EFFECT OF AFLATOXIN B, TREATMENT ON PREGNANCY, NEWBORN, AND QUALITY AND QUANTITY OF MILK PRODUCED FROM MAMMALS

BY

MOSAAD ATTIA ABDEL-WAHHAB
B. Sc. Animal production 1981,
M. Sc. Animal physiology 1989

A thesis submitted in partial fulfillment
of
the requirements for the degree of

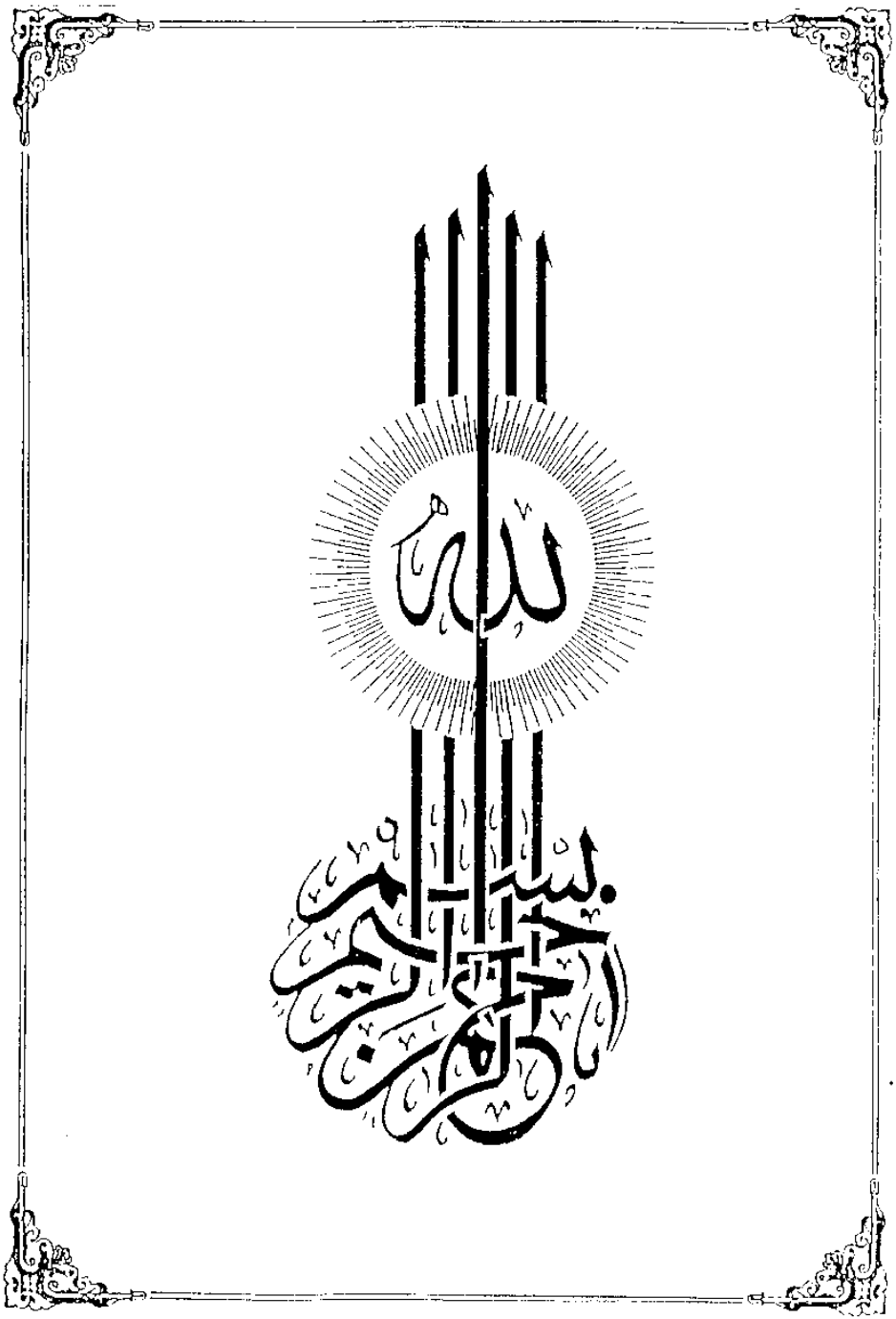
DOCTOR OF PHILOSOPHY

in

Agricultural Science
(Animal physiology)

Department of Animal Production
Faculty of Agriculture
Ain Shams University
Cairo - Egypt

1996



EFFECT OF AFLATOXIN B_1 TREATMENT ON PREGNANCY, NEWBORN, AND QUALITY AND QUANTITY OF MILK PRODUCED FROM MAMMALS

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ABSTRACT

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In the rabbit study, 15 pregnant animals were divided into three groups, group 1 dosed orally with 0.15 mg and group 2 dosed orally with 0.1 mg AFB_1 /kg body weight during 12-30 days of gestation while group 3 was used as control. Treatment with AFB_1 significantly decreased GPT and GOT contents in the serum of pregnant rabbits.Histological examination of the ovaries collected at the end of the treatment period showed coagulative necrosis in the growing and mature follicles and, decreased number of Graffian and growing follicles with increased number of atretic follicles.

The effects of sorbents (HSCAS 1, HSCAS 2, and clinoptilolite) on AFB_1-induced developmental toxicity were studied in 84 female rats. The sorbents were added to the diet at a level of 0.5% (w/w). Test animals were dosed orally with AFB_1 at 2.0 mg/kg body weight during gestation (days 6-13), and dams and fetuses were evaluated for maternal, developmental, and histological parameters on day 20 of gestation. AFB_1 al.one and clinoptilolite plus AFB_1 resulted in significant maternal and developmental toxicity. HSCAS1 and HSCAS 2 markedly diminished the maternal (i.e., mortality, reduction in body weight, ascites, hepatotoxicity, and decreased feed intake), and developmental (i.e., embryolethality and embryotoxicity) effects induced by AFB_1 when added to the diet at a concentration of only 0.5% w/w. Clinoptilolite was ineffective in preventing the maternal and developmental toxicity induced by AFB_1 in rats. Interestingly, clinoptilolite plus AFB_1 resulted in very severe maternal liver lesions (more than AFB_1 alone). None of the sorbents exhibited any toxicity either in maternal animals or developing embryos .

Thirty two adult male rats maintained on diets containing 0.5% (w/w) HSCAS 1, HSCAS 2 or clinoptilolite were dosed orally with 2.0 mg AFB_1/kg body weight.HSCAS 1 and HSCAS 2 markedly reduced the excretion of AFM_1 (major urinary metabolite) in the urine of rats compared to the clinoptilolite. The findings from this study confirm that HSCAS tightly bind AFB_1 and, the AFB_1-HSCAS complex is not significantly dissociated *in vivo*. HPLC, CSID-M_1, and ELISA were compared for

detection of AFM_1 in three kinds of milk. CSID-M_1 and HPLC methods were accurate and detected AFM_1 at concentrations as low as 0.125 ppb in milk samples. ELISA detected AFM_1 at a concentration of ≥ 0.25 ppb. This study demonstrates that the CSID-M_1 minicolumn method is rapid, accurate, cost-effective, and user friendly.This method is particularly useful for the field screening of milk and to predict exposure to AFB_1.
Key Words: Aflatoxin B_1, Clay, rabbits, rats, pregnancy, newborn, milk aflatoxin M_1.

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