

# Effect of Nigella Sativa Seed Powder on Testosterone and LH levels in Streptozotocine Induced Diabetes male Albino Rats.

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## Abstract

### Introduction –

Nigella Sativa belong to the botanical family of ranunculaceae. It has been known as black seed and its seeds are frequently used in folk medicine in Middle East and some Asian countries for the promotion of good health and treatment of many ailments. Nigella Sativa seeds has been used in traditional Iranian medicine as a natural remedy for promotes females menstruation, galactagogue, carminative, laxative and anti-parasitic properties. The present study is conducted to find out effect of Nigella Sativa seed powder on testosterone and LH levels in streptozotocine induced diabetic male albino rats.

### Materials and Methods –

This work is conducted as part of Ph.D work under Department of Physiology, Shri BM patil Medical College, BLDE University, Bijapur. University ethical committee and Institution Animal Ethical committee are approved the work according to CPCSEA Rules. 18 rats were selected for this study and divided in to 3 groups each contains 6 rats, one group served as normal control, one group served as Diabetic control and one groups served as Treatment group with Nigella Sativa seed powder(300mg/kg BW).

### Results –

Testosterone(ng/dl) level of Normal Control rats was  $82.78 \pm 8.26$ , Diabetic rats was  $41.62 \pm 7.28$  and treated with Nigella Sativa rats was  $71.34 \pm 6.58$ . LH(mIU/L) level of Normal Control rats was  $0.46 \pm 0.12$ , Diabetic rats was  $0.20 \pm 0.06$  and treated with nigella sativa rats was  $0.30 \pm 0.09$ .

### Conclusion –

Compared with normal rats the level of testosterone was decreased in diabetic rats, when it is treated with Nigella Sativa Seed powder the levels of testosterone increased significantly. Compared with normal rats the level of LH was decreased significantly in diabetic rats, when it is treated with Nigella Sativa Seed powder the levels of LH not significant with other groups.

**Key Words** – Testosterone, LH, STZ, Diabetes, Nigella Sativa.

## INTRODUCTION

The insufficient vitamins intake can cause deleterious effects on spermatogenesis and production of normal sperm[1], the sufficient consumption of vitamins and natural antioxidants can protect sperm DNA from oxidative stress and improve male fertility[2]. Vegetable oils contain several natural antioxidant constituents. Some of them such as pumpkin oil[3], celery oil[4], nigella sativa oil [5] and sunflower oil [6] were reported to possess marked antioxidant activity. Natural materials such as medical plants are widely accepted as feed additives. Generally, the use of chemical products may cause unfavourable side effects. Many of synthesized chemicals could cause hazards to animal or human. Different studies showed a beneficial positive effect of using Nigella Sativa seeds as feed additive in diet of ruminants. Nigella sativa is a plant of

Ranunculaceae family that grows spontaneously and widely in several Southern Mediterranean and Middle Eastern countries.

Its seed has over 100 different chemical constituents, including abundant sources of all the essential fatty acids. Although it is the oil that most often used medicinally, the seeds are a bit spicy and often used whole in cooking curries, pastries and Mediterranean cheeses[7]. Nigella sativa seeds are used extensively in traditional medicine of many countries. It has been used for treatment of many diseases owing to the reported antiviral, antiinflammatory, anti-schistosomiasis and immunomodulatory activities[8]. In recent years, the pharmacological investigations confirmed that most of the therapeutic properties of this plant are due to thymoquinone which is major active component of Nigella sativa oil[9]. Previous data suggest

that the seeds oil and thymoquinone exhibited spermiprotective effect against testes damage.

Reproductive dysfunction is recognized as a consequence of diabetes mellitus[10] represented in decrease in libido, impotence and infertility[11]. In a study poor semen quality has also been reported in diabetic men including decreased sperm motility, sperm concentration, increased abnormal sperm morphology[12] and reduced levels of testicular hormone[13]. Nigella Sativa seed contains a complex mixture of more than 100 compounds[14]. Most of the therapeutic properties of Nigella sativa are due to the presence of the polyphenol Thymoquinone (TQ) [15] which is the major component (28-57%) of Nigella sativa oil[16]. In addition, there are many fatty acids. The most important of which are linoleic acid (55.6%), oleic acid (23.4%) and palmitic acid (12.5%)[17]. Nigella sativa and TQ have been known by their hypoglycemic, hypolipidemic[18]and radical scavenging activity[19].

Nigella sativa oil has the ability to protect testis against oxidative stress possibly through antioxidant effects of its bioactive compounds[20]. Antioxidant property of thymoquinone is attributed to the quinine structure of thymoquinone molecule[21] and the easy access to sub cellular compartments thus facilitating the ROS scavenging effect[22]. Thymoquinone was shown to inhibit non-enzymatic lipid peroxidation. This leads to decreased oxidative stress and protection of the antioxidant enzymes of testis[23]. The hypoglycemic effect of Nigella sativa oil adds more to its antioxidant effect by decreasing ROS production due to lowering glucose circulating in the blood stream. In addition, Nigella sativa oil increase the number of Leydig cells in rat testes[24] beside the presence of unsaturated fatty acids in Nigella sativa oil that stimulate 17 L-hydroxysteroid dehydrogenase activity[25] thus increasing testosterone level. The present study was conducted to study effect of Nigella Sativa seed powder on Testosterone levels in streptozotocine induced diabetic male albino rats.

#### MATERIALS AND METHODS

**Study design** - This work is conducted as part of Ph.D work under Department of Physiology, Shri BM patil Medical College, BLDE University, Bijapur. University ethical committee and Institution Animal Ethical committee are approved the work according to CPCSEA Rules. 18 rats were selected for this study and divided in to 3 groups each contains 6 rats, one group served as negative control, one group served as Diabetic control and one groups served as Treatment group with Nigella Sativa seed powder(300mg/kg BW), at the end of 45<sup>th</sup> day blood was collated and measured serum Testosterone and LH by kit method.

**Plant material** – Nigella sativa seeds were grinded in to fine powder[9] with piston and mortal with help of Bapuji

pharmacy college, Davangere. Nigella sativa powder administrated orally according to study of M. Murugesan[26].

**Streptozotocine – Induced diabetes** -The rats were given Streptozotocine intraperitoneal injection 50mg/BW, Streptozotocine dissolved in ice-cold citrate buffer(PH 4.5)[27]. The diabetes was confirmed by measuring glucose by Code free Glucometer, the glucose level above 250mg/dl considered as diabetes, glucose levels were checked at regular periodical periods.

#### RESULTS

Testosterone(ng/dl) level of Normal Control rats was 82.78±8.26, Diabetic rats was 41.62±7.28 and treated with Nigella Sativa rats was 71.34±6.58. LH(mIU/L) level of Normal Control rats was 0.46±0.12, Diabetic rats was 0.20±0.06 and treated with nigella sativa rats was 0.30±0.09(Table 1).

#### DISCUSSION

Infertility is a complex disorder with significant medical, psychosocial and economic aspects. About 25% of couples do not achieve pregnancy within 1 year, 15% of whom seek medical treatment for infertility and less than 5% remain unwillingly childless. Infertility affects both men and women. Male causes for infertility are found in 50% of involuntarily childless couples[28]. A wide majority of medicine plants possess pharmacological principles, which has rendered them useful as curatives for numerous ailments. According to the World Health Organization (WHO) reports, 70-80% of the world population confide in traditional medicine for primary health care[29]. Plants and derivatives of plant played a key role in world health and have long been known to possess biological activity. Thirty percent of all modern drugs are derived from plants [30]. In addition, Plants have a long folklore of use in aiding fertility, including fertility-enhancing properties and aphrodisiacal qualities[31, 32].

The testes, epididymis and other reproductive organs are structurally and physiologically dependent upon the testosterone and other androgens. Testosterone stimulates growth and secretary activity of the reproductive organs[33,34]. LH stimulates the production of testosterone in Leydig cells, which in turn may act on the Sertoli and peritubular cells of the seminiferous tubules and indirectly stimulates spermatogenesis via testosterone. In our study the testosterone was decreased in diabetes induced rats and at the same time LH was decreased, in nigella sativa treated rats the testosterone levels are increased significantly but LH levels were not significant change. Our results are in agreement with studies of Mukhalad AM et, al.[35], Gokçe A et.al.[36], Rahmatollah Parandin[37].

**Table 1. One way results of Testosterone(ng/dl)and LH (mIU/L)**

Parameter	Group 1 Normal Rats– Control	Group 2 Diabetic Rats– Control	Group 3 Diabetic Rats – Nigella sativa seed powder	F	P
Testosterone(ng/dl)	82.78 ±8.26 <sup>a</sup>	41.62±7.28 <sup>b</sup>	71.34±6.58 <sup>a,c</sup>	33.625	.000
LH(mIU/L)	0.46±0.12 <sup>a</sup>	0.20±0.06 <sup>b</sup>	0.30±0.09 <sup>a,b</sup>	7.088	.000

The difference between groups P<0.05 considered as significant.

According to Phytochemical analytical study of Nickavar B, indicated the rich presence of unsaturated fatty acids (Linoleic acid 55.6%, Oleic acid 23.4%, Palmitic acid 12.5%, Stearic acid 3.4% and else.) in nigella sativa seeds[38]. In study of Fellner et al, the supplementation of rats diets with oils rich in polyunsaturated fatty acids, such as Linoleic acid has positively influenced reproductive functions[39]. The study of Gromadzka-Ostrowska et al shown that the unsaturated fatty acids stimulate the activity of 17  $\beta$ -hydroxysteroid dehydrogenase, the most important key enzyme in the testosterone biosynthesis pathway[40]. The study of Samir Bashandy found that administration of Nigella Sativa oil to hyperlipidemic rats improved their reproductive efficiency and produced additional protection against hyperlipidemia induced reduction in fertility[41]. According to study of Al-Ali A et al. Thymoquinone is the major active component derived from Nigella sativa and reported that many of the pharmacodynamic effects Nigella sativa are due to Thymoquinone[42]. The study of Gokce et al.[36] confirmed that Thymoquinone treatment has protective effects on testicular parameters. The present study results are correlating with previous studies and confirmed that the testicular favouring results due to thymoquinone content in nigella sativa seed. So the nigella sativa seed may be used for increasing testicular activity.

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