

**UNIVERSITI TEKNOLOGI MARA**

**AFLATOXIN IN GROUNDNUTS AT RETAIL PREMISES  
IN THE DISTRICT OF GOMBAK, SELANGOR**

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**Project Paper Submitted in Partial Fulfillment of the Requirements  
for the Degree of Environmental Health and Safety (Hons.)**

**Faculty of Health Sciences**

**JULY 2015**

## Declaration by Student

Project entitles “**Aflatoxin in Groundnuts at Retail Premises in the District of Gombak, Selangor**” is presentation of my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of **Mr. Hj. Hashim Bin Ahmad** as Project Supervisor. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons.)

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## **ACKNOWLEDGEMENT**

I would like to express my deep gratitude to Gombak Health District Office Dr. Rozlan Bin Ishak and my supervisors Hj. Hashim Bin Ahmad, for their patient guidance, enthusiastic encouragement and useful critiques of this Environmental Health Field Practical. I would also like to thank Gombak Environmental Health Officer En. Mohd Sabri Bin Redzuan, for her advice and assistance in helping and giving information in the practical training. My grateful thanks are also extended to Occupational Health and Safety Committee member in Gombak Health District Office who helped me in the practical session and also Gombak Vector Control Unit for the information and help in completing the practical task.

I would also like to extend my thanks to Pn. Maziah in Environmental Health Lab, UiTM for giving me permission to use the instrument and device for practical training session.

Finally, I wish to thank my family, husband, children and friends for their support and encouragement throughout my practical and study.

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# CHAPTER 1

## 1.0 INTRODUCTION

### 1.1 Background

Mycotoxins are toxic secondary metabolites and most mycotoxins produced by filamentous fungi can grow on food, especially before harvest and in storage. When humans and animals eaten, inhaled or absorbed through the skin mycotoxins, it can cause illness or death to humans and animals. There are 20 groups of secondary metabolites of fungal aflatoxins but only four identified aflatoxin in foods that aflatoxin B1 (AFB1), Aflatoxin B2 (FB2), Aflatoxin G1 (AFG1) and Aflatoxin G2 (AFG2) (Polychronaki et al., 2008; Liu, Y., and Wu, F.2010)

The two fungi called *Aspergillus flavus* and *Aspergillus parasiticus* is mainly produced Aflatoxin. These toxins occur naturally and has been found to be used in a variety of commodities (including peanuts) used for animal and human consumption (Richard Lawley, 2013).

The molds (*Aspergillus flavus* and *Aspergillus parasiticus*) can colonize a variety of crops both in the field of non-destructive plant pathogens and in storage, and can grow and produce aflatoxin over a wide temperature range (13-37°C) and at relatively low moisture levels (approximate least  $A_w$  0.82). Fungal growth and aflatoxin production in storage plants are also important, especially if the drying is insufficient, or storage conditions to allow access to insects or pests (Richard Lawley, 2013).

Both of humans and animals may have harmful effects on the health because aflatoxin may also cause carcinogenic, mutagenic, teratogenic and immunosuppressive (IARC, 1993). Of the four types of aflatoxins, AFB1 is a metabolite of the most dangerous but it is not a powerful toxin (Yen et al, 2009). Toxins can severely affect the liver and promote human carcinogen, ie, cause cancer depending on their level. In addition, the International Agency for Research on Cancer (IARC) classified as a group of Aflatoxin a carcinogen (IARC, 1993) and is

known as the causal agent of human hepatocellular carcinoma (HCC) (Yen et al, 2009). Aflatoxin poses great health risk to both humans and animals in developing countries, due to the high level of consumption of contaminated products (Richard Lawley, 2013).

### **How do they affect human health?**

Aflatoxins can cause acute poisoning, and potentially death, in mammals, birds and fish, and also in humans at high exposure levels. The liver is the primary organ involved, but also the level of aflatoxin was found in the lungs, kidneys, brain and liver of individuals dying of acute aflatoxicosis. Acute necrosis and cirrhosis of the liver is typical, along with bleeding and edema. LD50 (lethal dose) value for animals vary between 0.5 and 10 mg / kg body weight (Richard Lawley, 2013).

From the point of view of food security, chronic toxicity is more important, certainly in areas that are more advanced in the world. Aflatoxin B1 is the most acutely toxic and has been classified as Group 1 carcinogens that primarily affects the liver by IARC (International Agency for Research on Cancer, 1993). Human exposure to aflatoxin can lead directly from the intake of contaminated food, or indirectly from the use of food from animals previously exposed to aflatoxin in feed (Richard Lawley, 2013).

Aflatoxin B1 is the most potent carcinogens and mutagens in many animals, and therefore potentially in humans, and the liver is the main target organ. The ingestion of low levels for a long time been associated with primary liver cancer, chronic hepatitis, jaundice, cirrhosis and impaired nutrient exchange. In other cases, aflatoxin can also play a role as Reye's syndrome and kwashiorkor (a condition in childhood are associated with malnutrition). Less is known about the chronic toxicity of aflatoxin G1 and M1, but is also considered to be carcinogenic, although perhaps a little less powerful than B1 (Richard Lawley, 2013).