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ASPERGILLUS FLAVUS AND AFLATOXINS RESIDUES IN LUNCHEON MEAT

(With One table)

By

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أسبراجلاس فلافس وبقايا الافلاتوكسين فى اللانشون

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يعد التلوث الغذائى واحدا من أهم مشكلات العصر الامر الذى دفعنا الى عمل دراسة ميدانية لتواجد فطر الاسبراجلاس وبقايا الافلاتوكسين فى اللانشون بمحلات السوبر ماركت بمحافظة أسيوط. وقد تم تجميع ٥٠ خمسون عينة بطريقة عشوائية ممثلة لأكبر شركتين لانتاج اللانشون فى مصر وذلك فى الفترة من يناير حتى أكتوبر ١٩٩٤ . وقد دلت النتائج عن وجود فطر الاسبراجلاس فى العينات بنسبة تصل الى ٨٠٪ بينما وصلت نسبة تواجد متبقيات الافلاتوكسين فى عينات اللانشون الى ١٤٪ ووصل أقصى ارتفاع لها الى ١و١١ جزء فى البليون من B1 ، ٢و٣ جزء فى البليون من G1 . الأمر الذى يشكل خطورة على صحة المستهلك خاصة على الفترات الطويلة.

SUMMARY

Fifty representative luncheon samples were collected from Assiut markets obtained from the most two luncheons producing companies in Egypt represented by (A and B) along period of ten months from January to October 1994. Aflatoxigenic mold *(Aspergillus flavus)* was isolated, identified and counted. Samples were analyzed also for detection of aflatoxins B_1,B_2,G_1,G_2,M_1 and M_2 residues. The results of mycological examination revealed that, 76 and 84% of luncheon smples were found to be contaminated by *Aspergillus flavus*, in company A and B respectively on dicloran agar at 25°C. Results of aflatoxin analyses revealed that, about 14% of the samples were positive for aflatoxins B_1 or B_1 and G_1 while all samples were negative for aflatoxins B_2,G_2,M_1 and M_2. The highest detectable levels were 11.1 ppb aflatoxin B_1 and 3÷2 ppb G_1. The hazardous effects of these natural pollutants were discussed.

Keywords: *Aspergillus flavus, aflatoxin residues residues, luncheon meat.*

INTRODUCTION

Toxic mold metabolites (mycotoxins) represent as a broad spectrum of biologically active substances that occur as a result of growth of saprophytic (spoilage) molds on various types of feed, food components and its products. Aflatoxins occupy the most important ingredient among mycotoxins that is a collective term for a group of toxic and carcinogenic secondary metabolites produced by some strains of *Aspergillus flavus* and *Aspergillus parasiticus* during growth as time, temperature and humidity are suitable for proliferation of the mold. Animals are exposed to aflatoxins mainly by oral route. Humans are exposed to aflatoxins directly by

consuming contaminated commodities or indirectly by consuming animls' products have ingested aflatoxins contaminted feeds *(HSIEH, 1981)*.

Luncheon meat usually consists of finely chopped meat and fat, with or without some added cereal and using, cured with salt and nitrite and heat processed *(RANKEN, 1984)*.

The carcinogenic potential of low level of aflatoxins is indicative amiably aflatoxin contamination examination through all phases of the food chain. Possible exposure to residues of these toxins in animal tissues and its products is a public health concern that should be examined. In Egypt, information concerning human exposure to aflatoxins from animal products is relatively incomplete, these initiating us to investigate the incidence of aflatoxins and aflatoxigenic mold (*Aspergillus flavus)* contamination in luncheon as a meat product widely consumed in Egypt.

MATERIAL and METHODS

Fifty random samples of luncheon were collected from Assiut city markets including the most luncheon producing companies (two main companies represented by A and B) in Egypt over a period of ten months from January 1994 to October 1994. The samples were kept in separate clean plastic bags, and frozen until analysis.

Mycological analysis:

All samples were analyzed mycologically on dicloran-rose bengal medium as reported by *KING et al.* (1979). Fifteen segments (10 x 10 cm) were used from each sample. They were put (5 segments/plate) on the surface of the agar medium and the plates were incubated at 25°C for 7 days. The *Aspergillus flavus* isolates were counted and identified according to *RAPER and FENNELL (1965) & KOZAKIEWICZ (1989)*.

Aflatoxin analysis:

Samples were minced and 50 gm of each samples were analyzed for detection of aflatoxins according to the method of the Association of Official Analytical Chemists (1980). Statistical analysis of data was performed after *KALTON (1967)*.

RESULTS

The obtained results are recorded in table 1.

DISCUSSION

Contamination of luncheon by molds and mycotoxins affects the yield quality and nutritional value of the products. *Aspergillus flavus* and *Aspergillus parasiticus* constitute the main aflatoxin producing molds. 67 and 84% of luncheon samples were found to be contaminated by *Aspergillus flavus* in company A and B respectively on dicloran agar at 25°C. Segment range as 0-15 segments (in a mean level of 2.9± 0.83) and 0-14 segments (in a mean level of 2.4±0.61) respectively. Molds may contaminating the surface of certain cured and aged meats, as, country cured hams and fermented

sausage. Included among the organisms isolated from this meat were strains of *Aspergillus* species *(BULLERMAN and AYRES, 1968).*

14% of luncheon samples were contaminated by aflatoxins. Aflatoxin M_1,M_2,B_2 andG_2 were not detected in all samples examined. Aflatoxins contamination of luncheon samples may be originated either from the animal tissues previously fed on aflatoxin contaminated feed or due to using aflatoxin contaminated ingredient e.g. cereals. Early studies by *ALLCROFT & CARNAGHAN (1963) and KEYL et al. (1968)* on aflatoxins residues in meat tissues of animals fed contaminated feed suggested that no significant buildup of aflatoxins in animal tissue. However, more recent work has shown that significant quantities of the aflatoxins have been detected in the tissues of pig *(KROGH et al., 1973)* and beef cattle *(PURCHASE, 1973)* fed on aflatoxin contaminated feeds.

Cereals represent one of the most important food and feed sources that may become contaminated with aflatoxins *FENG and TANG (1990)* found that, maize, maize bran, groundnut cakes, and any mixed feeds containing maize and groundnut cakes were the most serious contaminant with aflatoxins. Aflatoxins are seldom a problem in refined oils and fats as the neutralization, bleaching, and deodorization steps fully remove any aflatoxins that may be present. However, it is possible for unprocessed groundnut oil, favored in some parts of the world for its nutty flavour, to be contaminated with aflatoxins *(ROSSELL, 1984).* Aflatoxin BI is heat stable (*ROEGNER, 1967),* so it resists heat during luncheon processing.

Consequently, it was noted that luncheon samples collected from the two main luncheon company producers in Egypt were relatively highly contaminated by aflatoxigenic mold (*Aspergillus flavus)* and aflatoxins. This contamination probably originated from other additives than animal tissues or during processing. transport, and/or storage while the main animal tissues' metabolites (M_1& M_2) were negative. Therefore food additives must be analyzed for mycotoxins specially aflatoxins before introduction in food manufacturing specially cereals. Also strict hygienic measures and regulations should be imposed during processing, packaging, transportation and storage of food specially luncheon

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Table 1: Incidence and levels of *A. flavus, A. oryzae* and aflatoxins contamination.

Comp	Comp. A			Comp. B		
No.	*A. flavus*	*A. oryzae*	AFL.ppb	*A. flavus*	*A. oryzae*	AFL.ppb
1	3	-	11.1 B1-3.2 G1	2	-	1.3 B1
2	3	-	-	2	-	-
3	6	-	-	14	2	-
4	1	-	-	3	-	-
5	9	-	-	4	-	-
6	15	-	-	4	-	-
7	1	-	-	6	-	-
8	3	-	-	8	-	-
9	4	-	-	5	-	-
10	1	-	-	1	-	-
11	1	-	2.5 B1	1	-	-
12	2	-	-	1	-	1.6 B1
13	2	-	-	1	-	-
14	1	-	-	1	-	-
15	1	-	-	2	-	-
16	5	-	-	1	-	-
17	4	-	-	1	-	-
18	-	-	-	1	-	-
19	6	-	-	1	-	-
20	6	-	2 B1	3	-	2.3 B1
21	-	-	-	2	-	0.5 B1
22-25	-	-	-	-	-	-
Rang.	0 - 15	0-0	0-11.1	0-14	0-2	0-2.3
Mean	2.9±0.83			2.4±0.61		