



## MORPHOLOGICAL CHANGES IN RABBITS UNDER AFLATOXIN INDUCED TOXAEMIA

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### ABSTRACT

**Objective:** Amongst all the mycotoxins so far identified, aflatoxins have received maximum attention because of its toxicological characteristics and also because of the fact that they are most frequent contaminants of a variety of foods consumed by human beings. Ingestion of Aflatoxin contaminated food/feed causes Aflatoxicosis in human beings, cattles, poultry and other animals. Body growth is an indicator of physical health of the animal and is influenced by a large number of internal and external factors. **Methods:** Young inbred New Zealand strain of rabbits [approx. one month old] was fed with Aflatoxin contaminated diet for 30 days. The decrease in body weight and RIW was noted at 15 and 30 days of treatment, **Results:** Significant reduction in body weight was only recorded at 30 days of treatment. **Conclusion:** The present results clearly indicate decrease in weight gain, weight loss, appetite and anorexia during Aflatoxin induced toxicosis.

**Keywords:** Mycotoxins, Aflatoxin, Aflatoxicosis, Anorexia, Toxicosis.

### INTRODUCTION

Growth is a process of increase in weight with time and space. Gain in weight indicates dominance of anabolism over catabolism and vice – versa during loss in weight. Body growth is an indicator of physical health of the animal and is influenced by a large number of internal and external factors.

Ingestion of Aflatoxin contaminated food/feed causes Aflatoxicosis in human beings, cattles, poultry and other animals. Very few scientists have reported the effect of mycotoxins on body eight and organ weight [Huff, 1980; [1] Rukmini et. al., 1980; [2] Huff and Doerr, 1981; [3] Raval, 1991; [4] Verma and Raval, 1992 c [5]]. During progression of Aflatoxicosis histoarchitecture of various organs like liver, kidney, heart, lungs, spleen, adrenal and gastrointestinal tract gets altered. Aflatoxin is one of the most potent hepatotoxic agents and is known to cause necrosis and cancer of liver. The present investigation was an attempt to examine morphological alterations caused by feeding Aflatoxin contaminated diet to rabbits.

Yusuf and his colleagues fed rat with 5 and 10 % ginger lily corm. In their study, they found that histopathological sections of the liver, of *G. unguiculata* corm meal-fed rats showed some hepatotoxic effects which might be responsible for the hepatocytic necrosis and mononuclear leucocytes infiltration of the periportal areas of the test rats when compared with those of the control rats [6]

### MATERIALS AND METHODS

A toxigenic strains of *Aspergillus parasiticus* [ NRRL 3240 ] was grown in SMKY liquid medium at 28 + 2 C for 10 days as described by Diener and Davis [ 1966 ] [7]. Culture filtrate was extracted with chloroform and Aflatoxin content was quantified using Shimadzu UV 160 a Spectrophotometer [Nabney and Nesbitt, 1965 [8]]. The Aflatoxin concentrate in chloroform was thoroughly mixed with feed to get a concentration of 15 mg Aflatoxin / kg feed and left overnight for evaporation of chloroform. Presence of toxin was ensured by random sampling and analysis. Feed for control animals mixed with pure chloroform and analyzed for Aflatoxin to rule out any trace of toxin [Raval, 1991[4]].

### Experimental Work

Young inbred New Zealand strains of rabbits [*Oryctolagus cuniculus*] weighing 200 – 225 gm [approximately one month old] were fed with ration and water *ad – libitum* and maintained under laboratory conditions. Ten rabbits were randomly divided into two groups as follows:

**Group – I** Rabbits was fed with Aflatoxin – contaminated feed [15mg/kg] for 30 days.

**Group – II** Rabbits, which served as control received non – toxic feed.

### Body Weight

To examine effects of Aflatoxin on body weight each group of rabbits were weighed individually at 15 days interval and mean weight was calculated. The relative increase in weight [RIW] was calculated by following formulae:

$$RIW = \frac{W_1 - W_0}{W_0} \times 100$$

$W_1$ = mean body eight at particular interval.

$W_0$ = mean body weight at 0 day of treatment.

Besides weight, behavioral changes were also recorded. On completion of the treatment rabbits were sacrificed by cervical dislocation and morphological changes in the internal organs and tissues were recorded. Organs such as liver, kidney, spleen, lungs, heart, thyroid and adrenal were isolated and their absolute and relative weights were recorded.

Student “t” test was used for statistical analysis of the data.

### Results

Rabbits fed with Aflatoxin contaminated diet showed loss of appetite, lethargy and respiratory disorders.

Table 1 shows changes in the body weight and relative increase in weight [RIW] during Aflatoxicosis. A decrease in body weight was observed at 15 and 30 days of treatment. Reduction was also noted in relative weight at each intervals studied.

Internal hemorrhages were also observed in many organs such as gastrointestinal tract, as well as, pale and fragile liver was observed.

Alterations in organ weights were also recorded [Table 2]. The absolute and relative weight of liver, kidney, spleen and adrenal registered increase during Aflatoxicosis, while decrease was recorded in lungs and thyroid. Though absolute weight of heart decreased, relative weight showed increase during Aflatoxicosis.

Table 1 : Alterations in body weight and relative increase in weight of control and aflatoxin – fed rabbits

Days of treatment	Control		Treatment	
	Body weight (gm)	Relative increase in weight (gm)	Body weight (gm)	Relative increase in weight (gm)
0	220.00± 6.00	--	221.0± 5.00	--
15	342.50± 10.25	67.07	325.5± 5.25	38.20
30	440.50± 5.50	117.07	408.50 <sup>a</sup> ± 4.80	76.40

Values are mean ± S.E. M., n = 5 Significant at the level <sup>a</sup> P < 0.02

Table 2: Alterations in absolute and relative organ weights of control and aflatoxin – fed rabbits

Organs	Control		Treated	
	Absolute weight (gm)	Relative weight (gm)	Absolute weight (gm)	Relative weight (gm)
Liver	20.967±2.691	4.759±0.456	22.602±2.671	5.531± 0.365
Kidney	3.332±0.220	0.756±0.106	3.523±0.115	0.862± 0.097
Heart	1.057±0.043	0.239±0.015	1.047±0.067	0.256± 0.025
Lungs	1.757±0.231	0.399±0.031	1.278±0.180	0.313± 0.045
Spleen	0.115±0.012	0.026±0.010	0.120±0.011	0.029± 0.009
Adrenal	0.092±0.002	0.021±0.003	0.095± 0.001	0.023± 0.005
Thyroid	0.031±0.002	0.007±0.001	0.027± 0.003	0.006± 0.001

Values are mean ± S.E. M., n = 5

## DISCUSSION

Young inbred New Zealand strain of rabbits [approx. one month old] was fed with Aflatoxin contaminated diet for 30 days. Both body weight and relative increase in weight [RIW] was recorded at 0, 15 and 30 days of treatment. Though the decrease in body weight and RIW was noted at 15 and 30 days of treatment, significant reduction in body weight was only recorded at 30 days of treatment.

On completion of treatment rabbits were sacrificed by cervical dislocation and absolute and relative organ weights were recorded. Increase in absolute and relative weight was observed in liver, kidney, spleen and adrenal while decrease was found in lungs and thyroid. Relative weight of heart increased irrespective of decrease in absolute weight. Loss of appetite, lethargy and respiratory disorders were evident during Aflatoxicosis. Gas filled gastrointestinal tract and hemorrhage in various visceral organs were observed.

The present results clearly indicate decrease in weight gain, weight loss, appetite and anorexia during Aflatoxin induced toxicosis. Similar results were also reported [ Clark et. al. , 1980[9] 1982;[10] Huff et. al. , 1986,[11] 1988;[12] Raval, 1991;[4] Verma and Raval, 1992 b[13] , c [5] ]. Ferrando and Henry [1965 [14]] recorded staggering, ataxia of nervous system, muscular spasms and characteristic stretching of the head and neck prior to death of the animals under toxemia. Gross hemorrhages present in many tissues were also recorded [Raval, 1991[4]; Verma and Raval, 1992 c [5]]. Internal hemorrhage, pale and fragile liver and gas filled gastro intestinal tract was recorded [Ranjana, 1987[15]; Raval, 1991[4]; Verma and Raval, 1992 c [5]]. Aflatoxin also causes lethargy [Raval and Verma, 1992[16]] and respiratory disorders [Verma and Raval, 1992 b [13]].

Aflatoxin is also known to increase the relative weight of spleen and kidney in broilers [Smith and Hamilton, 1970[17]; Huff et. al., 1986[11], 1988[12]] and also rabbits [Raval, 1991[4]; Verma and Raval, 1992 c [5]].

## CONCLUSION

In conclusion Aflatoxin contaminated diet cause decrease in weight gain, though the organ weight was increased, further studies could be done to found the difference in body weight and organ weight. ACKNOWLEDGEMENT

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