

Effect of ginger rhizome extract additives to Awassi rams ration on the weights and sperms quality

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Abstract:

This study was conducted on 9 awassi rams at age (1.5)year with live body weight (45- 46) kg, from 10/3/2011 to 20/5/2011. Rams were divided to three groups , each group contain 3 rams , to investigate effect of ginger rhizome addition on body weights and sperms viability. Results indicates significant differences ($p < 0.05$) in final weight kg /animal in G_2 (56)kg and G_3 (56.6)kg as compared to control group G_1 (51.4)kg. Results revealed significant increase in total weight gain in G_2 (10)kg , G_3 (11.4)kg and daily weight gain g/ animal in G_2 (176)gm , G_3 (190) gm respectively as compared to control group G_1 (5.9) kg and (98) g/ animal respectively. Results of microscopically study revealed that no significant difference on individual motility among groups. Significant difference ($p < 0.05$) in survival index, dead spermatozoa and abnormal sperms characters in G_2 (67.88) (12.19) and (16.04), (68.70) (12.04) and (15.36) in G_3 as compared to G_1 (50.76) (20.94) and (23.65) respectively.

Introduction:

Identification :- Zingiber officinal is belonging to zingiberaceae family originated in south east Asia and has been Introduced to Europe and other areas (to ancient Indian , china and oriental culture) by Arab and Spanish traders or explorers at 13th – 14th centuries *Kikuzaki et al. (2000)* .Zingiber or ginger is very famous plant in many countries , grow best in tropical and subtropical areas , which have good rainfall with hot and humid condition during summer *Tyler et al. (1988)*.

Ginger constituents :- All components of ginger are zingreone , gingerdiol , Zingibrene, gingerols and shagools substance , all these have anti oxidant activity *Zancan et al. (2000)*. and the main constituent of ginger include volatile oil (Lineol , camphene , geranial , linalool , Limonene and citronellol) with protcolytic enzymes , vitamin B_6 , vitamin c , calcium , magensium phosphorous , potassium , Linoleoc acid and also essential

aminoacid (valine , methionin , Leucine, Histidine , Arginine , Lysin , isoleucine , Alanninie and pheny-alaninie *Kikuzaki et al. (2000)* .
Medical uses :- ginger is used worldwide as traditional herbal medicine for treatment of symptoms such as a common cold , influenza , nausea , vomiting of motion sickness *Jendrassik et al.(1993)* , antiemetic , relieving pain associated with arthritis , osteoarthritis and rheumatism *Srivastava et al. (1989)* , and gastrointestinal disorder *Kamtchoving et al. (2008)*. Ginger is very useful in treatment of many disease as migraine *Holtman et al.(1986)* infectious disease *Jendrassik et al.(1993)* and salmonellosis , antibiotic and antifungal *Chang et al.(1986)* .*Stolova et al.(2007)* found that ginger extract showed higher antioxidant capacity especially in higher temperature, ginger have antitumor and antiproliferative effect *Uimela et al.(1999)*. In organ phosphate insecticide and heavy metals toxicity as skeletal muscle productive *Ahmed et al.(2000)* .The ginger may have a beneficial effect for urea removal from plasma and may be considered as a therapeutic herb in uremic patient *Mehradad et al.(2007)*, antihypercholesterolemic *Tanable et al. (1993)*, antithrombotic and in diabetes mellitus *Sekiya et al.(2004)*, in depression, paralysis, convulsion and in hypertension *Meyer et al. (1995)* , antihistaminic *Qian et al. (1992)* , and inflammatory and inquired immunity *Sekiwa et al. (2000)* . In human consumption ginger commercial products as (ginger beer , tablets , gingeral , ginger bread and jam) are beneficial for health as excellent antioxidants by preventing lipid oxidation and without side effect *Bandari et al.(2005)* . Ginger products play important role in infertility which is a major problem in male life due to several factors such as drug treatment , chemotherapy , toxins , air pollution and insufficient vitamin intake which have harmful effects on sperm production by spermatogenesis *Mosher (1999)* in the test's seminiferous tubules by mitotic and meiotic division of germ cells (gonocytes) to form spermatids with 12 cellular associations *Mosher (1999)* ,then release in lumen of tubules after incubated in sertoli cells to go to caudal of epididymis for 6-14 days to have ability for maturation ,motility and fertilization *Amann (1988)*.The aim of objectives of this study were to investigate the effect of ginger extract add to the concentrated feed mixture (CFM) on growth performance and some sperm parameters in rams.

Materials and methods:

Experimental animal :-Awassi rams were purchased from local market at (1.5 years age with average weight 45.5 kg) at period from 10/3/2011 to 20\5\2011 .The present study was carried out at animal department shatra technical institute , 45km north of Nasirya city. The animals were randomly divided into control group (G₁) (N₃) and experimental groups (N₆) which divided in to groups (G₂) and (G₃) each include (3) animals and housed individually with experimental house , light , temperature and humidity were constantly control .

Nutrition :-Animal in control group (G1) were fed the concentrated feed mixture (CFM) contained corn crops (25%) crushed barely(25%) , wheat bran (25%) ,wheat flour (15%), molasses (5%) , urea (2%), limestone(1%)and commone salt (1%) with out any dditives,while ,the second and third groups were fed the same as in G1 but supplemented with (10)g/d and(20)g/d of ginger extract in G2 and G3 respectively. Ginger root extract powder was purchased from Dlf market – Sakat - Newdlahi India (ginger powder dry).Fresh water, green alfalfa and nutrition complements were available during the the whole experimental period Representative samples of feed stuffs were analyzed according to Alkawaja et al. (1978) as in table (1) .

Table (1) Chemical analysis of tested ingredients of formulated ratio during trial

Item	Dry matter %	Crud protein	Crud fiber	Crude fat	Dissolved CHO	Ash	Gross – energy mj/kg/DM
Corn crobs	92.75	2.08	31.30	0.63	56.10	2.64	0.986
Crushed barely	92.85	10.72	6.50	1.42	70.39	3.82	1.190
Wheat barn	90.42	15.86	10.63	4.04	54.89	4.99	1.137
Wheat flora	91.14	12.80	2.24	1.63	72.52	1.95	1.230
Molasses	81.49	3.12	0.32	-	67.29	10.76	0.981

Treatment and Vaccination :- All animals were examined to be free from infectious disease, treated and vaccinated before beginning of experiment as following programs in table(2).

Table (2) representing the medical programs.

Drug name	origin	Dose	Method of injection	Purpose
fazinx	Swiss	0.2 ml/kg	orally	For liver flukes
Fandex	Spanish	0.2 ml/kg	orally	For external parasite
Ivenmeetine	Spanish	0.2 ml/kg	Sub-cut	For external parasite
Co. Bagdad	Iraq	2ml	Sub-cut	entrotaximia

Experimental Programs:-Body weights of animals were recorded weekly to fix the initial weight after (14) days from beginning of experiment .The total weight increasing kg\animal was calculated by subtraction initial weight from final weight . The daily weight were obtained from total weight divided on numbers of experiment day *Sekiya et al.(2004)*. Stander hemocytometric chamber method was used for sperm viability (motility, survival index, abnormal and dead sperm) according to *WHO (1999)* with Indian link stain was using for determining sperm morphology and examined by normal warmer slide .

The Statical Analysis was computed using analysis of variance procedure described in *SAS (2001)* and significant differences among means were separated by *Duncan (1955)* multiple rang test.

Results and discussion :-

The obtained results in this study are illustrated in table (3) , there were no significant difference in initial weight among groups due to nearest weights at the beginning of experiment .

Table (3) Represent the effect of ginger extract on the weights :-

Items	Control group	Tested groups	
	G1	G2	G3
No. of animals	3	3	3
Initial weight /kg	45.5 ^a	46 ^a	45.2 ^a
Final weight / kg	51.4 ^b	56 ^a	56.6 ^a
Total weight increasing/kg	5.9 ^b	10 ^a	11.4 ^a
Daily weight gained/g	98 ^b	176 ^a	190 ^a

Means with different superscripts statistically different ($p < 0.05$)
Data presented in table 3 showed that, significant different at ($p < 0.05$) level for final weight kg/ animal in G2 (56)kg and G3 (56.6)kg as compared to control group G1 (51.4) kg. The present study confirmed that, the total weight increasing expressed the effect of ginger extract on final weight as shown in table (3) in G2 (10)kg and G3 (11.4) kg / animal with significant difference as compared to control group (5.9) kg/ animal , which represent the daily weight gain G2 (176) g/ animal and G3 (190) g / animal with significant difference as compared to control group (98) g / animal , with explanation that the G3 be standing out on G2 but with no significant difference . Findings of the research study indicated that groups receiving ginger shown better growth performance due to androgenic activity of ginger extract at 10g ,20 g and have important role on bone formation *Huang et al.(1999)* . This finding is in full agreement with that proposed by *Kamtchoving et al. (2008)* reported that ginger has effect on digestive absorption , salivary gland secretion, activity of liver , pancreas enzymes and in regulation in the digestive system ,while *Pdk(1998)* reported that ginger has high appetite activity and intestinal parasitic expeller and agreement with *Huang et al.(1999)* suggested that ginger had ability for protein and fat absorption from intestine. These result are agreement with result obtained by *Erust et al. (2000)* who reported that the medical plants additives improve the body weight gain due to increase pepsin ,trypsin, lipase, chemotrypsin and bile pigments, also other study *Lawrence et al (2000)* stated that ginger contained essential amino acid and good protein. Also *Newall (2001)* reported that growth performance was achieved by

rams fed diet containing medicinal plants and ginger extract additive improved the digestion coefficient, nutritive value and could improved gross activity of rumen microflora specially cellulolytic bacteria and may be due to role of medicinal plants as inhibitors of gram positive bacteria and could be useful improving utilization of nutrient. Results of microscopically examination for sperms parameters presented in table (4) demonstrated that there were no significant difference on individual motility in G1 , G2 and in G3 ,

Table (4) represent the viability of sperm

Sperm characteristics	G1	G2	G3
Individual motility	62.00 ^a ± 4.80	64.63 ^a ± 4.22	64.90 ^a ± 4.07
Survival index	50.76 ^b ±4.22	67.88 ^a ±3.95	68.70 ^a ±2.26
Dead spermatozoa	20.94 ^a ± 3.72	12.19 ^b ± 1.32	12.04 ^b ± 1.33
Abnormal sperm	23.65 ^a ± 3.80	16.04 ^b ±3.88	15.36 ^b ±3.19

Means with different superscripts statistically different (p<0.05).

The survival index was 67.88% in G2 and the corresponding value in G3 was 68.70% with significantly higher in comparison to value 50.76% in G1 at level (p<0.05) . In addition dead and abnormal sperms were significantly (p<0.05) lower with G2 12.19% ,16.04% , and 12.04 , 15.36% in G3 as compared to control group G1 20.94% , 23.65% respectively .This study was revealed that ginger extract has androgenic activity and useful effects on sperm parameters (survival, dead and abnormal sperm) ,these results are in agreement with *Sekiwa et al.(2000)* who reported that ginger _extract has protective effect against testicular damage and oxidative stress, and ginger contain a wide variety of both antioxidative and androgenic activity. *Amr et al.(2006)* have demonstrated that ginger treatment increased the activities of testicular antioxidants enzyme and have protective against cipstalin–induced testical damage and oxidative stress in animals .In histopathological study for seminiferous tubules *Arash et al. (2009)* indicated that animal exposed to ginger showed show the cycle of spermatogenesis was regular and regular seminiferous tubules with the normal germinal epithelium morphology and some sperm presence in the lumen of tubules and with disagreement with *Atiken et al.(1995)* who suggested that ginger extract increased significantly sperm motility and viability. In conclusion

this study considered ginger extract posses a useful effect on body performance, spermatogenesis and some sperms parameters in rams.

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دراسة تأثير إضافة مستخلص رايزومات الزنجبيل لعليقة الكباش العواسية في أوزان الحيوانات ونوعية السائل المنوي

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المعهد التقني الشرطة

الخلاصة:

أجريت الدراسة على تسعة من الكباش العواسية المحلية بعمر 1.5 سنة وبمعدل وزن حي 45.5 كغم خلال الفترة ما بين 2011/3/10 - 2011/5/20 قسمت الحيوانات إلى ثلاثة مجاميع بواقع 3 كباش في كل مجموعة بينت النتائج وجود اختلاف معنوي عند مستوى ($p < 0.05$) في الأوزان النهائية كغم/حيوان في (G2)(56), (G3) (56.6) عند مقارنتها مع مجموعة السيطرة (G1)(51.4). كما بينت النتائج وجود زيادة معنوية في الأوزان الكلية كغم/حيوان في (G2), (10) (G3) (11.4) عند مقارنتها مع مجموعة السيطرة وزيادة وزنيه يومية غم/حيوان في (G2) (176), (G3) (190) على التوالي عند مقارنتها مع مجموعة السيطرة (G1) (98) غم. وكذلك كانت الدراسة ألمجهريه للنطف عدم وجود فرق معنوي في الحركة الفردية بين المجاميع مع اختلاف معنوي عند مستوى ($p < 0.05$) في حيوية النطف والنطف الميتة والنطف المشوهة في (G2) (67.88) (12.19) (16.04) وفي (G3) (68.70) (12.04) (15.36) عند مقارنتها مع (G1) (50.76) (20.94) (23.65) على التوالي.