EFFECT OF SOME ENZYMES AND MEDICINAL PLANTS ON FERTILITY IN DIFFERENT RABBIT BREEDS

By

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B.Sc. Agric. Sc. (Animal Production), Ain Shams University, 2011

A thesis submitted in partial fulfillment

Of

The requirements for the degree of

MASTER OF SCIENCE
in
Agricultural Sciences
(Animal Physiology)

Department of Animal Production
Faculty of Agriculture
Ain Shams University

2017

Approval Sheet

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ABSTRACT

Samar Raafat Farouk Mohamed: Effect of some Enzymes and Medicinal Plants on Fertility in Different Rabbit Breeds. Unpublished M. Sc. Thesis, Department of Animal Production, Faculty of Agriculture, Ain Shams University, 2017.

The present experiment was carried out at Intensive Rabbit Production Unit, belonging to Consulting and Research Center, Faculty of Agriculture, Ain Shams University. This experiment designed to study effect of some enzymes and medicinal plants on fertility in NZW rabbits. A total number of 24 mature New-Zealand White (NZW) rabbit bucks (aged 6 months) were used in the present study. Animals were divided into four comparable experimental groups (6 males each). The first group was fed a commercial diet and kept untreated (control group), while the 2^{nd}; 3^{rd} and 4^{th} groups (treated groups) were fed the same diet but supplemented with ZAD; Arak extract and ZAD with Arak extract (2 cm/ L) given in water), respectively. Unreceptive female was used as teaser for semen collection purpose. Semen was collected twice weekly and evaluated, after that, good ejaculates from bucks of each group were pooled together and diluted by adding one part semen to five parts extender at 37°C. During maturity fertilizing ability of bucks was studied as affected by ZAD and/ or Arak (*Salvadora Persica*) in drinking water. Physical semen characteristics and testosterone were recorded. Females were used for fertility test (conception rate and litter size were recorded). Present experiment showed a higher rate of growth and sexual desire (sec) in treated than control. Mass motility and advanced sperm motility increased ($P \leq 0.05$) in males treated with ZAD and/ or Arak. The average percentages of dead spermatozoa, sperm abnormalities were decreased by adding ZAD and/ or Arak to drinking water. The improvement in body growth and male reproductive parameters combined with elevated blood testosterone level was indicated by fertilizing ability of bucks and fertility traits of does which were significant ($P \leq 0.05$) and arranged in descending

order as (ZAD and Arak); ZAD then Arak group, respectively as compared to the control group. It could be concluded that, rabbit reproductive performance was improved by supplementing ZAD and/ or Arak to drinking water and the better results were obtained in the 4th group which received combined treatment of ZAD and Arak. Treatment with Arak may enhance and promote the physiological effects of ZAD on body growth and reproductive performance in rabbit bucks.

Keywords: ZAD, Arak, Bucks, Semen characteristics, Fertility.

ACKNOWLEDGEMENTS

Firstly, I wish to express my prayerful thanks to **"ALLAH"** who gives me everything I have. Deep thanks and sincere appreciation to **Dr. E.B. Abdallah** (Principal Supervisor), Professor Emeritus of Animal Physiology, Animal Production Department, Faculty of Agriculture, Ain Shams University for his direct supervision, ideal guidance, providing the facilities of work, reviewing the manuscript and his encouragement from the first step to the last one during this work. He gave me the best example of what a university professor should be.

I wish to express my thanks and sincere gratitude to **Dr. F.A. Khalil,** Professor Emeritus of Animal Physiology, Animal Production Department, Faculty of Agriculture, Ain Shams University for his supervision, support, reviewing the manuscript and valuable advice generously given throughout the present work of the thesis. I deeply grateful and thanks to **Dr. A. M. Elsherbiny,** Professor of Animal Physiology, Animal Production Department, Faculty of Agriculture, Ain Shams University for his encouragement, valuable advice, reading and correcting manuscript and constant interest throughout this work.

I would like to thank **Dr. M. El-Sayed,** professor of Animal Breeding, Department of Animal production, Faculty of Agriculture, Ain shams University, for her continuous help in statistical analysis. Great acknowledgments and deep grateful are due to **Dr. T. Soliman,** chief of Research of Animal Physiology, Animal Production Research Institute, Agricultural Research Center for the facilities presented during this experiment. My dear feelings and gratitude go to my parents and brothers and sisters for their sensations and kind support along the course of this study. Also, I would like to give love to my lovely son **Ezz El-Din**.

I wish to express my sincere gratitude to **Dr. O. Youssry,** professor Emeritus of Animal Breeding, Department of Animal production, Faculty of Agriculture, Ain shams University, for his continuous support and encouragement throughout this work. I would like

to thank **Dr. H. Gado,** professor Emeritus of Animal Feeding, Department of Animal production, Faculty of Agriculture, Ain shams University, who gave me exogenous enzymes (Zad). Great acknowledgments and deep grateful are due to **Dr. E. Tharwat,** Professor of Animal Physiology, Animal Production Department, Faculty of Agriculture, Ain Shams University, for his continuous support and encouragement throughout this work.

CONTENTS

	Page
LIST OF TABLES……	IV
LIST OF FIGURES……..	V
LIST OF ABBREVIATIONS……..	VI
INTRODUCTION…..……..	1
REVIEW OF LITERATURE……..	3
2.1 Feed enzymes additives…….	3
2.1.1 Feed enzymes additives in monogastric…….	3
2.1.2. Enzymes and food digestion …….……	3
2.1.3. Enzymatic supplements and growth performance ……	4
2.2. Arak ……..	6
2.2.1. Medicinal plants and growth performance of rabbits…..	6
2.2.2. Medicinal plants and reproductive performance …..……	9
2.3. Fertility……...……..	10
2.4. Rabbit semen characteristics……..……..	11
2.5. Reaction time…….……...	12
2.6. Ejaculate volume……..……	14
2.7. Mass motility……..……..	16
2.8. Dead spermatozoa …….……..	17
2.9. Sperm-cell concentration…….…….	19
2.10. Sperm abnormalities percentage…….	20
2.11. Total sperm output……..	21
3. MATERIALS AND METHODS…….……	22
3.1. Plant material……	22
3.2. Preparation of miswak extract……..	23
3.3. Experimental animals……...	23
3.4. Housing and management…….	23
3.5. Biological treatments……..	24
3.6. Experimental design…….	24

3.7. Blood collection and plasma Testosterone concentration 24
3.7.1. Plasma aspartate amino transferase (AST) concentration. 25
3.7.2. Plasma alanine amino transferase (ALT) concentration... 25
3.7.3. Plasma cholesterol concentration……... 25
3.7.4. Plasma testosterone concentration……. 25
3.8. Libido (Sexual desire)……. 25
3.9. Semen collection…….. 26
3.10. Semen evaluation…….. 26
3.10.1. Mass motility ……. 26
3.10.2. Advanced motility……... 26
3.10.3. Dead spermatozoa……... 27
3.10.4. Sperm abnormalities…… 27
3.10.5. Semen-ejaculate volume…….. 28
3.10.6. Sperm-cell concentration (x 10^6/ml)…… 28
3.10.7. Total-sperm output (x 10^6/ejaculate)……... 28
3.11. Some reproductive measurements in bucks……. 28
3.11.1. Semen Extension……. 28
3.12. Fertility trials…… 29
3.13. Statistical analysis…….… 29
4. RESULTS AND DISCUSSION…… 31
4.1. Effects of ZAD and/ or Arak on body weight…… 31
4.2. Effects of ZAD and/ or Arak on libido of NZW rabbit males……. 33
4.3. Semen characteristics……. 34
4.3.1. Semen mass motility……. 34
4.3.2. Advanced sperm motility…….. 35
4.3.3. Dead and abnormal spermatozoa……... 38
4.3.4. Semen volume, sperm-cell concentration and total sperm output…...…… 41
4.3.5. Effect of ZAD and/ or Arak on biochemical analysis 45
4.3.5.1. Plasma aspartate amino transferase (AST) concentration 45
4.3.5.2. Plasma alanine amino transferase (ALT) concentration…. 47

4.3.5.3. Plasma cholesterol concentration…… 49
4.3.5.4. Plasma Testosterone concentration of NZW and BB rabbit males…….. 51
4.3.6. Fertility traits of rabbit does inseminated artificially with treated bucks…… 53
4.3.6.1. Conception rate and litter size at birth…… 53
SUMMARY AND CONCLUSION…….…… 56
REFERENCES……..…… 59
ARABIC SUMMARY

LIST OF TABLES

No.		Page
1	Reaction time……	12
2	Ejaculate volume…….	14
3	Mass motility……..	16
4	Dead spermatozoa……..	17
5	Sperm cell concentration……	19
6	Total sperm output…….	21
7	The chemical composition of Arak % (on DM basis)……	24
8	Effect of ZAD and/ or Arak on body weight…….	32
9	Libido and sperm motility of NZW rabbit bucks fed added with ZAD and/ or Arak…….	36
10	Dead and abnormal spermatozoa of NZW rabbit bucks fed added with ZAD and/ or Arak……..	39
11	Semen volume and sperm-cell concentration per ml and per ejaculate of NZW rabbit bucks treated with ZAD *and*/ or Arak……..	43
12	Effect of ZAD and/ or Arak on AST concentration (IU/L)…	46
13	Effect of ZAD and/ or Arak on ALT concentration (IU/L)...	48
14	Effect of ZAD and/ or Arak on cholesterol concentration (mg/d1)……...	50
15	Effect of ZAD and/ or Arak on Testosterone concentration of NZW rabbits……..	52
16	Fertility traits of untreated does inseminated artificially with treated bucks……...	54

LIST OF FIGURES

No.		Page
1	Effect of ZAD and/ or Arak on body weight…….	33
2	Effect of ZAD and/ or Arak on libido (sec)……..	37
3	Effect of ZAD and/ or Arak on mass motility (score)……..	37
4	Effect of ZAD and/ or Arak on advanced sperm motility (%)..	38
5	Effect of ZAD and/ or Arak on dead spermatozoa (%)…….	40
6	Effect of ZAD and/ or Arak on sperm abnormalities (%)….	40
7	Effect of ZAD and/ or Arak on semen ejaculate volume (ml)	44
8	Effect of ZAD and/ or Arak on sperm cell concentration ($x10^6$/ ejaculate)…….	44
9	Effect of ZAD and/ or Arak on total sperm output ($x10^6$/ejaculate)……..	45
10	Effect of ZAD and/ or Arak on AST……	47
11	Effect of ZAD and/ or Arak on ALT……	49
12	Effect of ZAD and/ or Arak on Cholesterol……..…...	51
13	Effect of ZAD and/ or Arak on Testosterone……	53
14	Effect of ZAD and/ or Arak treated bucks on Conception rate…….	55

LIST OF ABBREVIATIONS

Symbol	Meaning
/	Per
AST	Aspartate amino transferase
ALT	Alanine amino transferase
G1	Control treatment
G2	ZAD treatment
G3	Arak treatment
G4	ZAD with Arak
NRC	National Research Council
NZW	New Zealand White
TSO	Total sperm output

INTRODUCTION

Rabbit's production has a potential in the developing countries to supply cheap and high quality animal protein within shortest possible time. Rabbits have a number of characteristics that make them suitable for meat-production in Egypt. These characteristics are the small size, short generation interval, high reproductive potential, rapid growth rates, genetic diversity, and the ability to utilize forages and plant by- products as major diet component.

Moreover, the lipid fraction of rabbit meat is rich in poly unsaturated fatty acids and especially linolenic acids. These properties of rabbit meat create an interesting dietic function in human alimentation. On the other hand, feeding costs represent the largest part of the production costs, and may represent 70% of the total cost. Any reduction of the feeding costs is important to reduce the total costs. Feed additives can improve the efficiency of feed utilization and animal performance.

The benefits of adding enzymes to diets of non ruminant animals particularly poultry, has become more common in recent years **(Campell and Bedford, 1992)**. Current developments in this area include digestibility of starch and non-starch polysaccharides in cereals. The exogenous enzyme supplementations are well documented **(Bedford and Morgan, 1996).** Several studies have been attempted for incorporating exogenous enzymes into rabbit diets to improve nutrients availability **(Falcao *et al.*, 2007)**. There is an increasing awareness about the beneficial effects of medicinal plants worldwide **(Dahanukar *et al.*, 2000)**. Attempt to use untraditional natural materials such as some medicinal plants could be widely accepted as feed additives. Therefore, ZAD and Arak were used in this study. In Egypt, rabbits are characterized by many advantages that make them suitable animal, it could be bred to minimize the gab between the demand and available of animal protein **(FAO, 2010, Daadar and Seleem, 1999b).**

INTRODUCTION

In recent years, several efforts were carried out to use local agricultural By-products in animal feeding due to their participation as part in the solution of feed shortage problems and dramatic increases in prices of animal feed ingredients **(Tipu *et. al.*, 2002).** Little information are available about the rational inclusion of Arak and/ or ZAD in diets of reproducing rabbits. Therefore, the present study was conducted to evaluate the effect of ZAD and/ or Arak on fertility in different rabbit breeds. Arak stems are obtained from the roots of Salvadora persica, which grows in the area around Mecca and the Middle East area in general. It has medicinal value in manifold uses.

Arak contains more than 10 different natural chemical compounds: fluoride, tannins, resins, alkaloids, Salvadoricine, volatile oils, sinigrin, sulfur, vitamin C, sodium bicarbonate, chlorides, calcium, benzylisothiocyanate and others including silica, salicylic acid, sterols, trimethylamine, saponins and flavonoid **(Akhtar and Ajmal, 1981; Hattab, 1997)**. Five flavonoid compounds (kaempferol, quercetin, quercetrin, rutin and quercetin glucoside) were isolated from the root of this plant **(Islam *et al.*, 2000)**.

Flavonoids have antibacterial, astringent, detergent and abrasive properties **(Almas, 2002)**. At last years, there are international interested concerning application of natural sources in animal production field **(Hashim *et al.*, 2013).** Besides flavonoids, both polyphenolic compounds and certain alkaloids seem to stimulate immune function, reduce cholesterol level and play a role in the prevention of a number of chronic diseases such as cancer and cardiovascular disease in rabbits **(Chang and Gershwin, 2000)**. The aim of the present study was to evaluate the effect of including ZAD and Arak (Salvadora persica) as a dietary supplement on productive and reproductive traits during maturity periods of New Zeeland White (NZW) male rabbits. The study also aimed to establish the optimum level of ZAD and Arak.