JHE JOURNAL OF HOME ECONOMICS, MENOUFIA UNIVERSITY
Website: https://mkas.journals.ekb.eg
Print ISSN 2735-5934 Online ISSN 2735-590X

NUTRITION AND FOOD SCIENCES

Improvement of Male Rats Fertility and Immunity using Nettle Root

El-Kholie Emad, Ragab Sherif, El-Deba Ebtehal

Department of Nutrition and Food Sciences, Faculty of Home Economics, Menoufia University, Shibin El Kom, Egypt

Article Type
Original Article

Corresponding author:
Emad A. El-Kohlie
emad.elkhouli@hec.menofia.edu.eg
Mobile:+2 01005370728

DOI:10.21608/mkas.2023.235711.1253

Cite as:
El-Kholie et al., 2024, Improvement of Male Rats Fertility and Immunity using Nettle Root. JHE, 34 (1), 1-15

Received: 11 Sep 2023
Accepted: 20 Dec 2023
Published: 1 Jan 2024

ABSTRACT:

This investigation attempted to examine how nettle root powder affected infertile rats. Twenty-four male rats have been employed, averaging 140-150 grams. Four major groupings have been set up for the animals. To induce male rats to become infertile, the second major group (n=6) was once given injections of cadmium chloride, while the first significant group (n=6) was kept as a negative control group. For 28 days, a 5% nettle root in powdered form diet used to be obtained for one group of infertile rats, even as a third infertile group of rats once received a 2.5% nettle root powder diet. Rats were sacrificed after starving for the duration of the experiment, and blood was once taken and processed to extract the serum. The following measurements have been made: the hormones recognized as luteinizing hormone (LH), follicle-stimulating hormone, additionally recognized as (FSH), and testosterone hormone, different immunological markers that are IgG as well as IgM ranges, liver enzymes, renal functions, lipid fractions like TC, TG, LDL-c, VLDL-c, and HDL-c are some of the lipoproteins that make up the human body, serum glucose, renal biomarkers like uric acid, urea, creatinine and liver enzymes that is ALP, ALT, and AST, have been assessed. The obtained records confirmed that nettle root treatment significantly increased two hormones (Testosterone and FSH). In contrast, LH hormone declined, while glucose, lipid fractions, renal, and liver biomarkers decreased, whilst HDL-c performed the reverse. In conclusion, nettle powder has favorable effects on fertility hormones and the immune system in rats.

Keywords: *Rats, plants roots, fertility, immunity*

INTRODUCTION

The potential to have sex and produce possible sperm cells in the fluid is regarded to be an indicator of ordinary male fertility (1). The following guidelines on problems impacting man fertility: obesity, tobacco use, alcohol use, caffeine use, disordered reproductive hormones, stress induced through oxidative reactive oxygen species, and a shortage of antioxidants (2). The incapability to become pregnant at some stage in twelve months of uninterrupted, unprotected sexual recreation besides

the use of contraception is known as infertility. While men's fertility is regarded to remain strong until the age of forty, female fertility is believed to have been at its top in the early levels of life. In healthy, attainable couples, being pregnant normally happens inside eight months following typical sexual contact (3). Numerous reasons, along with hormonal imbalances, physiological obstructions endometriosis, anovulatory phases, polycystic ovarian disorder, insufficient hormone production, a quick luteal stage, and a deficiency in luteinizing hormone, would possibly contribute to infertility (4). A healthful reproductive gadget for men is a corollary of a healthful man genital system. Human fertility has been observed to have drastically diminished at some stage in the closing fifty years. Additionally, 15% of marriages are stated to ride fertility issues. 50% of infertility cases amongst couples with fertility troubles are brought on with the aid of the male partner. According to surveys, 6% of men between a long time of 15 and 44 are infertile or have notably decreased fertility (5).

A series of biological reactions known as the immune system guards an organism against illness. It recognizes and reacts to a broad spectrum of infectious agents, keeping apart them from the living thing's own right tissue, together with viruses, parasitic worms, tumor cells, and things like wooden splinters. The adaptive immune system learns how to become aware of chemical compounds it has already met and responds to every stimulation in a way that is particular to that stimulus. Each count on cells as properly as molecules to elevate out their tasks (6).

Urtica dioica, every now and then recognized as stinging nettle, used to be recommended medicinal herb that is a member of the Urticaceae family. The herbaceous perennial flowering herb recognized as nettle has a lengthy record of use in traditional medicinal drug as an herb with beneficial homes (7 and 8). This herb has also been linked to documented health benefits like anti-inflammatory, anti-tumor, anti-osteoporosis, anti-hypertensive, anti-diabetic, liver-protecting, antioxidant, effects on testicles, and improving spermatozoa and sperm characteristics (9 and 10). Nettle has a pro-fertility functionality due to the fact it contains a range of active compounds, including phytosterols, terpenoids, phenols, fatty acids, saponins, flavonoids, tannins, proteins, and amino acids (11). Nettle extract's contains various active components located in the leaf and roots and should be used for treating infertility (12). Nevertheless, nettle root extract therapy resulted in a dose-dependent rise in testosterone concentrations in mice. It additionally has pro-fertility and antioxidant properties, probably because of its active compounds, and has ovary protecting and pro-fertility properties. (13). When administered with the nettle extract, it ought to be useful to preserve

prolactin degrees at desirable stages in each infertile and pregnant populations, showing pro-fertility qualities. Serotoninergic medicines like fluoxetine, escitalopram, and venlafaxine have been linked to slightly greater concentrations of prolactin, and nettles have additionally been observed to include serotonin (14).

This research aimed to investigate the possible effects of varying dosages of nettle roots on male rat infertility hormones, immunity, and other biochemical parameters.

MATERIALS AND METHODS

MATERIALS:

Source of nettle root

Nette root (Urtica dioica) was purchased from the Haraz herbalist store, Cairo. Egypt.

Cadmium chloride

Cadmium chloride (CdCl2) was purchased from the German Merk chemical Co.,

Experimental animals

Twenty adult of male albino "Sprague Dawley" rats weighing 150-160 gm were obtained from the Research Institute for Medical Insects in Doki, Cairo ,Egypt.

METHODS

Materials preparation

Nettle root is ground into powder using sunrise to dry it, then saved in dark glass bottles in a dry and cool area until utilized, as described via Russo (15), that referred to the fact that all herbs need to be stored in dry, and darker surroundings to keep away from the oxidation process of their contents.

Induced infertility in rats

To induce infertility in rats, 1 ml/kg of body weight of 0.1 percentage solution of cadmium chloride (CdCl2) was used to be administered (16).

Design of an experiment

The study was once carried out at the Menoufia University, Shebin El-Kom, Faculty of Home Economics. The research protocol #14-SREC-05-2022 used to be accepted with-using Science Research Ethics Committee of the Faculty of Home Economics.

Rats have been maintained in regular, healthy conditions at a temp. of 25°C, wire cages are used. In this study, 24 adulate white albino "Sprague Dawley" rats have been utilized, weighing 150-160gm. To facilitate adaptation, all rats obtained a casein diet prepared in accordance with (17) for 7 days. Following the modification period, four groups of six rats have been created as follows: Group (1): Rats have been only given the basal diet as group of control negative. Group (2): As a positive control, male rats with infertility had been simply given the basal diet. Group (3): Male rats with infertility have been given a basal diet along with 2.5% of nettle roots powdered. Group (4): Male rats with infertility have been given a basal diet along with 5% of nettle roots powdered.

At the end of the experimental period (28-day) test, each animal used to be

individually weighed, slaughtered, and had blood tests taken.

Collection of blood samples

After testing, blood samples were obtained. using abdominal aorta which rats had been scarified whilst being sedated with ether. To separate the serum, blood samples have been placed in sterilized, sanitized centrifuge tubes and allowed for coagulating on ambient temp. for a duration of ten minutes. To prepare the serum for evaluation, it was once totally parted ways, put into cleaned centrifuge pipes, and stored freezing at -20°C. Biochemical evaluations have been carried out on all serum samples (18).

The biochemical evaluation

According to Allen (19), measuring total cholesterol was carried out for this purpose. The techniques mentioned in (20) were used to measure triglycerides. The Lopez (21) method can be used to measure high-density lipoproteins (HDL-c). According to Lee and Nieman's approach (22), VLDL and LDL determinations were made.

VLDL (mg/dl) = Triglycerides /5.

LDL (mg/dl) = (Total cholesterol – HDL) – VLDL.

Using Patton and Crouch's (23) enzymatic technique, urea was determined. While using Barham and Trinder's (24) enzymatic approach, uric acid was measured. The Schirmeister (25) kinetic technique was used to calculate creatinine.

Alkaline phosphatase (ALP) was measured by enzymatic colorimetry in accordance with Belfied and Goldberg (26).

Alanine amino transferase (ALT) and aspartate amino transferase (AST) activity were determined using Young (27) technique.

According to Trinder (28), the Calorimetric evaluation was once used to determine plasma glucose enzymatically. Utilizing Fahim (29) methods, the calorimetric measurement was done to measure the levels of follicle stimulating hormone (FSH), and luteinizing hormone (LH). Pardelles (30) method was used to identify testosterone hormone calorimetrically.

Statistical analysis:

The data were analyzed using a completely randomized factorial design (31) when a significant main effect was detected; the means were separated with the Student-Newman-Keuls Test. Differences between treatments of ($P \leq 0.05$) were considered significant using Costat Program. Biological results were analyzed by One Way ANOVA.

Results and Discussion

Table (1) displaying the average testosterone level in rats with infertility given different nettle concentrations. One should note that the common values of the group with negative control indicate with values of 1.77 and 0.81 mIU/ml, which significantly greatly outperformed the group with positive control. As for the disorder groups tested, the obtained

results showed that the significantly greater testosterone hormone value recorded with group 4 (5% nettle roots). Group 3 (2.5 % nettle roots) had a lower value indicating 1.4 and 0.94 mIU/ml, respectively.

Regarding FSH hormone, it could be observed that the mean value of FSH hormone of group with control negative showed significantly maximum value when compared to the group with positive control, the average reading was 0.30 and 0.12 mIU/ml. But obtained results of tests disorder groups showed that, the significantly greater FSH hormone value recorded with group 4 (5% nettle roots). While the lower value recorded with group 3 (2.5 % nettle roots), which were 0.20 and 0.17 mIU/ml, respectively.

In the case of LH hormone, the average of rats with infertility given varied diets, as proven in Table (1). It is clear to see that the average LH hormone values for the groups with control positive and negative, ranging from 0.18 and 0.13 mIU/ml, did no longer extensively vary from one another. As for the tests disorder groups, the data collected showed non-significantly smallest LH hormone value recorded with group 4 (5% nettle). While the greatest value recorded with group 3 (2.5 % nettle roots), which were 0.15 and 0.13 mIU/ml, respectively. The findings of this study support the claims made by using (32) that testosterone hyperactivity is one of the causes of infertility. The testes' histopathological abnormalities caused by testosterone had been decreased through the nettle roots extract, which additionally stronger their structure. and its improper usage may additionally result in troubles with reproduction.

LH and FSH hormones are also elevated when testosterone levels drop. Leydig cells are impacted by using LH, which increases each their quantity and activities. Nettle consists of elements like sterols, flavonoids, and polysaccharides which are related to testosterone functioning as properly as antiandrogen properties (33).

Table (1): Influence of various levels of nettle roots on male hormones of infertility rats

Parameters / Male group	LH hormone (mIU/ml) Mean ± SD	FSH hormone (mIU/ml) Mean ± SD	Testosterone hormone (mIU/ml) Mean ± SD
G1: Negative control (-)	0.13^{a}± 0.10	0.30^{a}± 0.20	1.77^{a}±0.10
G2: Positive control (+)	0.18^{a}± 0.20	0.12 ^{b}±0.10	0.81^{b}± 0.30
G3: Nettle 2.5% powder	0.15^{a}± 0.10	0.17 ^{b}± 0.10	0.94^{b}± 0.50
G4: Nettle 5% powder	0.13^{a}± 0.10	0.20 ^{b}± 0.10	1.40^{ab}± 0.90
LSD (P≤0.05)	0.101	0.100	0.701

Mathematical averages and standard deviation of the mean are represented by values. ANOVA test results show that means with distinct letters (a, b, c, d, etc.) in the same column differed substantially at P≤0.05 but those with similar letters do not.

The serum IgM average reading for infertile rats given varied diets is displayed in table 2's findings. The best serum IgM of negative control group

showed significantly larger value in relation to group with control positive, that had respective concentrations of 339.5 and 317.43 mg/ml. As contrasted with that, tests disorder groups showed that the significantly greater IgM value recorded with group 4 (5% nettle roots), while the lesser value recorded with group 3 (2.5 % nettle roots), which mean 380.21 and 370.03 mg/ml, respectively.

It used to be clear that the average IgG values of the group with negative control, were 1240.15 and 1210.75 mg/ml, respectively, had been significantly larger than these of the positive control group. As for the tests disorder groups, the data collected demonstrated that significantly greater IgG value recorded with group 4 (5% nettle roots), while the lesser value recorded with group 3 (2.5 % nettle roots), which were 1387.27 and 1355.59 mg/ml, respectively. The results are in agreement with the findings of (34) who found that nettle extract has an immunological effect, with considerably greater amounts of phagocytic, lysozyme, and myeloperoxidase activity evaluating to the group of control. In addition, serum examined that protected all extracts confirmed elevated IgG and IgM concentrations as contrasted with normal. In addition to performing as gonadotrophic hormones in mice, nettle water and methanol extract has favorable outcomes on the body's immune device and hormonal (35).

Table (2): Influence of various levels of nettle roots on IgG, IgM of infertility male rats

Parameters / Male group	IgG (mg/ml) Mean ± SD	IgM (mg/ml) Mean ± SD
G1: Negative control (-)	1240.15 c± 5	339.5 c± 4.9
G2: Positive control (+)	1210.75 d± 2.9	317.43 d±1.4
G3: Nettle 2.5% powder	1355.59 b± 4.6	370.03 b± 2
G4: Nettle 5% powder	1387.27 a± 3.1	380.21 a± 5
LSD (P≤0.05)	2.110	3.800

Mathematical averages and standard deviation of the mean are represented by values. ANOVA test results show that means with distinct letters (a, b, c, d, etc.) in the same column differed substantially at P≤0.05 but those with similar letters do not.

Table (3) displays the impact of various nettle root concentrations on the serum triglycerides (TG) of male rats who are infertile. It is obvious that the TG of control positive group showed that the significantly greater value when compared to group with control negative, that were 149.00 and 76.50 mg/dl, accordingly. As for tests disorder groups, the data collected demonstrated significantly lesser TG value recorded with group given 2.5% nettle roots, thus greater range recorded with group given 5 % nettle roots, which were 128.20 and 108.30 mg/dl, respectively.

Regarding serum total cholesterol (TC) in infertile rats given a meal containing a nettle. It is evident that the TC of group with control positive showed significantly greater value when compared to the

group with control negative, which were 146.50 and 90.00 mg/dl. As for tests disorder groups, the data collected showed significantly lesser TC value recorded with group 4 (5% nettle roots), while the greater value recorded with group 3 (2.5 % nettle roots), the average reading was 101.05 and 121.75 mg/dl. These observations guide the findings (36) advised that nettle roots and leaves very excessive polyphenol content material can also extensively contribute to fitness benefits such as lowering TC, and TG levels.

Additionally, 4% of powdered nettle mixes confirmed the best minimal decrease in total cholesterol and triglyceride ranges when compared to rats in the control group with l positive cholesterol (37).

In comparison to each of the groups with control and combination plant treatment, serum ranges of lipid fractions that is TC, TG, LDL-c, and VLDL-c all significantly decreased. For HDL-c, the reverse is once observed (38).

Table (3): Influence of varying concentrations of nettle roots on triglycerides and total cholesterol of male rat

Parameters / Male groups	Triglycerides (mg/dl) Mean ± SD	Total cholesterol (mg/dl) Mean ± SD
G1: Negative control (-)	76.50d± 1.90	90.00d± 1.40
G2: Positive control (+)	149.00 a± 3.20	164.50a± 2.80
G3: Nettle 2.5% powder	128.20b± 3.00	121.75b± 2.10
G4: Nettle.5% powder	108.30c± 2.70	101.05c± 1.70
LSD (P≤0.05)	2.785	2.341

Mathematical averages and standard deviation of the mean are represented by values. ANOVA test results show that means with distinct letters (a, b, c, d, etc.) in the same column differed substantially at P≤0.05 but those with similar letters do not.

The average blood HDL-c ranges of infertile rats served on a variety of diets had been proven in Table (4). Comparing the values of the two control groups, 53.82 and 33.52 mg/ml, respectively, the negative control group proven a considerably larger value. As for the tests disorder groups, the obtained results observed that with significantly greater HDL-c value recorded with group 4 (5% nettle roots), while the lesser value recorded with group 3 (2.5 % nettle roots), which were 42.31 and 36.47 mg/dl.

Table (4) indicates the serum LDL-c ranges of infertile rats received a variety of diets. It must be stated that the suggested LDL-c value of the group with control positive was once considerably greater than that of the group with control negative, that were 146.5 and 90 mg/ml. As for the tests disorder groups, the obtained results showed that the significantly greater LDL-c value recorded with group received 2.5% nettle roots, whilst the lesser value recorded with group received 5 % nettle roots, that were 59.54 and 44.08 mg/dl.

Regarding the serum VLDL-c ranges of infertile rats received a variety of diets. Data noticed that the average range of VLDL-c of group with control positive showed significantly greater value when compared to group with control negative that were 149.00 and 76.50 mg/ml. As for tests disorder groups, the data collected demonstrated significantly greater VLDL-c value recorded with group received 2.5% nettle roots, while the lesser value recorded with group received 5 % nettle roots, that were 52.64 and 21.66 mg/dl. These outcomes support (39), claimed that the powdered nettle leaf had reduced blood lipid and lipoprotein levels. Lower levels of LDL-cholesterol and plasma total apo-protein B were found to have an important effect on the lipid fractions, including TC, LDL-c, VLDL, and LDL/HDL ratios.

Additionally, rats with hypercholesterolemia and diabetes have shown animals fed an organic nettle extract at concentrations of 100 and 300 mg/kg, there used to be a great reduction in the ranges of each TC and LDL-c (40).

Table (4): Influence of various levels of nettle roots on lipid fraction of infertility male rats

Parameters / Male group	HDL-c (mg/dl) Mean ± SD	LDL-c (mg/dl) Mean ± SD	VLDL-c (mg/dl) Mean ± SD
G1: Negative control (-)	53.82a± 2.10	90.00b± 3.10	76.50b± 1.4
G2: Positive control (+)	33.52d± 3.30	146.50a±3.70	149.0a± 1.9
G3: Nettle 2.5% powder	36.57c± 3.90	59.54c± 1.60	52.64c± 2
G4: Nettle 5% powder	42.31b± 2.30	44.08d± 4.60	21.66d± 1.4
LSD (P≤0.05)	1.70	2.52	0.64

Mathematical averages and standard deviation of the mean are represented by values. ANOVA test results show that means with distinct letters (a, b, c, d, etc.) in the same column differed substantially at P≤0.05 but those with similar letters do not

Effects of different levels of nettle roots on liver activity such as ALT, AST, and ALP of infertility male rats are seen in Table (5). It is obvious that the ALT liver enzyme of group with positive control showed significantly greater concentrations when compared to group with negative control, that were 55.10 and 38.70 U/L. As for tests disorder groups, the data collected demonstrated that significantly lesser ALP value recorded with group 4 (5% nettle roots), while the greater value recorded with group 3 (2.5 % nettle roots), which mean 43.41 and 56.14 U/L, respectively.

Regarding AST liver activity, it is obvious to mention that AST liver enzyme of group with control positive showed significantly larger value as comparing to group with control negative. The average reading was 115.80 and 48.50 U/L. Whereas, tests damage groups, data stated that with significantly smaller ALP value recorded with group 4 (5% nettle). While the bigger value recorded with group 3 (2.5 % nettle roots), which mean 69.34 and 83.17 U/L.

The group with positive control significantly outperformed the group with

control negative in terms of ALP liver activity. Both average readings were 225.15 and 65.45 U/L. Considering tests damage groups, the obtained data noted that with significantly lower ALP value recorded with group 4 (5% nettle roots), while the higher value recorded with group 3 (2.5 % nettle roots), which were 161.36 and 183.92 U/L. These outcomes are in line with those of (37) which discovered that powdered nettle roots and leaves covered excessive ranges of protein, dietary fiber, and naturally taking place antioxidant activity. These findings can also be relevant to the improvement of new dietary supplements of a versatile herbal world to enhance the liver activities of ALP, AST, and ALP in rat groups due to their powerful antioxidant effects.

These findings are in line with those of (41) who proven that nettle roots display hepatic injury caused via ischemia-reperfusion damage and that they show liver protective properties thru enhancing paraoxonase, arylesterase, and tissues of the liver activity of catalase.

Table (5): Influence of various levels of nettle roots on liver activity of infertility male rats

Parameters / Male groups	ALT (U/L) Mean ± SD	AST (U/L) Mean ± SD	ALP (U/L) Mean ± SD
G1: Negative control (-)	38.70c±4.50	48.50d±3.90	65.45d±50
G2: Positive control (+)	55.10a±3.30	115.80a±4.90	225.15a±3.70
G3: Nettle 2.5% powder	56.14a± 30	83.17b±1.90	183.92b±20
G4: Nettle 5% powder	43.41b± 2.4	69.34c±4.60	161.36c±3.60
LSD(P≤0.05)	1.760	2.701	2.451

Mathematical averages and standard deviation of the mean are represented by values. ANOVA test results show that means with distinct letters (a, b, c, d, etc.) in the same column differed substantially at P≤0.05 but those with similar letters do not.

Table (6) illustrated the average urea for infertility rats fed on variety of diets serum urea of positive control group showed that the significantly greater value when compared to group with negative control , that were 43.85 and 28.15 mg/dl. As for tests disorder groups, the results attained showed that the significantly greater urea value captured with group received 2.5% nettle roots, but lesser value recorded with group received 5 % nettle roots, which mean 35.6 and 31.28 mg/dl, respectively.

Table (6) displays the average blood creatinine concentration for rats with infertility given varied diets. The serum creatinine of control positive group showed that the significantly maximum concentration as comparing to group with negative control, that were 1.27 and 0.28 mg/dl. As for groups suffered from tests disorder, the outcomes attained showed significantly greater creatinine concentration observed for group receiving 2.5% nettle roots, but lesser concentration observed for group receiving 5 % nettle roots, which mean 1.14 and 0.94 mg/dl.

The average uric acid concentration of group with control positive showed

significantly greater range as compared to group with control negative, that were 7.74 and 4.6 mg/dl. As for tests disorder groups, the data collected demonstrated significantly greater uric acid concentration recorded with group received 2.5% nettle. But less concentration was recorded for the group that received 5 % nettle roots, which mean 9.46 and 2.88 mg/dl. The findings of this investigation support those who reported that the nettle group receiving remedy confirmed an excessive antioxidant activity. Resulting it is anticipated that the renal-protective influence of nettle in gentamicin-induced kidney injury will keep intracellular degrees related with biological activity whilst allowing elevated gentamicin clearance (42).

Furthermore, every group of rats that were kidney-damaging given various diets revealed a considerable drop in the group with control positive averages for urea, uric acid, and creatinine concentrations. The group given 5% herb combination had the smallest numbers, however there used to be no discernible distinction between them and group with control negative. (43).

Table (6): Influence of various levels of nettle roots on renal biomarkers of infertility rats

Parameters / Male groups	Urea (mg/dl) Mean ± SD	Uric acid (mg/dl) Mean ± SD	Creatinine (mg/dl) Mean ± SD
G1: Negative control (-)	28.15 d ± 3.2	4.6 c ± 2.6	0.78 d ± 0.6
G2: Positive control (+)	43.85 a ± 2.3	7.74 b ± 2.5	1.27 a ± 1.2
G3: Nettle 2.5% powder	35.6 b ± 2.5	9.46 a ± 3.3	1.14 b ± 1
G4: Nettle 5% powder	31.28 c ± 4.9	2.88 d ± 2.7	0.94 c ± 0.3
LSD(P≤0.05)	2.36	0.72	0.81

Mathematical averages and standard deviation of the mean are represented by values. ANOVA test results show that means with distinct letters (a, b, c, d, etc.) in the same column differed substantially at P≤0.05 but those with similar letters do not.

The influence of nettle roots on the glucose ranges of infertility rats are displayed from Table (7). The collected data demonstrated that the group with control negative recorded a decrease value with a statistically significant difference, whereas the control positive group mentioned a greater glucose degree. The corresponding averages had been 98.70 and 184.25 mg/dl.

Compared to the positive control group that served as a positive control, all infertility rats fed various levels of nettle roots showed significant reductions in indicated values. The group of rats who acquired 2.5% nettle roots had the biggest glucose level, whilst the group that acquired 5% nettle roots had the smallest value; their averages reading had been 145.66 and 136.56mg/dl. This information is consistent with (44), they discovered that nettle can prevent the disaccharides involved in carbohydrate degradation in the beginning. Nettle has been used in traditional clinical practices due to the fact it inhibits the transfer of

glucose and disaccharidase. This shows that it would possibly be an effective nettle treatment for diabetes.

Furthermore, nettle roots have been observed to appreciably lower patients' fasting blood sugar ranges in 8 controlled research consisting of diabetic mulitas type two people. Discovering how nettle extract works to minimize blood glucose ranges in the context of diabetes requires first identifying its active substances and cellular mechanisms of action (45).

Table (7): Influence of varying concentrations of nettle roots on glucose of rats suffered from infertility

Parameters / Male groups	Glucose (mg/dl) Mean ± SD
G1: Negative control (-)	98.70d ± 2.70
G2: Positive control (+)	184.25a ± 3.32
G3: Nettle 2.5% powder	145.66b ± 3.51
G4: Nettle 5% powder	136.56c ± 3.60
LSD (P≤0.05)	3.860

Mathematical averages and standard deviation of the mean are represented by values. ANOVA test results show that means with distinct letters (a, b, c, d, etc.) in the same column differed substantially at P≤0.05 but those with similar letters do not.

CONCLUSION

We can use nettle roots powder as a decoction to enhance fertility and immunity due to the fact it has high quality effects on reproductive hormones and the immune system in rats, particularly at 5% levels.

REFERENCES

1. Daniel, S. E.; Hubert, J. and Caroline, M. Prostatitis, and male factors infertility: A review of the literature. Cur Pro Rep., (2006); 4: 45-53.
2. David, F.Y. and Jessy, N.M. Male infertility: Lifestyle factors and holistic, complementary, and alternative therapies. Asian Journal Androl., (2016); 18 (3): 410-418.
3. Knez, J. and Vlaisavljević, V. Ženska neplodnost. In: Takač I, Geršak K, eds: Ginekologija in perinatologija. 1st ed. Maribor: Medicinska fakulteta; (2016); p. 170-179. (In Slovene).
4. Nazni, P. Association of Western diet, and lifestyle with decreased fertility. Indian J. Med. Res., (2014);140 (1): 78-81.
5. Smith, J.F.; Walsh, T.J.; Shindel, M. and Paul, J. Sexual, marital, and social impact of a man's perceived infertility diagnosis. J. Sex Med., (2009); 6 (9): 2505-2515.
6. Litman, G.W.; Cannon, J.P. and Dishaw, L. Reconstructing immune phylogeny: new perspectives. Nature Reviews. Immunology. J. (2005); 5 (11): 866-879.
7. Zare, S.; Nabiuni, M.; Tayanloo, A.and Hoseini, S. et al. The effects of Urtica dioica extract on lipid profile, insulin resistance index and liver histology in polycystic ovary syndrome induced Wistar rats. Adv. Herb. Med., (2015);1(2):23-33.

8. Dar, S.A.; Ganai, F.A.; Yousuf, A.R. and Balkhi, M.U. et al. Pharmacological and toxicological evaluation of Urtica dioica. Pharm Biol., (2013); 51 (2): 170-80.
9. Hajhashemi, V. and Klooshani, V. Antinociceptive and anti-inflammatory effects of Urtica dioica leaf extract in animal models. Avicenna J. Phytomed., (2013); 3 (2):193-200
10. Jalili, C.; Salahshoor, M.R. and Naseri, A. Protective effect of Urtica dioica, L against nicotine-induced damage on sperm parameters, testosterone, and testis tissue in mice. Iran J. Reprod. Med., (2014); 12 (6): 401-408.
11. Joshi, B.C.; Mukhija, M. and Kalia, A.N. Pharmacognostical review of Urtica dioica L. Int. J. Green Pharm., (2014); 8 (4): 1-9.
12. Edirne, T.; Arica, S.G.; Gucuk, S. and Yildizhan, R. et al. Use of complementary and alternative medicines by a sample of Turkish women for infertility enhancement: A descriptive study. BMC Complement Altern Med., (2010);10 (1): 1-7.
13. Jalili, C.; Salahshoor, M.R. and Naseri, A. Protective effect of Urtica dioica, L. against nicotine-induced damage on sperm parameters, testosterone, and testis tissue in mice. Iran Journal Reproduction Med., (2014);12 (6): 401-802.
14. 14.Oladimeji, S.O.; Soares, A.S.; Igbalaye, J.O. and Awote, O.K.et al. Ethanolic root extract of Urtica dioica exhibits pro-fertility and antioxidant activities in female albino rats. International Journal of Biochemistry Research & Review, (2022); 31 (8): 29-38.
15. Russo, E. Handbook of Psychotropic Herbs: A scientific Analysis of Herbal Remedies for Psychiatric Conditions. Journal of Haworth Her. Pre. (2001); NY, USA. 15 (7): 648.
16. Rekha, D.K.; Nayanatara, A.K.; Ramswamy, C.; Sheila, R.P.; Ramesh, B.M. and Venkappa, S.M. Infertility in male Wistar rats induced by cadmium chloride: Role of ascorbic acid. Journal of China Medical, (2009); 41(11): 616-621.
17. AIN, American Institute of Nutrition. Purified died for Laboratory Rodent Final report. Journal of Nutrition, (1993); 123:1939-1951.
18. Chapman, D. G.; Castilla, R. and Campbell, J.A. Evaluation of protein in food. I. A. method for the determination of protein efficiency ratio. Canadian. Journal of Biochemistry Physiology, (1959); 37 (5): 679-686.
19. Allen, C.C. Cholesterol enzymatic colorimetric method. Journal of Clinical Chemistry, (1974); 2 (20): 470.
20. Fassati, P. and Prencipe, L. Triglyceride enzymatic colorimetric method. Journal of Clinical Chemistry, (1982); 28:2077.
21. Lopez, M.F. HDL-cholesterol colorimetric method. Journal of Clinical Chemistry, (1977); 23: 882.
22. Lee, R. and Nieman, D. National Assessment. 2nd Ed., Mosby, (1996); Missouri, USA.

23. Patton, C.J. and Croush, S.R. Enzymatic determination of urea. Journal Analytical Chemistry, (1977); 49: 464-469.
24. Barham, D. and Trinder, P. Determination of uric acid. Analyst, (1972); 97: 142.
25. Schirmeister, J. Creatinine standard and measurement of serum creatinine with picric acid. Deutsche Medizinische Wochenschrift,
26. (1964); 89: 1018-1021.
27. Belfield, A. and Goldberg, D.M. Revised assay for serum phenyl phosphatase activity using 4-amino-antipyrine. Enzymes, (1971);12 (5): 561-573.
28. Yound, D.S. Determination of AST. Clinical Chemistry Journal, (1975); 22 (5):1-21.
29. Trinder, P. Glucose. Journal of Annals Clinical Biochemistry, (1969); (62): 24-33.
30. Fahim, M.S.; Fahim, Z. and Harman, J.M. Clevenger, T.E.; Mullins, W.; Hafez, E.S. Effect of Panax ginseng on testosterone level and prostate in male rats. Arch Androl, (1982); 8 (4): 261-263.
31. Pradelles, P.; Grassi, J. and Maclouf, J. Enzyme immunoassays of eicosanoids using acetylcholine esterase as label: An alternative to radioimmunoassay. Analytical Chemistry, (1985); 57 (7):1170-1173.
32. SAS. SAS Users Guide: Statistics version 5th Ed. SAS. Institute Inc., (1988), Cary N.C.
33. Morovvati, H.; Najafzadehvarzi, H. and Rashidi, K. Effect of Urtica Dioica Extract on Histological and Histometrical Changes of Testis of Hamster after Testosteron Administration. Zahedan Journal of Research in Medical Sciences, (2013); 15 (11): 4-8.
34. Ganzera, M.; Piereder, D. and Sturm, S. Urtica dioica agglutinin: Separation, identification, and quantitation of individual isolectins by capillary electrophoresis and capillary electrophoresis-mass spectrometry. Electrophoresis, (2005); 26 (9): 724-731.
35. Bilen, S.; Unal, S. and Güvensoy, H. Effects of oyster mushroom (Pleurotus ostreatus) and nettle (Urtica dioica) methanolic extracts on immune responses and resistance to Aeromonas hydrophila in rainbow trout (Oncorhynchus mykiss). Aquaculture, (2016); 454 (1): 90-94.
36. Mahmoud, A.H.; Mahmoud El Sherbiny, M. and Ebrahim, A.Y. Assessment of Urtica pilulifera extracts on humeral immune response and hormones. Research and Review of Bioscience, (2016); 7 (6): 220-225.
37. Eldamaty, H.S. Effect of adding nettle leaves (Uritca dioica, L.) powder on basal diet to lower diabetes in rats. Egyptian Journal of Food, (2018); 46: 141-151.
38. Mosa, S.M. Potential Effect of Nettle (Urtica dioica), Leaves and Seeds on Kidney Disorder on Gentamicin-Induced Rats. M.Sc. Thesis, Faculty of Home Economic, (2023); Menoufia University.
39. Ragab, S.S.; El-Tahan, N.R. and Elmokdem, D.E. Biological, studies of some herbal and plants formula on the healthy status of obese female Rats.

Journal of Home Economics, (2020); 30 (4): 233-248.

40. Nassiri-Asl, M.; Zamansoltani, F.; Abbasi, E. and Daneshi, M.M. et al. Effects of Urtica dioica extract on lipid profile in hypercholesterolemic rats. Zhong Xi Yi Jie He Xue Bao. (2009); 7: 428-433.

41. El-Dashlouty, M.S.; Al-Mosselhy, S.M. and Abd-Allah, N.F. Effect of Jew's stone alone or in herbal formulations on the renal dysfunction. Journal of Home Economics, (2013); 23 (1): 67-89.

42. Kandis H.; Karapolat S.; Yildirim U.; Saritas A.; Gezer S. and Memisogullari R. (2010) Effects of Urtica dioica on hepatic ischemia-reperfusion injury in rats. Clinical (Sao Paulo) (2010); 65: 1357- 1361.

43. Salih, N.A. Effect of nettle (*Urtica dioica*) extract on gentamicin induced nephrotoxicity in male rabbits. Asian Pacific Journal of Tropical Biomedicine, (2015); 5 (9): 756-760.

44. Hassan, T.M.; El-Kholie, E.M. and Helmy, A.T. Protective effect of grapes of beer seeds and hops leaves as powder in treatment of kidney functions on nephrotoxic rats. Journal of Home Economics, (2020); 30 (4): 197-216.

45. Altamimi, H.M.; Abu-Reidah, I.M.; Altamimi, A. and Jaradat, N. Hydroethanolic extract of Urtica dioica, L. (stinging nettle) leaves as disaccharidase inhibitor and glucose transport in caco-2. Molecules, (2022); 27: 1-10.

46. Ziaei, R.; Foshati, S.; Hadi, A.; Kermani, M.A.H.; Ghavami , A.; Clark , C.T. and Tarrahi, M.J. The effect of nettle (Urtica dioica) supplementation on the glycemic control of patients with type 2 diabetes mellitus: A systematic review and meta-analysis. Phytotherapy Research, (2019); 34: 282-294.

مجلة الاقتصاد المنزلي، جامعة المنوفية

Website: https://mkas.journals.ekb.eg

الترقيم الدولي اون لاين 2735-590X

الترقيم الدولي للطباعة 2735-5934

التغذية وعلوم الاطعمة

تحسين خصوبة ومناعة ذكور الفئران باستخدام جذور نبات القراص

عماد محمد الخولى، شريف صبرى رجب، ابتهال محمد الديبة

قسم التغذية وعلوم الأطعمة .كلية الاقتصاد المنزلي .جامعة المنوفية، شبين الكوم، مصر

نوع المقالة

بحوث اصلية

المولف المسذول

ا.د/ عماد الخولي

emad.elkhouli@hec.menofia.edu.eg

Mobile:+2 01005370728

DOI:10.21608/mkas.2023.235711.1253

الاستشهاد الي:

El-Kholie et al., 2024, Improvement of Male Rats Fertility and Immunity using Nettle Root. JHE, 34 (1), 1-15

تاريخ الاستلام: ١١ سبتمبر ٢٠٢٣

تاريخ القبول: ٢٠ ديسمبر، ٢٠٢٣

تاريخ النشر: ١ يناير ٢٠٢٤

الملخص العربى:

يهدف هذا البحث إلى دراسة تأثير مسحوق جذور نبات القراص على الفئران المصابة بخلل في الخصوبة. تم استخدام أربعة وعشرون ذكرًا من فئران سبراغ داولى بوزن ١٤٠-١٥٠ جم في هذه الدراسة. تم تقسيم الحيوانات إلى أربع مجموعات رئيسية. تم الاحتفاظ بالمجموعة الرئيسية الأولى (ن=٦) كمجموعة ضابطة سالبة (-ve)، وتم حقن المجموعة الثانية (ن=٦) بكلوريد الكادميوم لتحفيز حدوث خلل في الخصوبة عند ذكور الفئران. في المقابل تم تغذية المجموعة الثالثة المصابة بخلل في الخصوبة على عليقة تحتوي على ٢,٥% مسحوق جذور نبات القراص، المجموعة الرابعة من الفئران المصابة بخلل في الخصوبة تمت تغذيتها على عليقة تحتوي على ٥% مسحوق جذور نبات القراص لمدة ٢٨ يوما. في نهاية التجربة، تم صيام الفئران طوال الليل قبل الذبح، وتم جمع الدم ثم طرده مركزيا لفصل السيرم. تم قياس مستوى الجلوكوز في الدم، إنزيمات الكبد، وظائف الكلى، صورة دهون الدم، هرمون التستوستيرون، هرمون (FSH)، وهرمون (LH). كما تم قياس بعض المؤشرات المناعية مثل IgG وIgM. أظهرت النتائج المتحصل عليها أن المجموعات المعالجة بجذور نبات القراص أدت إلى زيادة معنوية في هرموني (التستوستيرون، FSH) بينما انخفض هرمون LH، في حين انخفض مستوى الجلوكوز، الكولسترول، الدهون الثلاثية، LDL-c، VLDL-c، حمض اليوريك، اليوريا، الكرياتينين، انخفض ALP وALT وAST، والعكس صحيح مع HDL-c. نستنتج من ذلك أن مسحوق جذور نبات القراص له تأثير إيجابي على الجهاز المناعي وهرمونات الخصوبة في الفئران.

الكلمات الكاشفة: الفئران، جذور النباتات، هرمونات الخصوبة، المناعة