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Effect of Citrullus Lanatus (watermelon)pulp and seeds extracts on fertility of experimental rats

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Abstract

The present study was designed to study effect of watermelon extract on fertility of experimental rats. The biological evaluation on male rats Sprague Dawley Strain (250 -270 g) the study continued for 28 days. Five groups of rats, each contains 5 rats, were fed on different tested diets **Group1**: control group rats fed on basal diet. **Group 2**: fed on basal dietand treated daily orally with 100mg/kg body weight of watermelon pulp methanol extract. **Group 3**: fed on basal diet and treated daily orally with 200mg/kg body weight of watermelon pulp methanol extract. **Group 4**: fed on basal diet and treated daily orally with 100mg/kg body weight of watermelon seeds methanol extract. **Group 5:**fed on basal diet and treated daily orally with 200mg/kg body weight of watermelon seeds methanol extract. Chemical, biological, biochemical and histological tests were carried out. The results of this study showed that watermelon contains high amount of moisture and carbohydrates in watermelon seeds extract and watermelon pulp extract and low amount of fat.

Total phenol and lycopene recorded the highest value in watermelon seeds extract. Also, phosphorus and zinc recorded the highest value in watermelon pulp extract. Testosterone, folicles timulating hormone and lutenizinghormone in all groups tested were increased significantly and significant decreased in serum prolactin hormone compared with those of the control group. The results also showed a marked significant increasesin kidney function and liver enzymes which nearly returned toward the normal (control group) levels. However, there is an increase in the feed efficiency ratio (FER) and body weight gain (BWG) in all treated groups compared to the control group although the increase was not significant. This study therefore recommend that watermelon fruit could be an excellent source of active components which may increases male fertility.

Introduction

Watermelon(*Citrulluslanatus*)is a tropical plant of the *Cucurbitacea* family. It grows in South East Asia and most of Africa***(Mandel et al.,2005).*** It is primarily propagated by seeds and thrives best in warm areas. Watermelon seeds as a significant source of nutrients in the diet and can have health and economic benefits due to their fiber, minerals, phenolic content and antioxidant activity ***(Betty Tabiri et al.,2016).***

Citrullus lanatus methanol extract provides protection to spermcells against oxidative stress***Daramolaet al.,(2018).***

Citrulluslanatus (watermelon) methanol extract produces high amounts of arginine and citrulline, both contributing to the production of nitric oxide, a vasodilator that plays an important role in penile

erection ***(Cormioet al., 2011).Munguleet al. (2014)*** reported an aphrodisiac effect of the extract of Citrulluslanatus on rat models.*Citrulluslanatus* fruit's two dosages of methanol extract (was able to improve the observed decrease in sperm motility in groups, due to its phenolic content***(Oseni and Okoye, 2013).***

The fruit of methanol extract*Citrulluslanatus* contains high levels of vitamin C ***(Choudharyet al., 2015).***Vitamin C has been reported to protect human sperm by neutralizing radicals ofhydroxyl, superoxide and hydrogen peroxide and preventing agglutination of sperm ***(Fragaet al., 1991).*** It is therefore likely that the content of vitamin C of methanol extract of *Citrulluslanatus*has helped to improve the development of peroxidation resulting in improved morphology and viability of methanolextract of Citrulluslanatus rats.

Watermelon seeds methanol extract were shown to consist of lycopene, saponin, alkaloid, cyanogenic glycoside, flavonoid, oxalate and tannin during phytochemical screening ***(Catar and Chengappa, 1991)*****.** Lycopene an antioxidant was associated with reduced incidence of coronary heart disease, prostate cancer but affected sexual and reproductive function ***(Riccioniet al., 2005).***

Watermelon seedsmethanol extract (*Citrullus Vulgaris*) is an antioxidantprotect sperm DNA from free radicals and increase blood-testis barrier stability and other important molecules from oxidation and can improve sperm quality and consequently increase fertility rate in men***Arash Khaki et al.,(2013).***Citrulluslanatusseeds methanol extract are also essential mineral sources. This contains alpha-tocopherol in terms of vitamins, a portion of vitamin E that helps to keep young skin smooth and good fertility **Fokou*et al*.,(2004).** Increase the fertility rate and refereed the compatibility of the

watermelon methanol extract based citrulline and lycopene with higher testicular fitness and fertilized semen male productivity ***Mohammedand Al-Bayati.,(2014).***

Therefore the present study was designed to evaluate the effect of *CitrullusLanatus*(watermelon) pulp and seeds extracts on fertility of experimental rats.

Materials and Methods

Materials:

Citrulluslanatus (watermelon): were purchased from local market, Zagazig, Egypt.

Casein, vitamins, minerals, cellulose, choline chloride andmethanol solvent were purchased from El-Gomhoreya Company, Cairo, Egypt.

Oil and starch were purchased from local market, Cairo, Egypt.

Twenty-five male albino rats (Sprague Dawley Strain) were obtained from Food Technology Res. Institute, Giza.

Methods:

Extracts preparation

Collection and preparation of seeds andpulpmaterial:

Fruits of watermelon were bought from the market, fruit washed and cut open to obtain seeds, pulp. The seeds collected were washed and dried for two days; pulverized and powdered with a blender Powdered seed content was then weighed and stored in airtight containers until further use.The extraction of watermelon(pulp and seeds were done according to **(Varghese *et al*., 2013)**. All extracts were evaporated to dryness using a water bath.

Chemical analysis ofmethanol extractsof watermelon(pulp and seeds):

Chemical analysis ofwatermelon(pulp and seeds) extract including protein, carbohydrate, lipids, moisture and ash were conducted in Food Technology Res. Institute according to the method described by the***A.O.A.C., (2000).***

Determination of phosphorus and zinc contents:

Phosphorus and zinc in watermelon (pulp and seeds) methanol extractswere determined by***Baetz and Kenner,(1973).***

Determination of total phenols and lycopene contents:

Total phenols andlycopene inwatermelon(pulp and seeds)methanol extractswere determined by Folin-Ciocalteau 's reagent as described by ***Singleton et al.,(1999)andNazet al.,(2013)***,respectively.

Experimental design:

Male albino rats SpargueDawley Strain (25 rats) weighing (250 -270 g) were kept in individual stainless steel cages under hygienic conditions and fed one week on basal diet according to ***Reeves et al ., (1993)*** for adaptation at ad libitum in the animal house of Agricultural Res. Center in Ministry of Agriculture), Giza. The basal diet consisted of casein 10%, cellulose 5%, corn oil 4%, salt mixture 3.5%, vitamin mixture 1% and the remained amount is corn starch according to ***Lane Peter and Pearson, (1971)***with(100 and 200) mg/kg body weight of methanol extract of watermelon pulp,(100 and 200) mg/kg body weight of methanol extract of watermelon seeds daily during experimental period(28 days).

After the adaptation period,the experimental animals were divided into 5 groups,each group contained(5) animals:

Group1: control group, rats fed on basal diet(B.D).

Group2: fed on (B.D) and treated daily orally with100 mg/kg body weight of watermelon pulp methanol extract.

Group3: fed on (B.D) and treated daily orally with 200 mg/kg body weight of watermelon pulp methanol extract.

Group4: fed on (B.D) and treated daily orally with 100 mg/kg body weight of watermelon seeds methanol extract.

Group5: fed on (B.D) and treated daily orally with 200 mg/kg body weight of watermelon seeds methanol extract.

Watermelon (pulp and seeds) methanol extracts were given orally to the rats through a gastric tube.

During the experimental period (28 days), each rat was weighed every week and food consumption was recorded. The body weight gain% and feed efficiency ratio (FER) were determined according to ***Chapman et al., (1959)***using the following formula:

$$(\text{BWG}\%) = \frac{\text{Final Weight\_ Initial Weight}}{\text{Initial Weight}} \times 100$$

$$(\text{FER}) = \frac{\text{Daily body Weight gain(g)}}{\text{Feed intake (g/d)}}$$

At the end of the experimental period rats were fasted over night before sacrificing blood was collected then centrifuged. Serum was separated and stored at -20°c for biochemical analysis i.e. aspartate amino transferase (AST) and alanine amino transferase (ALT) ***Reitman and Frankel, (1957),*** serum alkaline phosphates (ALP) ***Belfield and Goldberg, (1971)***, serumtotal protein(T.P)***Gornallet al.,(1949),***serum albumin(ALB)

Doumasand Biggs,(1971),serum globulin(G) were calculated by subtracting serum albumin from serum total protein,serumtotal bilirubin(T.B) ***Balistreri and Shaw, (1987)***,serum uric acid ***Fossatiet al., (1980),*** urea ***(Marschet al.,1965),*** Creatinine***BartelsandBohmer*****, *(1971),***serum Testosterone(T)***Wilke and Utley,(1987),***Lutenizing hormone(LH) andFolicle stimulating hormone(FSH) ***Uotilaet al.,(1981*****)*** and Prolactin(PRL) ***Tietz , (1995).***

Histopathological Examination

Testes tissues were examined according to the method of ***Bancroft et al., (2012).***

Statistical analysis

The data was presented as means ± SD statistically analyzed using one way ANOVA test, $p<0.05$ was used to indicate significance ***Steel and Torri, (1980).***

Results and Discussion

Chemical composition of watermelon (seeds and pulp) methanol extracts.

The chemical composition of watermelon extract moisture, protein, fat, ash and total carbohydrates is demonstrated in **Table 1**.

The results showed that watermelon contains high amount of moisture in watermelon seeds extract and watermelon pulp extract and it was (93.8%) for both. Total Carbohydrates content of watermelon seeds extract and watermelon pulp extract were

estimated to be 4.17% and 5.34% respectively. In contrast, the Watermelon seeds and pulp extract showed low amount of ash and protein. Whereas, the fat content of watermelon seeds extract was higher than watermelon pulp extract.

Active component of watermelon (seeds and pulp) methanolextracts.

The amounts of total phenols, lycopene, phosphorous and zinc of watermelon extract are shown in **Table 2.** Total phenol and lycopene recorded the highest value in watermelon seeds extract and it was 359.23 mg GAE/100ml and 219.4364 mg/100ml, respectively.Whereas it was 149.83 mg GAE/100ml and 69.0303mg/100ml, respectively in watermelon pulp extract. Consequently, the watermelon proved as a good source of total phenol and lycopene. These results are is agreement with ***Naz et al., 2013.*** Also, phosphorous and zinc recorded the highest value in watermelon pulp methanol extract and it was 68.46 mg/l and4.74mg/l, respectively.Whereas it was 21.57mg/l and 0.5mg/l, respectively in watermelon seeds methanol extract.

Feed intake (FI), feed efficiency ratio (FER) and body weight gain (BWG)of rats treated with two levels of watermelon (seeds and pulp) methanolextracts.

Watermelon extract was subjected for animal biological experiment to study the effect of adding different levels of watermelon extract on the growth performance and measure the biochemical parameters compared to control group. Feeding and growth performance indicated by feed intake (FI), body weight gain (BWG) and feed efficiency ratio (FER) of all tested diets are presented in Table 3.

BWG% of rats fed on B.D and treated with watermelon(seeds and pulp)extracts for 28 days were calculated and it ranged from 2.57 to 11.00 %. While, there are no significant differences in values of feed intake and feed efficiency ratio in all tested groups. However, there is an increase in the feed efficiency ratio (FER) and body weight gain (BWG%) in all groups compared to the control group although the increase was not significant.

Our results agree with Studies by ***Oyewoet al., (2012)*** which noted significant dose-dependent weight gain following oral administration of watermelon methanol extract. Furthermore, ***El adawy and Taha, (2001)*** demonstrated that these watermelonmethanol extract contain nutrient components such as magnesium, calcium, potassium, iron, phosphorous and zinc that could gradually lead to weight gain.

Serum Testosterone, Folicle Stimulating Hormone, Lutenizing Hormone and Prolactin of rats treated with two levels of watermelon (pulp and seeds) methanol extracts.

Results of Serum Testosterone (T.T), Folicle Stimulating Hormone (FSH), Lutenizing Hormone (LH) and Prolactin (PRL) of experimental rats are presented in **Table 4.** It showed that T.T, FSH and LH in all treated groups (2, 3, 4 and 5) were increased significantly and significant decreased in serum PRL hormone compared with those of the normal rats. On the other hand, rats which feeding watermelon (pulp and seeds) extracts 200mg/kg groups(3 and 5) had significantly increased in T.T , FSH and LH compared with those of rats which feeding watermelon(pulp and seeds) extracts 100mg/kg groups(2 and 4).

The results are in agreement with***Mohammed and Al-Bayati ., (2014)***who reported that watermelonmethanol extract and their active ingredient lycopene and citrulline, play a DNA keeper and attendant in epididymis extracted spermatozoa, the sexual hormone. Additionally,***Mandel et al., (2005)***revealed that, *Citrullus lanatus*m ethanol extractis one of many plants with lycopene. Because of its rich antioxidant and potential health benefits, lycopene is of great interest two anterior pituitary hormones, Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH), control male fertility in mammals through testosteronesynthesis.***Fouadet al., (2015)*** who found thatthe exogenous antioxidants in *Citrullus lanatus* fruit methanol extract may have largely contributed to the improved level of FSH and sperm concentration at 200 mg / kg *Citrullus lanatus* fruit methanol extract. With a higher dosage of *Citrullus lanatus* fruit methanol extract, a better result could have been obtained**.** Another study by ***Ojiehet al., (2008)*** revealed that *Citrullus lanatus* seeds methano extract highly protein-rich, steadily increased testosterone levels in male wistar rats, resulting in a steady increase in FSHlevels in female rats but marginal and inconsistent changes in LH levels.

Kidney function of rats treated with two levels of watermelon (pulp and seeds) methanolextracts.

The obtained results in **Table 5** showed non- significant changes in serum creatinine in all tested groups,as compared to the normal (control group). While significant increase in serum uric acid in all tested groups (2, 3, 4 and5) and significant increase in serum urea in groups (3and5) for watermelon (pulp and seeds) extracts (100 and 200) mg/kg of rats as compared to with those of the normal rats (control group) .On the other hand non-significant changes in serum urea for groups (2and4) watermelon (pulp and seeds) extracts (100 and 200) mg/kg of rats, which nearly returned toward the normal

levels.Our results agree with***Adebayo et al ., (2018)*** who cleared that the methanolextract of *Citrulluslanatus* induced changes in the concentration of ureaat different concentrations of 200 and 600 mg/kg, but did not cause changes in creatinine concentration at different concentrations and according to the results of this study, there is no difference in overall administration. Another study by***Collins et al., (2007)***Citrulline-L-arginine in methanolextract of watermelon is an essential amino acid which plays an important role in reproductive, respiratory, renal, gastrointestinal, hepaticand immune systems and promotes wound healing**.**

Liver enzymes of rats treated with two levels of watermelon (pulp and seeds) methanolextracts.

Table 6 shows significant increase in the activity ofAlanine Amine Transaminase (ALT) liver enzyme of rats(G_2,G_3,G_4 and G_5)while other tested group group showed non-significant as compared to the normal rats (control group).On the other hand, there was no significant in the activity of liver function,total Bilirubin (T.B),AspartateAmineTransaminase(AST),Alkaline Phosphatase(ALP),Total protein **(** T.P),Albumin**(**ALB) andGlobulin (G) in watermelon pulp and seeds (100 and 200)mg/kg of rats extract groups(2,3,4 and 5) ,compared with those of the normal rats (control group), which nearly returned toward the normal levels.

Our results agreed with***Omotoso., (2018)*** stated that *Citrulluslanatus* seeds methanolic extract have rejuvenating effects on the liver additionally,***(Jiang et al., 2016)***reported that Lycopene also significantly decreases the levels of serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST) and antioxidant enzymes glutathione and superoxide dismutase. The results of ***(Bazabanget al., 2018)*** showed that watermelon seeds

methanolextract lead to significant decrease (P<0.05) in plasma AST, ALT, ALP, and protein concentration.

Histopathological Examinations

Histopathological examination of Testes:

Testes from control group showed apparently healthy seminefrous tubules with normal spermatocytes, spermatides, and spermatozoa, **(Fig. 1)** with score lesion of (**Healthy**)***** Testes from groups revealed different degrees of improvement than control group; testes from group2 rats were orally given 100 mg/kg body weight of watermelon pulp methanol extract revealed hyperplasia with increased number of spermatids in some seminefrous tubules and hyalinization of some other seminefrous tubules **(Fig. 2)** with score lesion of (**Active**)*****, while testes from group 3 rats were orally given 200mg/kg body weight of watermelon pulpmethanol extract reported hyperplasia with increased number of spermatids and spermatozoa **(Fig. 3)** with score lesion of (**Hyperactive**)*****, Moreover, testes from group 4 rats were orally given 100 mg/kg body weight of watermelon seedsmethanol extract showed increased spermatozoa formation with congestion in the interstitial blood vessels **(Fig. 4)** with score lesion of (**Active**)*****, On the other hands, testes from group5 rats were orally given 200 mg/kg body weight of watermelon seedsmethanol extract showed hyperplasia with increased numbers of spermatids and spermatozoa **(Fig. 5)** with score lesion of (**Hyperactive**)*****. Our results agree with***Dahl and Jeffrey(2010)*** who cleared that watermelon methanolextract content citrulline increasing sperm viability and decreasing any sperm physiology disorder. And that result accepted with watermelon methanolextract includes lycopene which showed an increase in sperm count due to an increase in testicularcellphysiological activity associated with testicular cell

reduction associated with apoptosis reduction**.**Also***Ebeyeet al.,(2015)*** said thatthe histology of the testisof the test group administered 100mg/kg of rats of watermelon seeds methanolextract found marked hyperplasia with abundant interstitium**.**

Conclusion

The results of this study may highlight the potential of watermelon (pulpand seeds) fruit as a source of dietary phytochemical that may be considered useful for human health. Hence, further research on the bioactivity of its active components could provide more information about the mechanism of action of its several therapeutic values.

Table 1: Chemical composition of watermelon (seeds and pulp) methanol extracts.

Content (%) / Samples	Moisture	Protein	Fat	Ash	Total Carbohydrates	Total
Watermelon seeds extract	93.8	0.6	1.24	0.19	4.17	100
Watermelon pulp extract	93.8	0.45	0.39	0.023	5.34	100

Table 2: Active component of watermelon (seeds and pulp) methanol extracts.

Content / Samples	Total phenols (mg GAE/100ml)	Lycopene (mg/100ml)	Phosphorous (mg/l)	Zinc (mg/l)
Watermelon seeds extract	359.23	219.4364	21.57	0.5
Watermelon pulp extract	149.83	69.0303	68.46	4.74

GAE: gallic acid equivalent.

Table 3: Feed intake (FI), feed efficiency ratio (FER) and body weight gain (BWG)of rats treated with two levels of watermelon (seeds and pulp) methanolextracts.

Parameters / Groups	FI (g/day) (Mean±S.D)	FER (g) (Mean±S.D)	BWG (%) (Mean±S.D)
(G_1) Control	19.39 [a]± 0.41	0.0120[a]± 0.011	2.57[a]± 2.34
(G_2) Watermelon pulpextract (100mg/kg)	19.52[a]± 0.59	0.0433[a]± 0.048	9.47[a]± 10.61
(G_3) Watermelon pulpextract (200mg/kg)	19.12[a]± 0.65	0.0242[a]± 0.018	5.13[a]± 3.81
(G_4) Watermelon seedsextract (100mg/kg)	19.30[a]± 0.58	0.0512[a]± 0.048	11.00[a]± 10.34
(G_5) Watermelon seedsextract (200mg/kg)	19.13[a]± 0.46	0.0245[a]± 0.014	5.12[a]± 3.09
LSD	0.717	0.043	9.309

Values are expressed as means ± SD.

Values at the same column with different letters are significant at $P<0.05$.

Table4: Serum Testosterone, Folicle Stimulating Hormone, Lutenizing Hormone and Prolactin of rats treated with two levels of watermelon (pulp and seeds) methanolextracts.

Parameters / Groups	T.T(ng/ml) (Mean±S.D)	FSH(mlu/ml) (Mean±S.D)	LH(mlu/ml) (Mean±S.D)	PRL.(ng/ml (Mean±S.D)
(G_1) Control	1.813^{c} ±0.657	1.325^{c} ±0.412	2.695^{c} ±0.801	0.733^{a} ±0.056
(G_2) Watermelon pulp extract (100mg/kg)	4.625^{b} ±0.968	2.460^{b} ±0.412	4.958^{b} ±0.729	0.460^{b} ±0.088
(G_3) Watermelon pulp extract (200mg/kg)	7.963^{a} ±0.514	3.948^{a} ±0.311	8.150^{a} ±0.599	0.346^{b} ±0.062
(G_4) Watermelon seeds extract (100mg/kg)	4.655^{b} ±0.879	2.570^{b} ±0.301	5.063^{b} ±0.471	0.457^{b} ±0.069
(G_5) Watermelon seeds extract (200mg/kg)	8.428^{a} ±0.537	4.435^{a} ±0.147	8.830^{a} ±0.282	0.356^{b} ±0.064
LSD	1.107	0.499	0.912	0.104

Values are expressed as means ± SD.

Values at the same column with different letters are significant at $P<0.05$.

Table5: Kidney function of rats treated with two levels of watermelon (pulp and seeds)methanolextracts.

Parameters / Groups	Creatinine (mg/dl) (Mean±S.D)	Urea(mg/dl) (Mean±S.D)	Uric acid(mg/dl) (Mean±S.D)
(G_1) Control	0.56^{a} ±0.034	33.97^{b}±3.93	2.59^{c} ±0.192
(G_2) Watermelon pulp extract (100mg/kg)	0.56^{a} ±0.062	36.94^{b}±2.00	3.09^{ab} ±0.235
(G_3) Watermelon pulp extract (200mg/kg)	0.69^{a} ±0.042	42.24^{a}±1.53	3.36^{a} ±0.154
(G_4) Watermelon seeds extract (100mg/kg)	0.69^{a} ±0.07	37.52^{b}±1.68	2.96^{b} ±0.159
(G_5) Watermelon seeds extract (200mg/kg)	0.61^{a} ±0.092	39.92^{a}±3.89	3.30^{a} ±0.128
LSD	0.096	4.25	0.27

Values are expressed as means ± SD.

Values at the same column with different letters are significant at $P<0.05$.

Table 6: Liver enzymes of rats treated with two levels of watermelon (pulp and seeds) methanolextracts.

Groups / Parameters	(G_1) Control (Mean±S.D)	(G_2) Watermelon pulp extract (100mg/kg) (Mean±S.D)	(G3) Watermelon pulp extract (200mg/kg) (Mean±S.D)	(G4) Watermelon seeds extract (100mg/kg) (Mean±S.D)	(G_5) Watermelon seeds extract (200mg/kg) (Mean±S.D)	LSD
T.B (mg/dl)	0.51^{a} ± 0.115	0.62^{a} ± 0.086	0.58^{a} ± 0.090	0.68^{a} ± 0.075	0.68^{a} ± 0.071	0.134
ALT (U/L)	37.43^{b} ± 3.79	39.69^{ab} ± 4.77	53.09^{a} ± 1.77	43.09^{ab} ± 13.74	48.46^{ab} ± 2.88	10.38
AST (U/L)	103.25^{a} ± 13.5	112.53^{a} ± 13.20	112.73^{a} ± 12.82	116.27^{a} ± 15.48	120.45^{a} ± 14.63	21.04
ALP (U/L)	84.00^{a} ± 6.80	88.42^{a} ± 20.55	89.86^{a} ± 10.19	104.08^{a} ± 16.65	91.55^{a} ± 12.73	21.44
T.P (g/dl)	6.68^{a} ± 0.31	7.18^{a} ± 0.22	6.87^{a} ± 0.24	6.89^{a} ± 0.30	7.01^{a} ± 0.24	0.40
ALB (g/dl)	3.66^{a} ± 0.15	3.83^{a} ± 0.35	3.58^{a} ± 0.21	3.62^{a} ± 0.28	3.71^{a} ± 0.29	0.40
G (g/dl)	3.02^{a} ± 0.16	3.36^{a} ± 0.24	3.29^{a} ± 0.14	3.27^{a} ± 0.36	3.30^{a} ± 0.14	0.34

Values are expressed as means ± SD.

Values at the same column with different letters are significant at $P<0.05$.

AST: Aspartate Amine Transaminase

ALT: Alanine Amine Transaminase

ALP: Alkaline PhosphataseT.B:Total Bilirubin

T.P:Total protein

ALB:Albumin

G:Globulin

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تأثير مستخلصات بذور ولب البطيخ على الخصوبة لدى فئران التجارب

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الملخص العربى

صُممت الدراسة الحالية لدراسة تأثير مستخلصات البطيخ على الخصوبة لدى فئران التجارب. تمت هذه الدراسة بإستخدام ذكور فئران التجارب من النوع الألبينو تتراوح أوزانهم (٢٥٠-٢٧٠) لمدة ٢٨ يوم. قسمت الفئران إلى خمس مجموعات بواقع خمس فئران فى المجموعة. **المجموعة الأولى:** مجموعة ضابطة تغذت على الغذاء الأساسى فقط والماء طول فترة التجربة. **المجموعة الثانية:** تغذت على الغذاء الأساسى مع معامله عن طريق الفم ١٠٠ملجم/كجم من وزنالجسم من مستخلص الميثانول للب البطيخ كل يوم. **المجموعة الثالثة**: تغذت على الغذاء الأساسى مع معامله عن طريق الفم ٢٠٠ ملجم/كجم من وزن الجسم من مستخلص الميثانول للب البطيخ كل يوم. **المجموعة الرابعة**: تغذت على الغذاء الأساسى مع معامله عن طريق الفم ١٠٠ ملجم/كجم من وزن الجسم من مستخلص الميثانول لبذور البطيخ كل يوم. **المجموعة الخامسة**: تغذت على الغذاء الأساسى مع معامله عن طريق الفم ٢٠٠ ملجم/كجم من وزن الجسم من مستخلص الميثانول لبذور البطيخ كل يوم. إجريت إختبارات كيميائية وبيولوجية وبيوكيميائية وهستولوجية. أظهرت النتائج أن مستخلص كل من بذور ولب البطيخ يحتوى على نسبة عالية من الرطوبة والكربوهيدرات ونسبة قليلة من الدهون. كما سجل إجمالى الفينولات والليكوبين أعلى قيمة فى مستخلص بذور البطيخ وسجل عنصرى الفوسفور والزنك أعلى قيمة فى مستخلص لب البطيخ. كما أظهرت النتائج زيادة فى هرمونات الذكوره فى جميع المجموعات المختبرة بشكل كبير وإنخفاض فى هرمون البرولاكتين مقارنة بالمجموعة الضابطة. كما وضحت النتائج زيادة فى وظائف الكلى وإنزيمات الكبد التى كانت فى المستويات الطبيعية. ومع ذلك, كان هناك زيادة فى نسبة كفاءة التغذية وزيادة وزن الجسم فى جميع المجموعات المختبرة مقارن بالمجموعة الضابطة

على الرغم إن هذه الزيادة لم تكن ذات دلالة إحصائية. لذلك توصى الدراسة بأن تكون فاكهة البطيخ مصدراً ممتاز للمكونات النشطة التى قد تزيد من خصوبة الرجال.