EFFECTS OF LYCOPENE ON SPERM QUALITY, REPROUCTIVE SYSTEM AND OXIDATIVE STRESS OF RATS TREATED WITH AFLATOXİN B1

M. Tas, B. G. Saruhan, D. Kurt, B. Yokus and M. Denli*

[5*]Dicle University, Agricultural Faculty Department of Animal Science, 21280, Diyarbakir, TURKEY

Muzaffer Denli (PhD)

muzaffer.denli@gmail.com

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INTRODUCTION

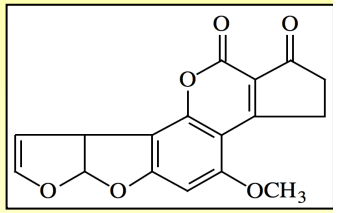
MYCOTOXINS are secondary toxic compounds, produced by many of genera of fungi.

Main mycotoxins producing genera are;

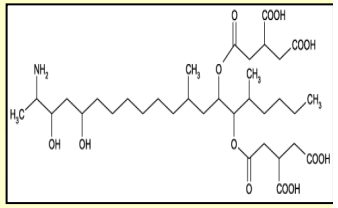
- ***Aspergillus*** ***-Fusarium***
- ***Penicillium*** ***-Claviceps,***
- ***Alternaria spp***

INTRODUCTION

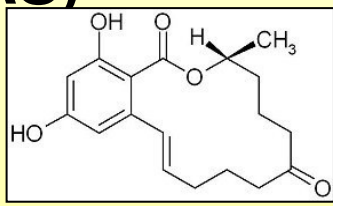
- More than 300 mycotoxins have been identified.



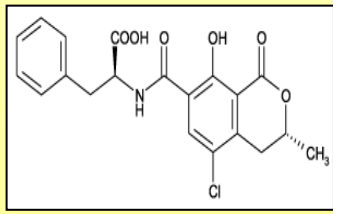
Mainly mycotoxins



- **Aflatoxins (B_1, B_2, G_1, G_2,)**
- Ochratoxins (A, B)
- Trichothecenes (DON, T-2 toxin, nivalenol and DAS)



- Fumonisins (F_1-F_3)
- Zearalenone



- Ergot alkaloids.

INTRODUCTION

Aflatoxins are the most toxic mycotoxins produced by *Aspergillus flavus* and *A.paraciticus.*

Four main aflatoxins

Aflatoxin **B_1,** B_2, G_1 and G_2

Two derivates

Aflatoxin **M_1** and M_2

AFB_1 and AFM_1 have been classified as natural carcinogen agents in humans by IARC (1993)

INTRODUCTION

Mycotoxin Problems in the World

•Up to **25 %** of the world's food commodities are significantly contaminated with mycotoxins (FAO,WHO,1999).

Causes significant

- Human and animal diseases
- Economic losses worldwide. few billion dollars (each year)

The risk posed by mycotoxins consumed in low amount but continuously is not yet explored, however the danger is very high **('hidden killers').**

INTRODUCTION

Lycopene, a naturally present carotenoid in tomatoes and other fruits.

Lycopene has attracted considerable attention due to;

- **potent antioxidant properties (Bertram et al. 1991).**
- **free radical scavenging capacity (Velmurgan et al. 2004)**
- **decreased the risk for gastric cancer (Velmurugan et al. 2001)**
- **antiproliferative effects on prostate (Giovannucci et al., 1995)**
- **breast cancer cell lines (Levy et al. 1995).**

OBJECTIVE

The aim of this study was to investigate if lycopene could diminish the adverse effects of aflatoxin B1 (AFB1) on sperm characteristics, testicular system and oxidative stress in rats.

MATERIALS AND METHODS

Animals

- 28 male Wistar-Albino rats (8 weeks old, weighing 260-350 g)
- 4 groups and 7 rats per treatment

Experimental design

1. Control (corn oil)
2. Lycopene (10 mg/kg BW, daily)
3. AFB1 (2.5 mg/kg BW) on 12th day single dose)
4. Lycopene + AFB1

Diets

Standard comercial rat diets (Obtained from Elazığ Yem Inc. Elazıg Turkey.

MATERIALS AND METHODS

Experimental Prosedures

AFB1 dissolved in PBS
i.p. single dose

Administration

- Testes characteristics
- Epididymis characteristics
- Sperm quality parameters
- MDA

MATERIALS AND METHODS

Sperm concentration and motility by method of Yokoi et al. (2003).

Malondialdehyde (MDA) in the testicular tissue by the colorimetric method described by Yoshioka et al (1979).

Histopathological examinations

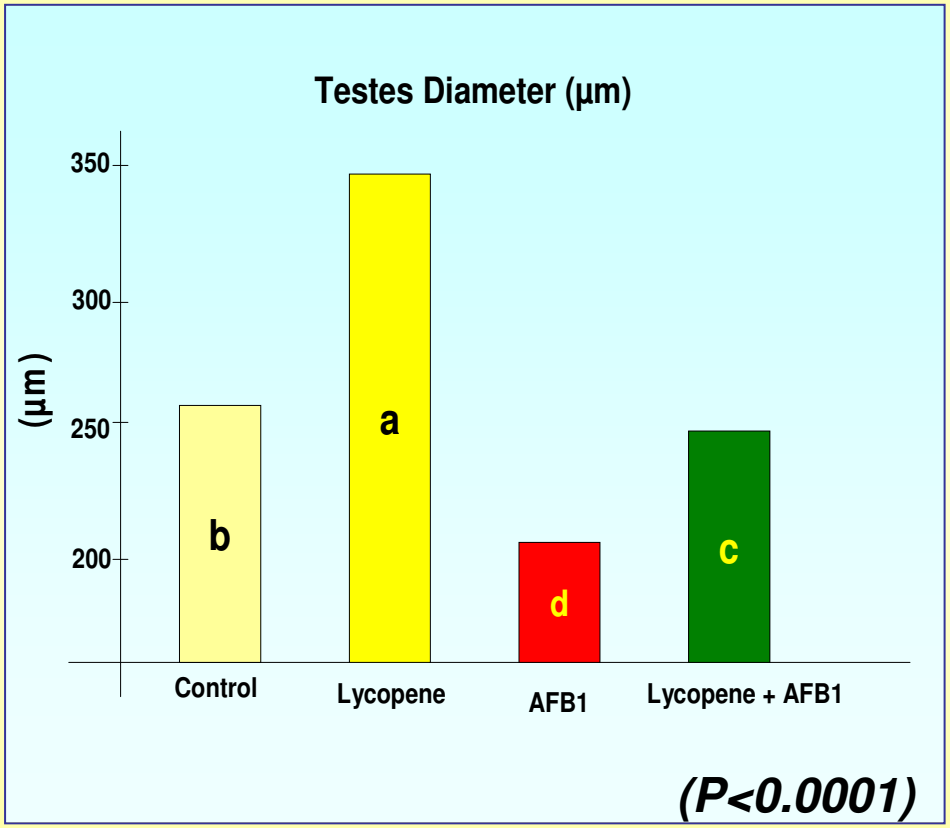
By standard histological techniques, and stained with Crossman's Triple for light microscopy.

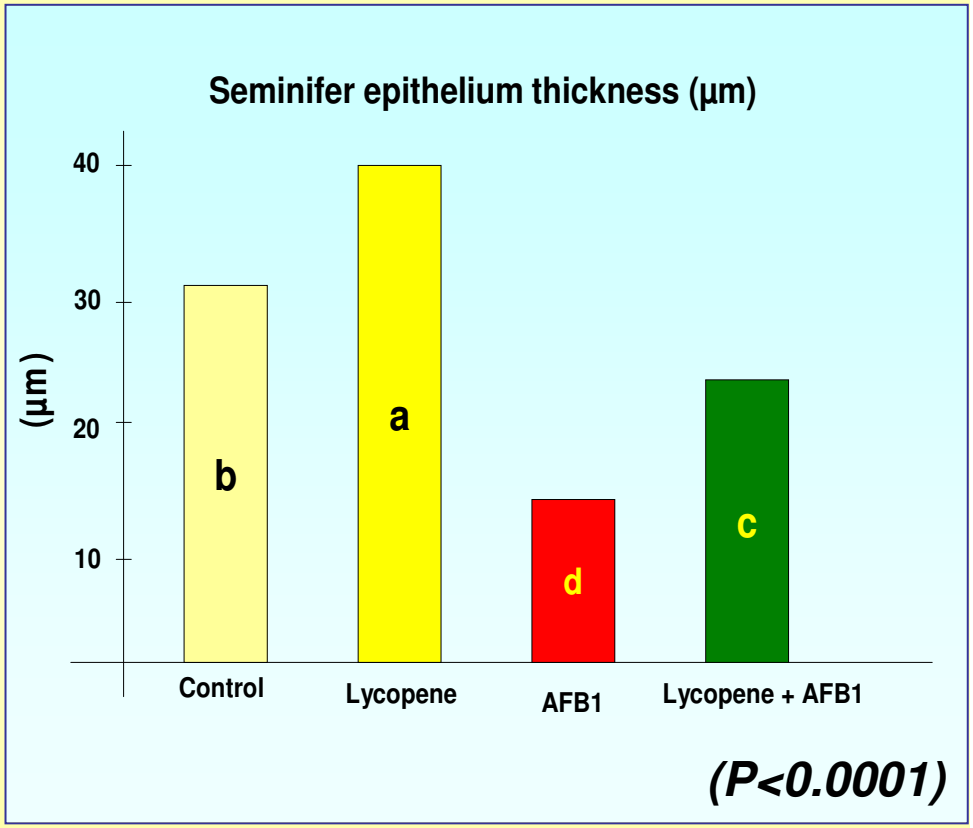
Statistical analyses

GLM procedure of SPSS 9.0 (1993). Tukey's test comparisons

RESULTS AND DISCUSSION

TESTES CHARACTERISTICS

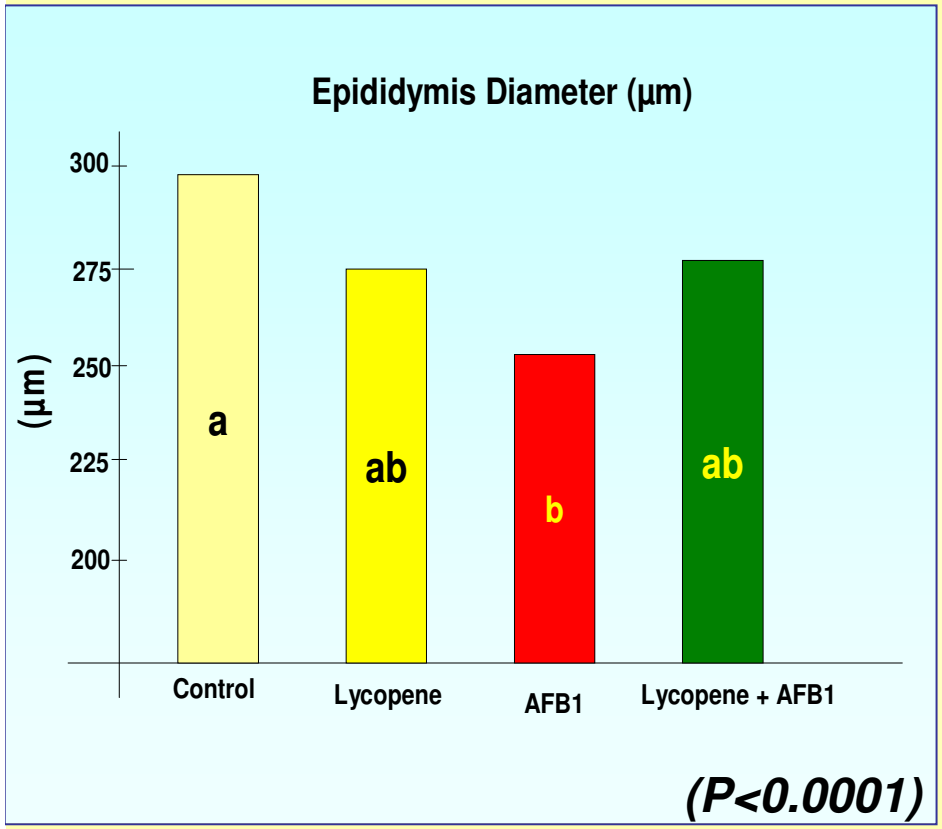


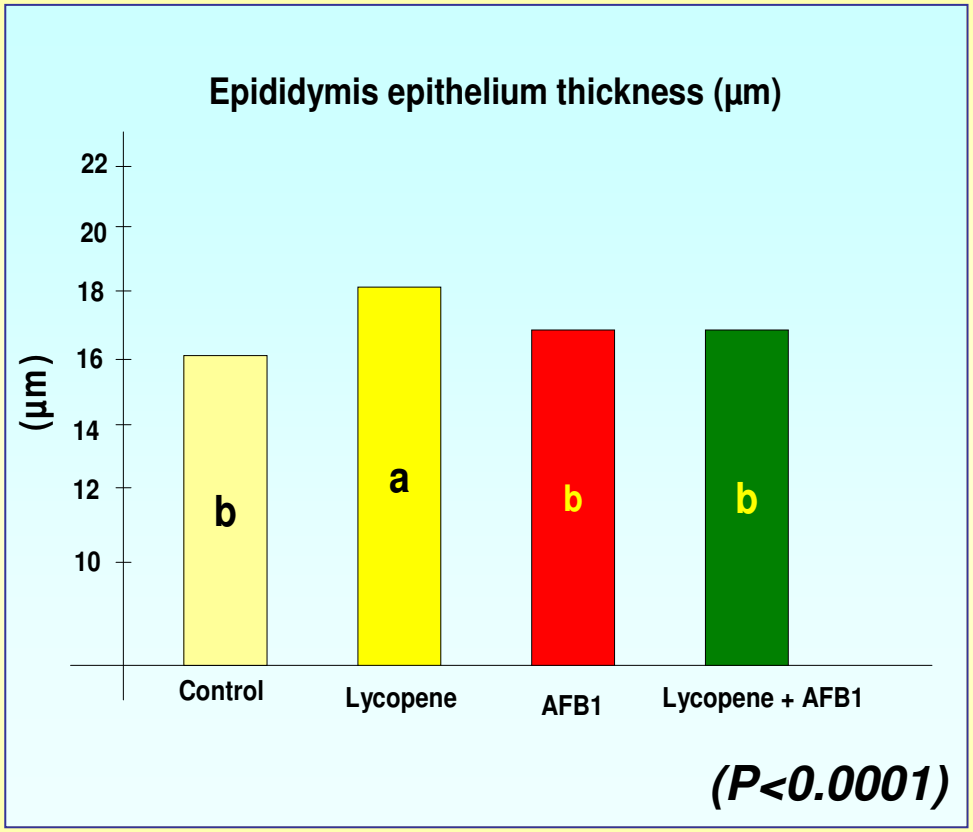


Testes (left and right) weight and lenght were not affected by treatments (P>0.05)

RESULTS AND DISCUSSION

EPIDIDYMIS CHARACTERISTICS





Testes epididymis (left and right) weight was not affected by treatments (P>0.05)

RESULTS AND DISCUSSION

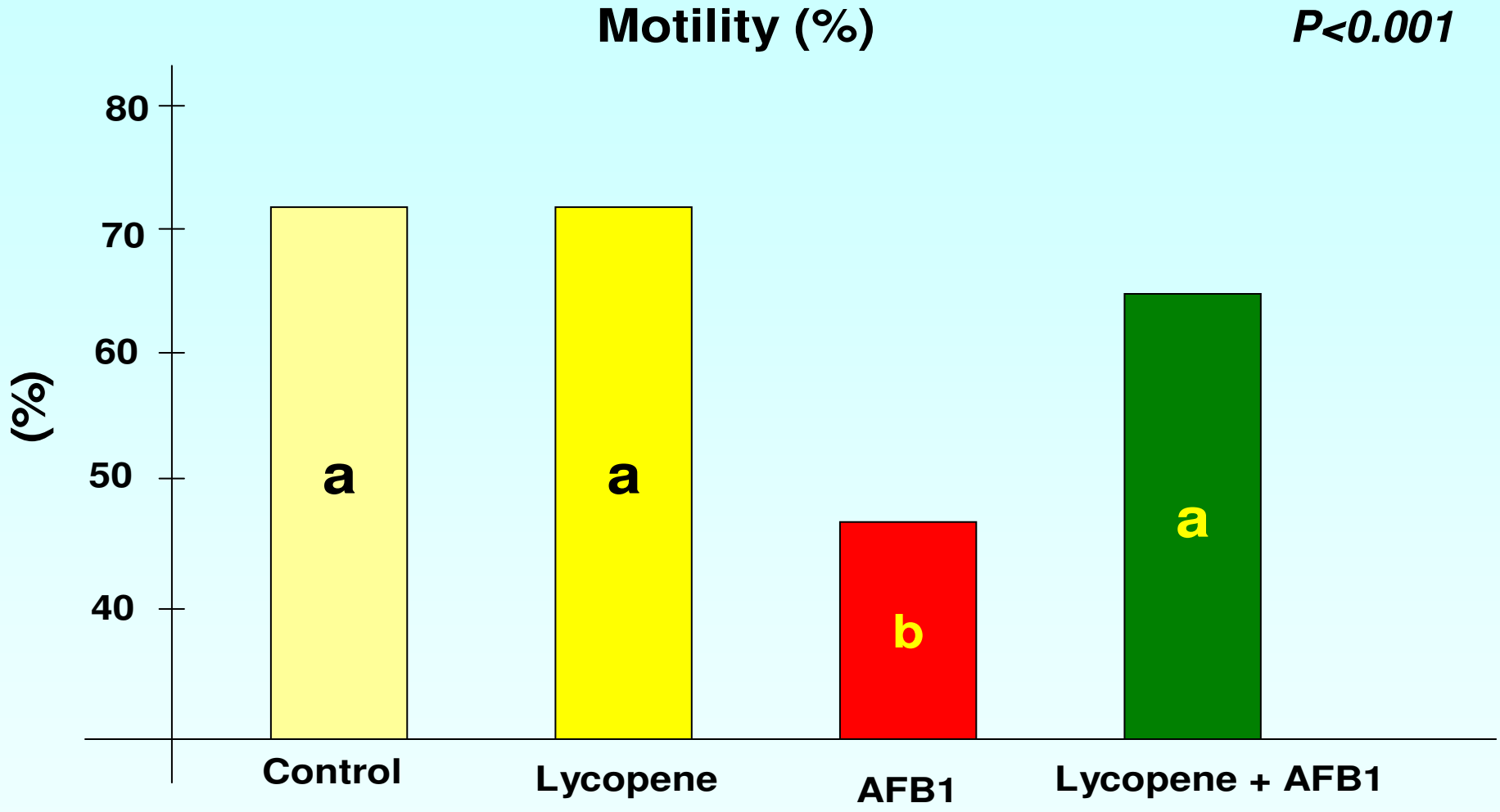
SPERM QUALITY CHARACTERISTICS

	Treatments					
	Control	Lycopene	AFB1	Lycopene+AFB1	SEM	P
Head defects	5.3b	6.6b	9.1a	7.0b	0.39	0.002
Tail defects	7.2c	9.1bc	15.6a	10.8b	0.75	0.0001
Total defects	12.6c	15.7bc	24.7a	17.8b	1.00	0.0001

Testes epididymis (left and right) weight were not affected by treatments (P>0.05)

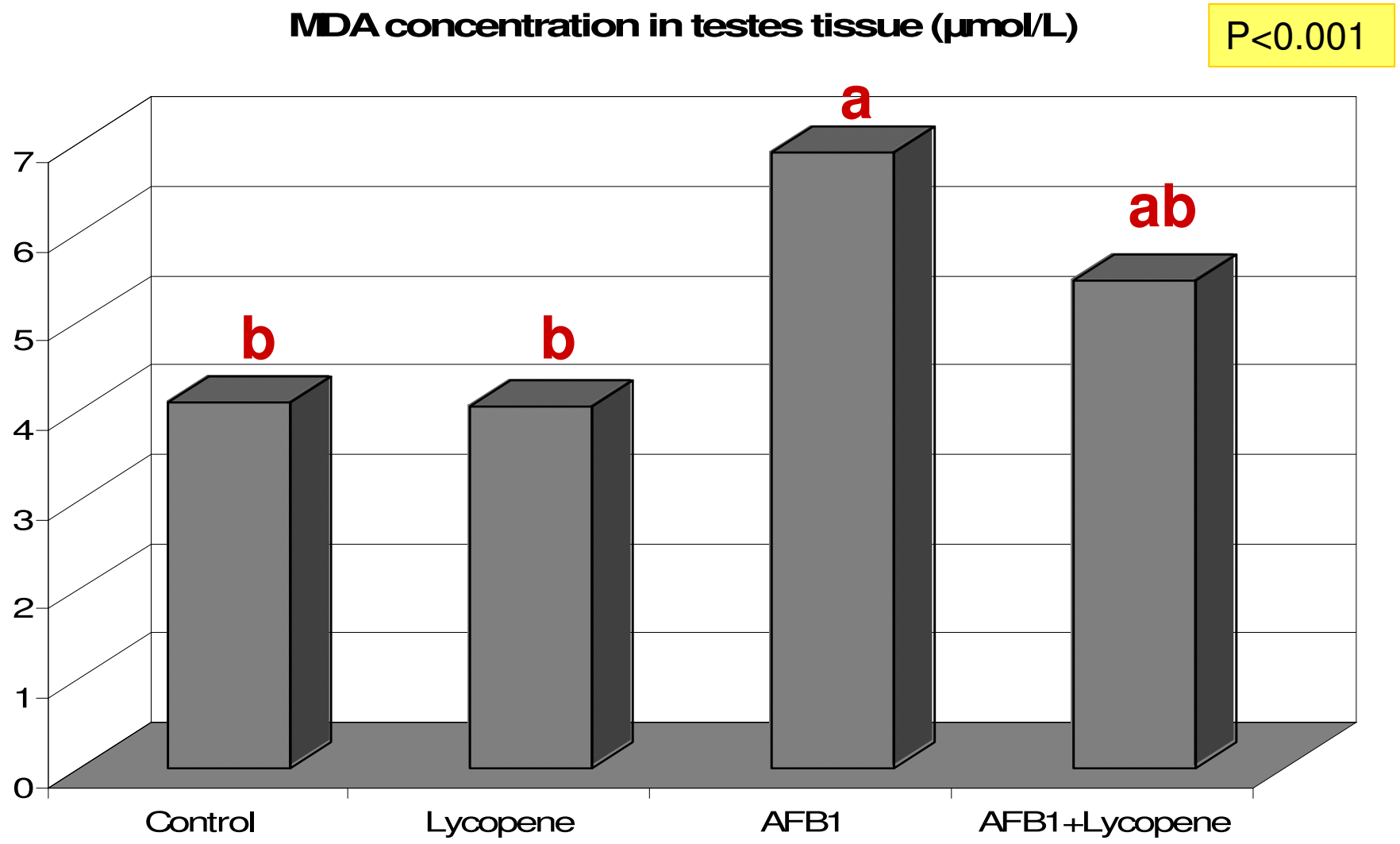
RESULTS AND DISCUSSION

SPERM QUALITY CHARACTERISTICS



RESULTS AND DISCUSSION

Lipid peroxidation in testes tissue

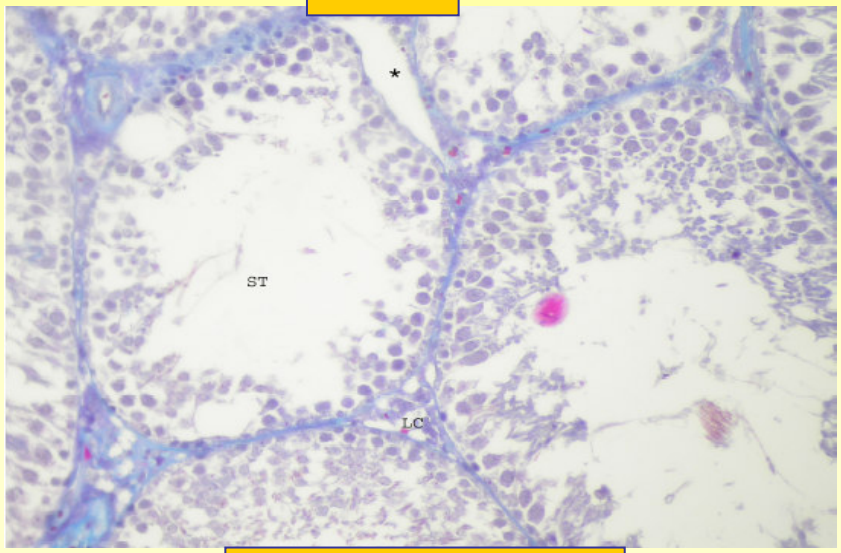


RESULTS AND DISCUSSION

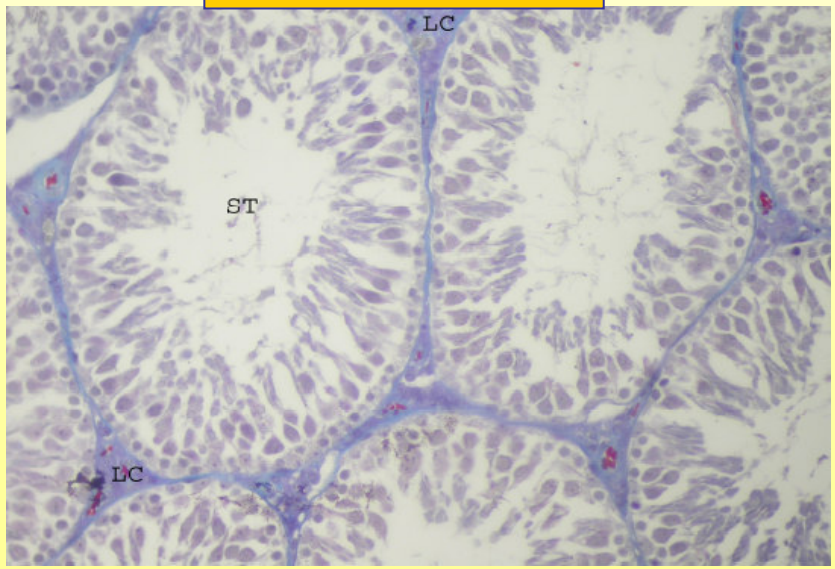
Histopatholigical Results

Control

AFB1



Lycopene + AFB1



The picture of the epididymis tissue of the control rat. (E: Epitelhium, S: Sterocilia, SM: Sirculer muscle) TriplleX20

RESULTS AND DISCUSSION

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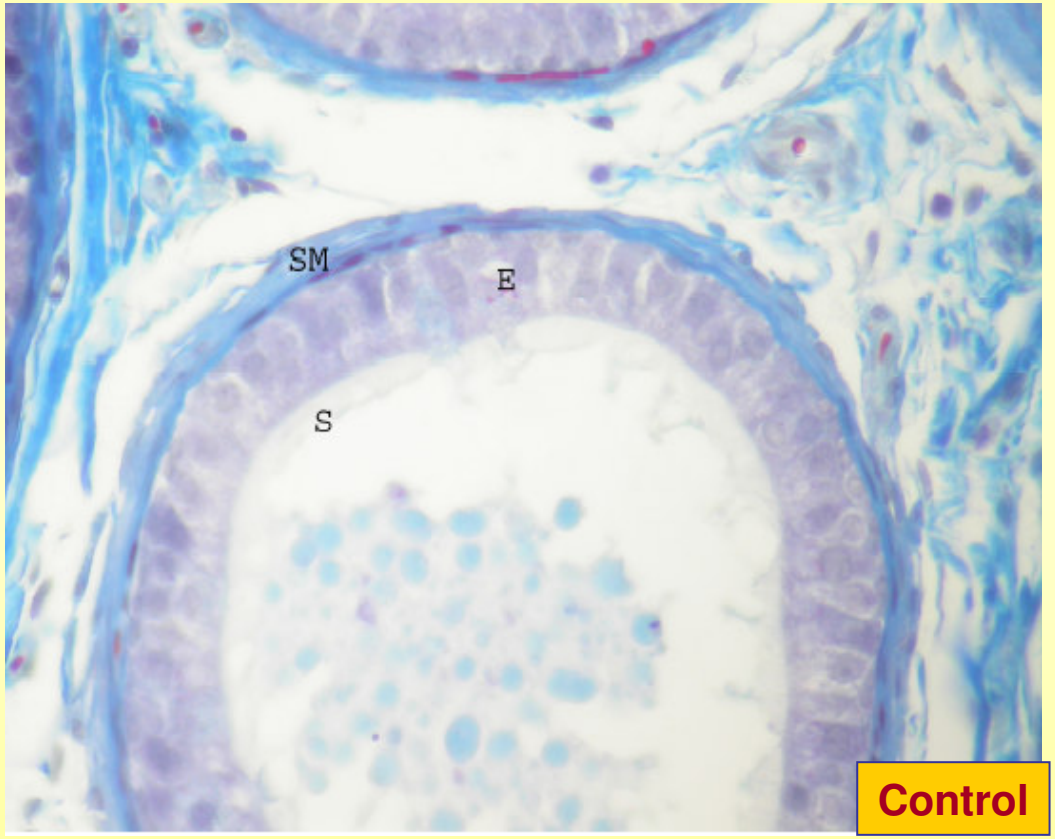
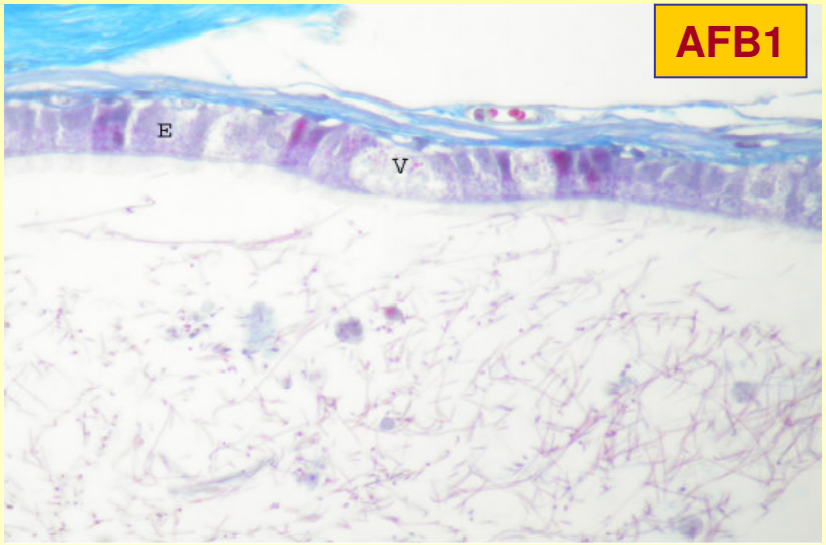
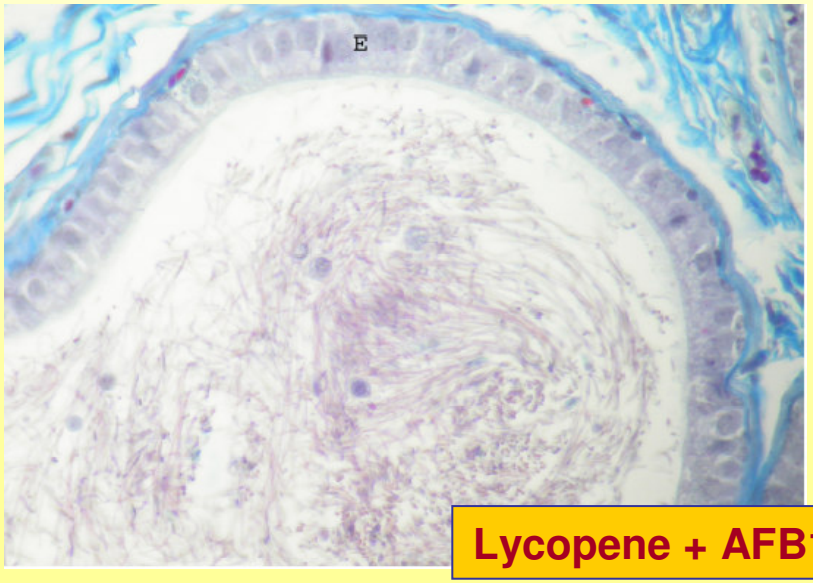


Control



AFB1



Lycopene + AFB1

CONCLUSIONS

AFB1 EFFECTS

- **Significantly decreased testes and testes epididymis diameter and seminifer epithelium thickness.**
- **Significantly decreased sperm motility and increased sperm defects.**
- **Caused histopathological degenerations in testes and epididymis tissue.**

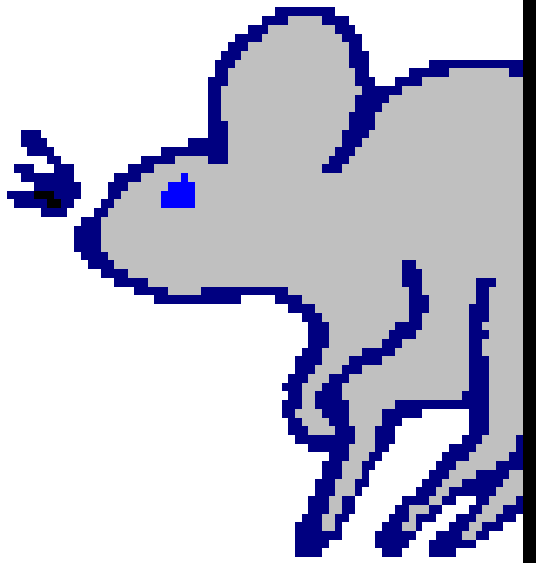
CONCLUSIONS

LYCOPENE EFFECTS

- **Treatment with lycopene increased the testes diameter and seminifer epithelium thickness.**
- **Epididymis epithelium thickness was significantly increased in rats treated with lycopene alone.**
- **Treatment with lycopene significantly increased sperm motility and prevented sperm abnormalities.**
- **Treatment with lycopene prevented elevation of MDA levels significantly in AFB1 + lycopene group**

CONCLUSIONS

Our study showed that AFB1 administration markedly impaired testicular function and treatment with lycopene caused improvements in rat sperm characteristics, reduced oxidative stress and alleviated the negative effects of AFB1 on parameters tested.



THANK YOU FOR YOUR ATTENTION