identified about 40.359 mould isolates obtained from air masses over Montreal during 1950 and 1951 to be *Cladosporium, Penicillium, Yeast, Aspergillus, Alternaria, Actinomycetes, Pullularia, Fusarium, Stemphylium, Verticillium, Rhizopus, Scopulariopsis, Phoma, Mucor, Botrytis, Cephalosporium, Trichoderma, Cephalothecium, Zythia* and *Nigrospora*.

Pawsey and Heath (1964) mentioned that 7238 mould species were isolated from air in the vicinity of Nottingham. At the top of the isolated mould genera were *Cladosporium herbarum, Penicillium, Epicoccum species, Botrytis cinerea, Pullularia pullulans, Aspergillus, Alternaria* and other fungi.

Youssef and El-Tarabishy (1966) recorded the isolation of 9237 mould strains from Cairo air. The most predominant fungal isolate was *Cladosporium. Alternaria* was the first in distribution, followed by *Epicoccum species, Aspergillus, Penicillium, Yeast, Stemphylium* and other fungi.

slaughter halls at Zagazig abattoir. They were *A. niger* was (31.11%), *Penicillium* (27.78%), *Cladosporium* (11.11%) *Alternaria* (10.00%) *Mucor (7.78%), Aspergillus fumigatus* (5.56%), *Fusarium* (4.44%) and *Aspergillus flavus* (2.22%).

Hamdy *et al.* (1989) reported that 806 mould isolates were recovered from air samples taken from camels and cattle slaughtering halls. The main isolated mould genera were *Aspergillus* (33.88% and 51.18%), dark mould (33.19% and 30.45%), *Penicillum (18.82%) and 14.17%) Trichoderma* (5.41% and 0.26%), *Rhizopus* (3.08% and 1.58%), *Abasida* (1.88 and 0.0%), *Acremonium* (1.65% and 0.26%), Fusarium (0.7% and 0.52%) *Geotrichum*).47% and 0.0%), *Scopulariopsis* (0.47% and 0.62%), *Mucor* (0.24% and 1.31%) and *Paecillomyces* (0.24% and 0.0%) from the air of camel and cattle slaughter halls, respectively.

Mansour *et al.* (1990) mentioned that from 50 air samples (25 each of camel and cattle slaughtering halls), 43 dematiaceous hyphomycetes were obtained which could be identified as *Cladosporium, A. niger* and *Alternaria species.*

Yassien *et al.* (1990) isolated from 20 swab samples taken from floors of slaughter halls 130 mould isolates which were identified as *Aspergillus, dematiaceous* moulds, *Penicillium, Abasida, Fusarium, Mucor* and *Geotrichum.* They also reported that *Asperigillus, Penicillium species* and black mould (*Alternaria, Cladosporium,* etc.) were the most common isolated mould strains from the surface of both camal and cattle carcasses and their surroundings.