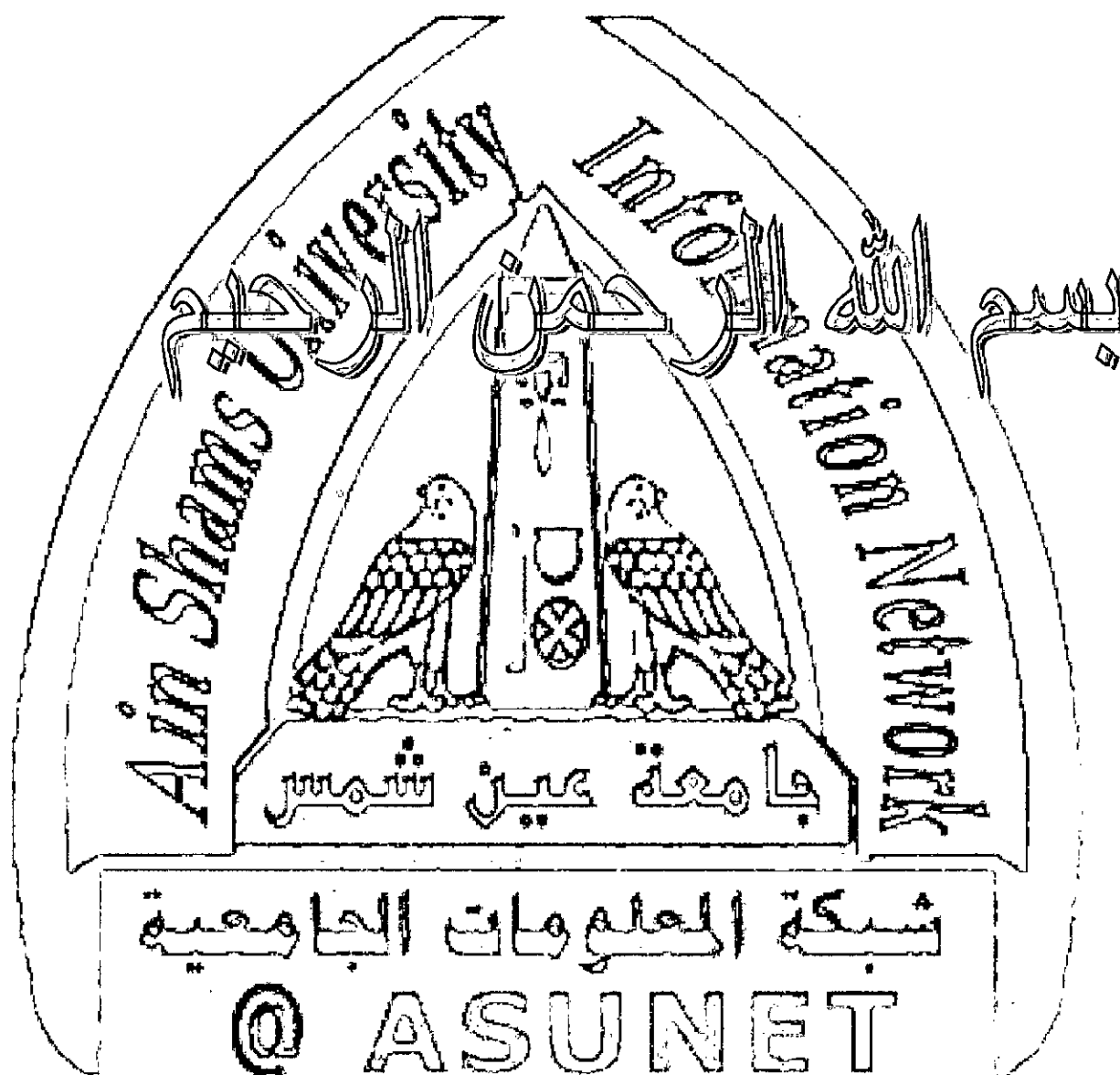




شبكة المعلومات الجامعية





# شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
على هذه الأفلام قد أعدت دون أية تغيرات



## يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

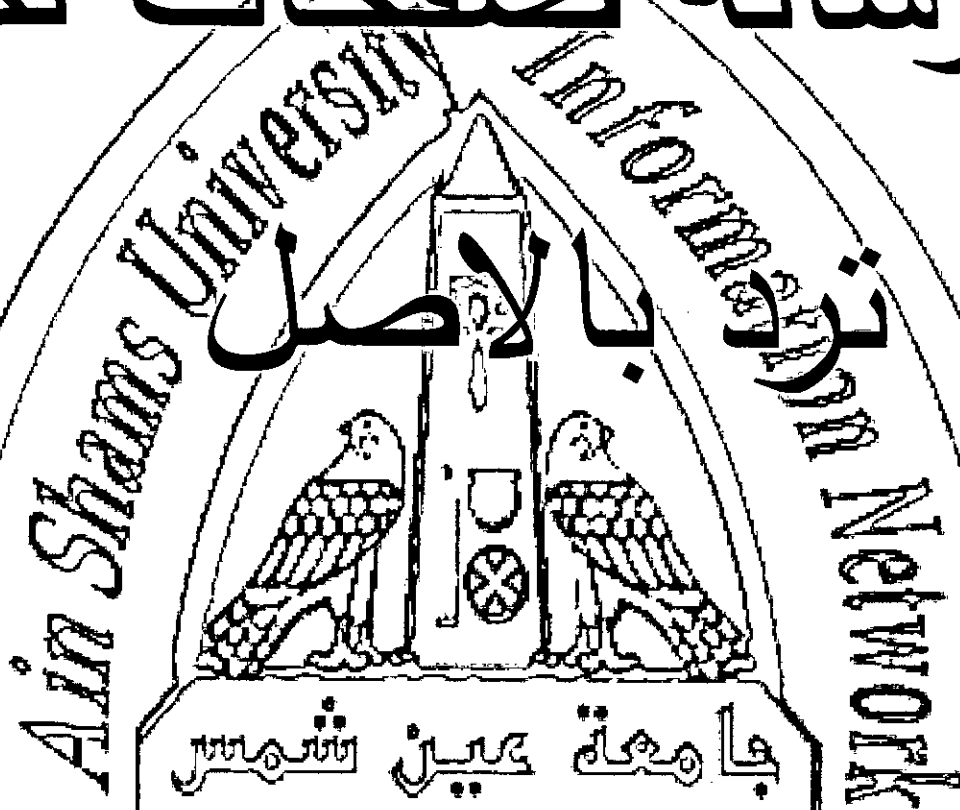
To be Kept away from Dust in Dry Cool place of  
15-25- c and relative humidity 20-40%

بعض الوشائع  
عن شبكة خالفة  
Ain Shams University  
Information Network  
جامعة عين شمس

شبكة المعلومات الجامعية  
@ ASUNET

# بالرسالة صفحات لم

بالأحلى



شبكة المعلومات الجامعية  
@ ASUNET

*Zagazig University / Benha Branch  
Faculty of veterinary Medicine, Moshtohor  
Department of Forensic Medicine and Toxicology*

# **SOME TOXICOLOGICAL STUDIES ON SOME MYCOTOXINS**

636,089614

A Thesis Presented  
By

**AHLAM FAROUK ABD EL-SAMEE**

(B. V. Sc., Zagazig Univ., Benha Branch, 1998)



For

**M.Sc. of Vet. Science  
Department of Forensic Medicine and Toxicology**

Under Supervision Of

**Prof. Dr. Hatem Hussien Bakry**

Professor of Forensic Med. & Toxicology  
Dean of Collage of Vet. Med., Moshtohor  
Zagazig Univ., Benha Branch

**Prof. Dr. Ragab El-Shawarby**

Prof. and Head of Forensic Medicine and  
Toxicology  
Faculty of Vet. Med., Moshtohor  
Zagazig Univ., Benha Branch

**Prof. Dr. Mohamed Abo Salem**

Prof. of Forensic Medicine and Toxicology  
Faculty of Vet. Med., Moshtohor  
Zagazig Univ., Benha Branch

**Assist. Prof. Dr. Elham El-Shewy**

Assist. Prof. of Forensic Medicine and Toxicology  
Faculty of Vet. Med., Moshtohor  
Zagazig Univ., Benha Branch

(2004)

384505

My sincere thanks are due to *Dr. Nabela Abd El-Aleem*, assistant Prof. of Forensic Medicine and Toxicology, Faculty of Veterinary Medicine, Moshtohor, Zagazig University, Benha Branch for her great guidance in preparing this manuscript.

Much gratitude is owed to *Dr. Ahmed Abd El-Hafez*, assistant Prof. of Pathology, Faculty of Veterinary Medicine, Moshtohor, Zagazig University, Benha Branch for his friendly help in facilitating the means for the histopathological study.

My extreme thank fullness is also to *Dr. Saad Sharawy* Assistant Prof. of Virology, Faculty of Veterinary Medicine, Moshtohor, Zagazig University, Benha Branch for his help in virological study.

I am profoundly grateful to all members of *Central Laboratory* in Faculty of Veterinary Medicine, Moshtohor, Zagazig University, Benha Branch for their help in all possible facilities.

I would like to endorse my utmost and sincere thanks *to faithful soul of my father, my lovely mother, my husband and my sisters and my daughter* for their continuous encouragement and great care throughout this study and allover my life.

# CONTENTS

Title	Page
<b>INTRODUCTION .....</b>	1
<b>AIM OF WORK .....</b>	2
<b>REVIEW OF LITERATURE .....</b>	3
Structure of aflatoxin .....	3
Fat favouring production of aflatoxin .....	5
Metabolism and molecular basis of aflatoxins .....	6
Mechanism of action of aflatoxins .....	10
Occurrence of aflatoxins in cereal grains .....	11
Occurrence of aflatoxins in poultry feed .....	16
Occurrence of aflatoxins in large animal feed .....	20
Aflatoxins and animal health .....	24
- Clinical signs .....	25
- Immunity .....	27
- Biochemistry and heamatology .....	31
- Gross lesion .....	39
- Histopathology .....	42
Detoxification .....	46
- Hydrated sodium, calcium, aluminum silicate .....	46
- Charcoal .....	49
- Clinoptiolite .....	51
- Sodium pentonite .....	52
- Yeast .....	53
- Soil .....	55
- Ammoniation .....	56
- Feed additives .....	56
Residues .....	61
- In poultry tissue .....	61



## LIST OF FIGURES

Figure	Title	Page
(1)	Structures of aflatoxins and closely related metabolites	4
(2)	HPLC resolution of aflatoxin B1 on reverse phase C18 column (10 $\mu$ m, 4 $\mu$ m, id $\times$ 30 cm)	89
(3)	HPLC resolution of aflatoxin B2 on reverse phase C18 column (10 $\mu$ m $\times$ 4 $\mu$ m, id $\times$ 30 cm)	90
(4)	HPLC resolution of aflatoxin G1 on reverse phase C18 column (10 $\mu$ m $\times$ 4 $\mu$ m, id $\times$ 30 cm)	91
(5)	HPLC resolution of aflatoxin G2 on reverse phase C18 column (10 $\mu$ m $\times$ 4 $\mu$ m, id $\times$ 30 cm).	92
(6)	Percentage of aflatoxin B1, B2, G1 and G2 in poultry, large animal feed, yellow corn and soybean.	94
(7)	Mean of aflatoxin B1, B2, G1 and G2 (ppb) in poultry, large animal feed, yellow corn and soybean.	94
(8)	Effect of aflatoxin B1 on mean body weight (g) of chicks along the experiment.	96
(9)	Effect of aflatoxin B1 on feed intake (kg) of chicks along the experiment.	96
(10)	Effect of AFB1 on relative organ weight of broiler chicks at the end of the experiment (7 weeks).	97
(11)	Effect of aflatoxin B1 on organ indexes at the end of the experiment (7 weeks) in broiler checks.	98
(12)	a) Effect of aflatoxin B1 on some haematological parameters (RBCs & WBCs) of boiler chicks at the end of the experiment (7 weeks).	100
	b) Effect of aflatoxin B1 on some haematological parameters (Hb & PCV%) of boiler chicks at the end of the experiment (7 weeks).	100
(13)	Effect of aflatoxin B1 on different white blood cells count of boiler chicks at the end of the experiment (7 weeks).	101

Figure	Title	Page
(14)	a) Effect of aflatoxin B1 on serum (total protein, albumin and globulin) of broiler chicks at the end of the experiment (7 weeks).	103
	b) Effect of aflatoxin B1 on serum (A/G ratio) of broiler chicks at the end of the experiment (7 weeks).	103
(15)	a) Effect of aflatoxin B1 on some liver function parameters (ALT, AST & ALP) of broiler chicks at the end of the experiment (7 weeks).	105
	b) Effect of aflatoxin B1 on some liver function parameters (total and direct bilirubin) of broiler chicks at the end of the experiment (7 weeks).	105
(16)	a) Effect of aflatoxin B1 on some liver function parameters (urea) of broiler chicks at the end of the experiment (7 weeks).	107
	b) Effect of aflatoxin B1 on some liver function parameters (creatinine) of broiler chicks at the end of the experiment (7 weeks).	107
(17)	Effect of aflatoxin B1 on haemagglutination inhibition titer in chicks along the experiment (7 weeks).	108
(18)	Effect of aflatoxin B1 on immune response of broiler chicks against IBD and IB vaccine.	109
(19)	Aflatoxin residues in chicks muscles at the end of the experiment (7 weeks).	110
(20)	Liver chickens experimentally feed on 10 ppb AFB1 showing large reddis areas and pale ness of hepatic surface	115
(21)	Thymus of chickens experimentally feed on 10 ppb AFB1 showing enlargement and congestion	115
(22)	Liver of chickens experimentally feed on 1- ppb AFB1 showing large, pale liver (1) compared with other groups.	116

Figure	Title	Page
(23)	Immune organs (bursa of Fabricius and spleen) of chickens experimentally feed on 10 ppb AFB1 showing enlargement compared with control group (3).	116
(24)	Liver of broiler chicks experimentally feed on 10 ppb AFB1 showing diffuse vacillation of hepatocytes. H & E stain x 100.	117
(25)	Liver of broiler chicks experimentally feed on 10 ppb AFB1 showing hyperplasia of bile ductal epithelium. H & E stain x 100.	117
(26)	Liver of broiler chicks experimentally feed on 10 ppb AFB1 showing congestion of portal blood vessels with lymphocytic cellular infiltration of portal area. H & E stain x 100	118
(27)	Liver of broiler chicks experimentally feed on 10 ppb AFB1 showing focal area of hepatic necrosis. H & E stain x 100	118
(28)	Liver of broiler chicks experimentally feed on 10 ppb AFB1 showing focal lymphocytic cellular aggregation forming nodules. H & E stain x 100	119
(29)	Kidney of broiler chicks experimentally feed on 10 ppb AFB1 showing shrinkage of some glomeruli. H & E stain x 100	119
(30)	Kidney of broiler chicks experimentally feed on cellular infiltration of interstitial tissue. H & E stain x 100	120
(31)	Bursa of broiler chicks experimentally feed on 10 ppb AFB1 showing depletion of the lymphoid follicles. H & E stain x 100	120
(32)	Brain of broiler chicks experimentally feed on 10 ppb AFB1 showing focal area of encephalomalacia. H & E stain x 100	121

Figure	Title	Page
(33)	Brain of broiler chicks experimentally feed on 10 ppb AFB1 showing neural degeneration and neurophagia. H & E stain x 100	121
(34)	Heart of broiler chicks experimentally feed on 10 ppb AFB1 showing congestion of intermuscular blood vessels and perivascular edema. H & E stain x 100	122
(35)	Spleen of broiler chicks experimentally feed on 10 ppb AFB1 showing focal aggregation of mononuclear inflammatory cells forming nodules. H & E stain x 100	122
(36)	Liver of broiler chicks experimentally feed on 10 ppb AFB1 and antitoxin 1kg/ton showing vacuolation of some hepatocytes. H & E stain x 100	123
(37)	Liver of broiler chicks experimentally feed on 10 ppb AFB1 and antitoxin 1kg/ton showing focal aggregation of mononuclear inflammatory cells mostly lymphocyte. H & E stain x 100	123
(38)	Liver of broiler chicks experimentally feed on 10 ppb AFB1 and antitoxin 1kg/ton showing preductal lymphocytic cellular aggregation. H & E stain x 100	124
(39)	Kidney of broiler chicks experimentally feed on 10 ppb AFB1 and antitoxin 1kg/ton showing degeneration of renal tubules with focal aggregation of inflammatory. H & E stain x 100	124
(40)	Bursa of Fabricius of broiler chicks experimentally feed on 10 ppb AFB1 and antitoxin 1kg/ton showing focal desquamation of some lining epithelium and slight lymphoid depletion. H & E stain x 100	125

## INTRODUCTION

Aflatoxicosis represents one of the most serious disease of poultry, livestock, companion animals and man (**Edds, 1973**).

The removal of performed aflatoxin from contaminated feed has been a major problem. These toxins are not heat-labile and can survive pelleting and other processing operations. They are non antigenic so vaccination is impossible **Rodricks and Stoloff, 1976**).

Mycotoxins are secondary metabolities produced by many important phytopathogenic and food spoilage fungi including *Aspergillus*, *fusarium* and *penicillium* species (**Sweeney and Dobson, 1999**).

Mycotoxins are a heterogeneous group of secondary fungal metabolities. Their formation in food and feed stuffs is influenced by may factors, including humidity, temperature, pH, oxygen concentration, type of substrate or presence of competitive microflora. Besides the negative effects of mycotoxins on health and performance of farm animals, it is of importance to consider to what extent mycotoxins carried over into edible tissues like meat, milk and eggs when fed to farm animals (**Blank, 2002**).

Mycotoxins contaminate various feed and food commodities, due to the global occurrence of toxigenic mould. They adverse health effects in human and animals. The nature of these toxic effects varies depending on the chemical structure of the toxin. The degree of these adverse effects is not only determined by toxin concentration present in food and feeds, but also by the time of exposure. Whilst in animals, next to acute intoxication, losses in productivity, reduced weight gain and immuno suppression are considered as most important feature of mycotoxicosis (**Fink, 1999**).



# Aim of Work

## **AIM OF WORK**

As aflatoxins were not only potent carcinogenic for human and animal but also resulting in an economical loss through cost of treatment and industrial losses and in detoxification. Moreover, impossibility for vaccination and treatment. Using antitoxin may reduce aflatoxin residues in animal tissue and improve animal performance. So we aimed to collect random samples of animal feed (poultry and large animal) and cereal grains (yellow corn and soybean) from different localities in Kalubia and Sharkia governorates and determinate aflatoxins content by HPLC a highly sensitive quantative method. In addition, experimental study was extended to explore the toxic effects of aflatoxins on broiler chicks beside determinate residues of aflatoxin in broiler chicks muscle as it considered a cheap source of protein for Egyptian consumer.