METABOLISM OF AFLATOXINS IN SHEEP

BY

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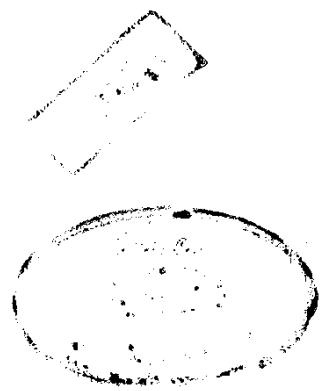

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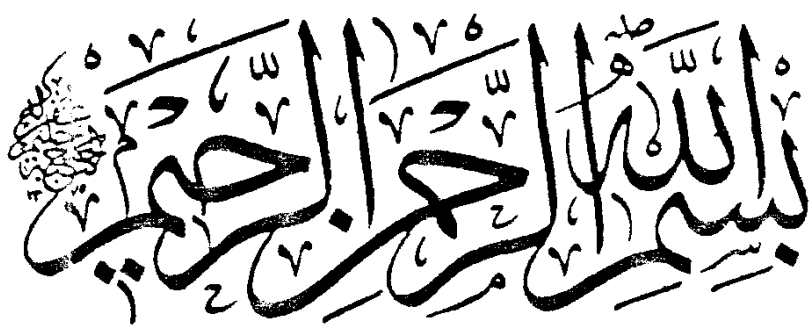

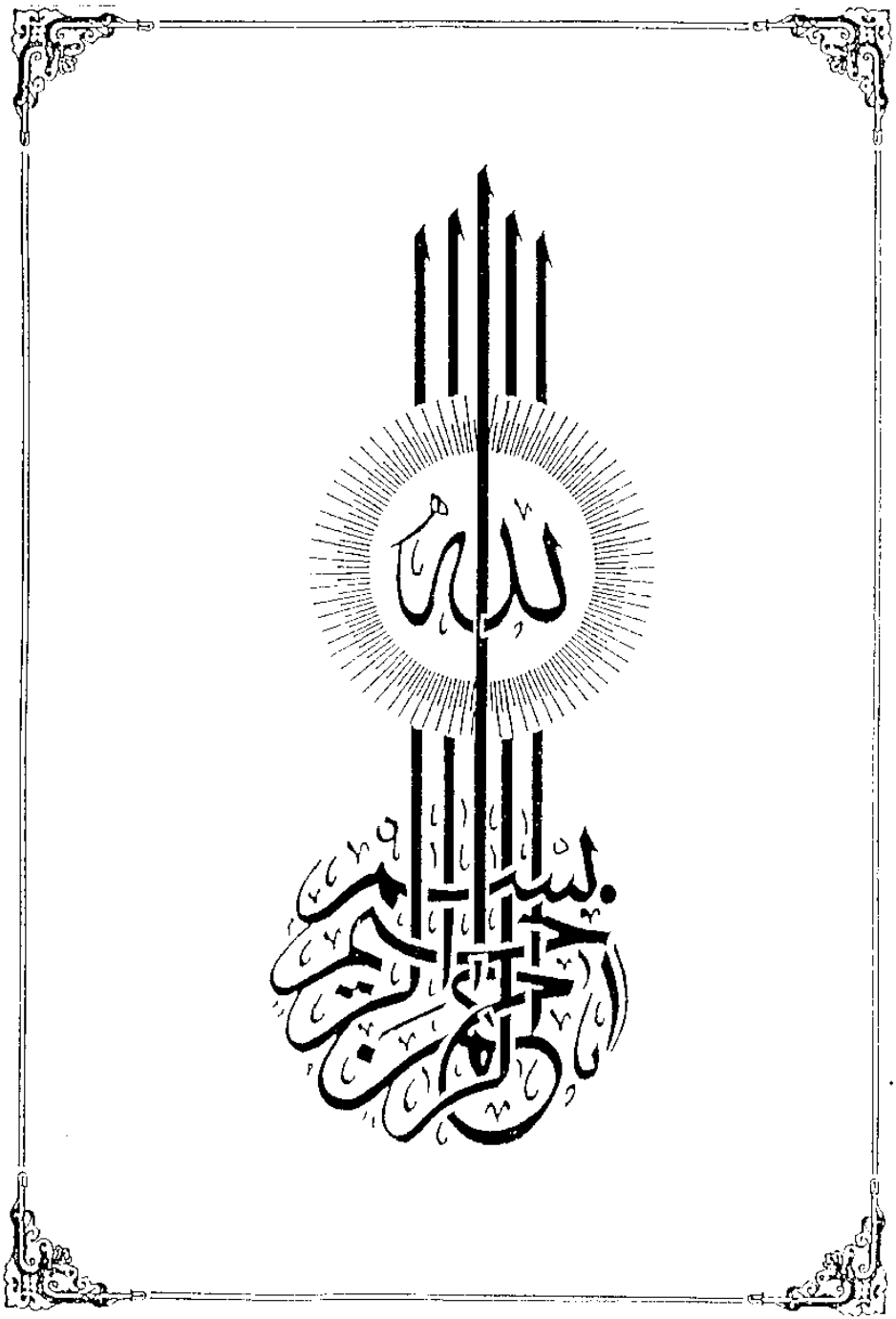

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INTRODUCTION

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Human health has been dramatically affected in out-breaks of acute aflatoxicosis, but these targic events my be only a part of the cost to society in terms of impaired health and productivity from the ingestion of sub-lethal levels of aflatoxins. People under malnutrition would suffer ever so much more from mycotoxins as the well-cared for. The international reports confirmed this facts which revealed that aflatoxicosis outbreaks involved wide-spread areas involved both developed and developing countries.

The economic losses resulting from aflatoxin contamina-ted foods and feeds is difficult to estimate but undoubtedly is large judging from the widespread occurrence of aflatoxin contami-nation and the large number of commodities affected.

A survey study was conducted in Egypt on foods and feedstuffs reported positive results of aflatoxins conta-minated feeds. Losses come about in many ways: from direct food looses and reduced productivity, from livestock looses, from deaths and lower growth rates and feed efficiency, and indirect costs of systems for control of aflatoxins in foods and feeds.

The differences in responses to aflatoxins in different animals has been attributed to their differential metabolism.

The rate of metabolism are an important factor in determining the type of toxic action of aflatoxins. However, once aflatoxin is in the liver and it is metabolized slowly, the unchanged molecule is available for conversion to an epoxide and the animals susceptibility to the chronic dffects of aflatoxins becomes more mainfest.

Little is known, however, of health effects resulting from short term and high level exposure to aflatoxins in different livestocks, but no available literature dealing with long term and low levels exposure to aflatoxins in sheep.

Therefore, the present work was conducted to study the metabolism of aflatoxins(B_1 B_2 G_1 and G_2) in sheep. This work include microbiological , nutritional and biochemical studies. Also, it is an attempt to shed more light on the cummulative effect of aflatoxins in sheep when feefing on contaminated rations.

REVIEW OF LITERATURE

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Historical aspect on aflatoxins and aflatoxincosis:

Sargent et al . (1961) was the first who observed that large numbers of turkey poults and ducklings in British farms had died as a result of consuming contaminated groundnut meals imported from Brazil.

The lethal agents was initially isolated from groundnut meals and suspected to be produced by the common mould Aspergillus Flavus. That toxic metabolite " aflatoxin " not only responsible for hepatotxicity in farm animals but also was carcinogenic to animals fed on contaminated meals (Allcroft and Carragham,1963).

Evidence was soon given by the several groups of investigators that the toxin obtained after paper chromatography was a complex mixture. Nesbitt et al .(1962) Succeeded in further resolving on alumina chromatoplates, two spots were obtained on filter paper. One had an R_F value of approximately 0.6 and showed a blue-violet fluorescence and the other with somewhat lower R_F value with green fluorescence, these two referred to as aflatoxin B and aflatoxin G, respectively. Arae et al. (1963) established the structural formulae of aflatoxin B_1 C_{17} H_{12} O_6 and aflatoxin G_1 C_{17} $H_{12}O_7$.

Isolation and characterization of four closely related metabolites were first reported by Hartely et al. (1963).

They separated the four compounds on silica gel chromatoplates using chloroform-methanol as developing solvent. These compounds designated aflatoxins B_1 B_2 G_1 and G_2 because of their blue and green fluorescent and their decreasing R_F values. The occurrence of aflatoxins other than B_1 B_2 G_1 and G_2 has been found in extracts from milk and urine of mammals and from cultures of Aspergillus flavus grown on natural and synthetic substrates (Allcroft and Carragham, 1963). Moreover, Allcroft et al. (1966) designated the milk toxin as " aflatoxin M " after finding it in the liver, kidney, and urine of sheep dosed with a mixture of aflatoxins B_1 B_2 G_1 and G_2.

Aflatoxins have been found to be naturally occurring in commodities other than peanut and cottonseed cake(Loosmore et al., 1965).

In feed samples collected from various parts of the world, particularly from Africa and Asia, aflatoxins were detected at biologically significant levels in a wide spectrum of commodities including barley, cassava, corn, cottonseed, cowpeas, millet, peanut, peas, rice, sesame, sorghum, soybean and wheat (Wogan,1965 and Shotwell et al., 1968). It is likely that aflatoxins will continue to be found in food and feedstuffs, wherever circumstances were favourable for fungal growth such as warm and moist wheather conditions and faulty or inadequate storage facilities (Wogan,1965).