

**AFLATOXINS IN MILK AND SOME OF  
DAIRY PRODUCTS AND FOODS IN  
BEHERA GOVERNORATE**

**A Thesis**

Presented to the Graduate School

Faculty of Agriculture (Damanhour), Alexandria University

In partial fulfillment of the Requirement for the Degree

Of

Master of Science

In

Dairy Science and Technology

By

Sahar Abd-Allah Ibrahim Nasser

(2008)

## SUMMARY AND CONCLUSION

Aflatoxins are the most dangerous types of mycotoxins. The homogeneity of aflatoxins concentration in products is a key factor in carrying out proper sampling. Distribution can be varying on homogeneous, as with aflatoxins in peanuts. While the number of contaminated peanut kernels in a lot is usually very low, the contamination level within a kernel can be very high. Similar results are known for corn. If insufficient care is taken to achieve a representative sample, the mycotoxins concentration in an inspected lot may be easily estimated incorrectly.

**aflatoxins are highly toxic and carcinogenic and their occurrence in human foods has been correlated with primary liver cancer .Aflatoxin B<sub>1</sub> is the most potent hepato carcinogen known .**

Mycotoxins can be present in livestock, reducing productivity in feed into milk or meat ,they become a food safety hazard in these products too.

So, in this study we had collected eighty samples, twenty samples for each commodity of (peanut, corn, rice and feed) and three hundred and six of dairy products samples ( raw milk 107, ras cheese 109 , Domiati cheese 25, and Processed cheese 65) to examine the occurrence of aflatoxins .

**The aims on this study were :**

- 1- Monitoring of aflatoxins B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub> and G<sub>2</sub> in milk and some dairy products along with some foods and feeds .
- 2- Studying the chemical composition of milk samples and some of its products which collected randomly from different districts of Behera Governorate.

All samples were analysed for proximate chemical composition and aflatoxins and the most important results were as follows :

### **Chemical composition of buffalo's and cow's milk**

#### Moisture content :

Moisture content of cow's and buffalo's milk samples varied significantly. It was between 86.60% at Abu El- Matamir district and 86.96% at Edko district for cow's milk while ranged between 83.47% (Abu El- Matamir) district and 83.8 % (Badr)district for buffalo's milk.

#### Total solids content :

**The total solids contents of cow's and buffalo's milk samples ranged between 13.04% at Edko district and 13.20 %at Abu El- Matamir district for cow's milk and varied between **16.17 %**at Badr district and 16.52 % at Abu El- Matamir district for buffalo's milk.**

#### Protein content :

The protein content of cow's and buffalo's milk samples was between 3.20% at Rosetta district and 3.60% at Abu El- Matamir district for cow's milk and ranged between 4.15 at Ityai El Barud district and 4.37 % at Rosetta district for buffalo's milk.

#### Fat content :

**The fat contents of cow's milk samples were between 3.84 % at Edko district and 4.50 % at Rosetta district for buffalo's milk, while it range between 6.85 % at Kafer El- Dauwar district and 7.82 % at Rosetta.**

#### Lactose content :

**Lactose content of cow's milk samples was between 4.30% at Shobraghet and Damanhur districts and 4.80 % at Abo Elmtamer district for buffako milk while it varied between 4.62% at Etay Elbarod district and 5.05% at Rosetta district.**

#### Ash content:

**Ash content of cow's and buffalo's milk samples was between 0.73% (Rosetta) district and 0.77% at (Shobraghet) district for cow's milk and varied between 0.75 % at Ityai El Barud district and 0.8 % at (El- Dilingat, El-Rahmaniya and Wadi Elnatron) districts for buffalo's milk.**

### **Chemical composition of Domiati, Processed and Ras cheeses**

#### Moisture content :

Moisture content of Domiati cheese samples was between 55.71 % at Rosetta district and 61.70% at EL- R%ahmaniya district.

The moisture content of Ras cheese samples was between 33.54 % ( Hosh Essa ) district and 34.72 % (Shobraghet ) district .

Moisture content of Processed cheese samples was between 41.62 % at Badr district and 43.13 % at EL- Diligat district .

#### Protein content :

The protein content of Domiati cheese samples varied markedly .It ranged between 12.74 % at EL-Rahmaniya district and 15.73 % at Itay El-Baroude district .

The protein content of Ras cheese samples differed significantly. It ranged between 24.16 % at Abu Hummus district and 26.42 % at Edko district . The protein content of Processed cheese samples was between 23.28 % at El-Rahmaniya district and 23.83 % at Badr district

#### Fat content :

The fat content of Domiati cheese samples collected from the different districts of Behera Governorate varied significantly . It was between 17.69% at El-Rahmaniya district and 19.79% at Rosetta district .On other hand, the fat content( dry matter )of Ras cheese samples was between 52.13 % at (El-Rahmaniya ) district and 53.65 % at (Shobraghet) district . . The fat content of Processed cheese samples was between 30.43 % at Kom Hamada district and 32.00 % at Badr district .

### PH values :

The pH values of Domiati cheese samples varied significantly . It ranged between 5.55 at Dilingat district and 6.45 at itay El Baroude district .

The pH values of Ras cheese samples ranged between 5.15 at Abu El- Matamir district and 5.55 at Rosetta district .

The pH values of Processed cheese samples were between 4.92 at Abu Kafer El-Dawour district and 5.06 at Kom Hamada district.

### Total acidity :

The acidity values of Domiati cheese samples ranged between 0.26% at Abu Hummus and Hosh Essa districts and 0.32 % (El-Mahmudiya and Kafer El-Dauwar) districts . While the acidity values of for Ras cheese samples were from 1.88 % at Abu El-Matamir district and 2.02 % at Kom Hamada district . The corresponding values Processed cheese samples varied significantly between 1.28% at Badr district and 1.54% at El-Mahmudiya and Rosetta districts .

## **Monitoring of aflatoxins B1, B2, G1 and G2:**

### Monitoring of aflatoxins(B1, B2, G1 & G2) in raw milk, ras cheese , Domiatti cheese, and Processed cheese :

**All the collected milk and dairy products samples were completely free from any traces of the four types of aflatoxins (i.e. B1,B2,G1and G2) .**

### Monitoring of aflatoxins in peanut, corn, rice and feed:

The data showed that 12 peanut samples were contaminated with aflatoxin B1 while 11 samples were contaminated with aflatoxin B2 and 75% of the contaminated samples were violated with B1. The mean, minimum and maximum were 7.75, 0.698 and 93.5 µg/kg, for aflatoxin B1, respectively, while, the mean, minimum and maximum of aflatoxin B2 concentration were 3.21, 0.501 and 16.22 µg/kg respectively. Aflatoxin G1 and G2 was not detected in all samples under study .

About 90% , 80% , 50% and 40% of raw corn samples were contaminated with aflatoxins B1 , B2, G1 and G2, respectively. The mean of contamination for aflatoxin B1, B2, G1 and G2 were 27.52, 5.98, 12.67 and 4.2 µg/kg, respectively while the minimum amounts were 0.84, 0.72, 1.2 and 1.00 µg/kg respectively. Data revealed also that maximum amounts of contamination were 382.2, 87.11, 66.92 and 24.33 µg/kg, respectively. About 75% of samples were violated the Egyptian MRL's for aflatoxin B1.

**Only one rice sample (out of twenty ) was contaminated with aflatoxin B1 with amounts of 0.92µg/kg**

Feed was the most commodity contaminated with aflatoxin, the contamination percentage for aflatoxin B1, B2 , G1 and G2 were 95%, 95% , 80% and 70 % ,respectively . The mean, minimum and maximum amounts of aflatoxin B1 in contaminated samples were 45.16, 7.41 and 533.35 µg/kg respectively. While for aflatoxin B2,the corresponding values were 19.62, 2.50 and 195.87 µg/kg, respectively. The amounts of mean, minimum and maximum of aflatoxin G1 were 15.84, 1.21 and 113.76 µg/kg ,respectively while in G2 were 6.23, 1.05 and 37.15 µg/kg, respectively.

Testing the penetration rate of the produced aflatoxins in hard cheese (B1, B2, G1 & G2):

There is no any traces of the four types of aflatoxins were detected after the incubation period of samples treated with spores of *Aspergillus flavus*.

### **Conclusion:**

In conclusion all samples of milk and dairy products collected in this study were free of aflatoxins B1,B2,G1 and G2 and they were safe from this point of view. Notwithstanding , most of feed samples collected from different districts of Behera Governorate were contaminated with different kind of aflatoxins (B1,B2,G1 and G2). We fail to detect aflatoxin M due to some implication for obtaining standard aflatoxin M.