

**Effects of two doses of lettuce leaves powder on some blood parameters and body weight in Iraqi Awassi rams**

Atheer salih Mahdi

Department of Animal production, Faculty of Agriculture, University of Kufa,  
Republic of Iraq

[atheersm81@yahoo.com](mailto:atheersm81@yahoo.com)

**Abstract :**

Current research studied the effect of using two different doses of lettuce (*Lactuca sativa*) leaves powder 50 and 100 g / head / day to Iraqi Awassi rams, with age of 12-18 months. Twelves Awassi rams were divided randomly into three groups, as follows; Control group, which was given zero dose, second group was given 50g/ head / day, and the third group, which was given 100 g/ head / day, From 13 April, to 13 May 2015. Blood sample were collected to determine the concentration of hemoglobin (Hb), total number of red blood cells (RBCs), white blood cells (WBCs).Weights of the three experimental groups were measured at the start and the end of the experiment. Results showed that there was a significant increase ( $P<0.05$ ) on Final weight gain, total weight gain, average daily gain (ADG), and dry mater intake in Awassi rams fed lettuce leave 100 g/ head / day as compared with control. Whereas there were no significant differences ( $P>0.05$ ) in the blood hematological parameters (Hb, RBCs, and WBCs ) .

Key words: lettuce leaves, Iraqi Awassi rams, blood parameters, Body weight.

## **Introduction:**

The attitudes of recent studies towards the organization of food, used herbs and medicinal plants for the treatment of many diseases. In addition, to avoid many side effects of drugs and hormones and to provide alternative sources or support chemical drugs. Medicinal plants are one of the first compound used as natural and economic sources to increase the nutritional value and improve economical returns of production and consumer safety (2). Increased use of medicinal plants is due to the good effect of these plants in the treatment of many cases, leading to use them very widely and because they contain active ingredients with the knowledge of how they work within the body of the organism (7). Medicinal plants are considered as a major source to the medical drugs that inter in the preparation of the drug in the form of derivatives or active substances such as Flavonoids and polyphenols (29). The World

Health Organization (WHO) has identified that 80% of the plants have a medical use. These medical benefits summed up in being one of the growth promoters (5) and antioxidants (30). It stimulates the functions of the digestive system by increasing digestive enzymes production, and promote liver, pancreas and the small intestine effectiveness. Control the formation of bile by reducing their secretions. It also helps reduce fat levels in blood serum, and improves the immune status (25). Lettuce (*Lactuca sativa*) leaves have been chosen for this experiment, because it was considered as the best leafy vegetables, where its leaves contain 95% water with little energy level. It is also contain vitamins B1, B2, C and E, carotene, potassium, calcium and iron in addition to many other nutrients, but in smaller amounts (10). Lettuce leaves contain special compounds called Lactucierins, which stimulates the thyroid function. It is also contains

mustard glycosides, fibers and folic acid (11,21). Lettuce leaves are good source of phenolic acid have antioxidant properties and disincentive for cancer (13). Therefore, this study aimed to evaluate the role of two dose of lettuce leaves powder on life body weight of rams, concentrations of hemoglobin(Hb), total red blood cells count (RBCs), and white blood cells count (WBCs).

### **Materials and Methods:**

This experiment was conduct in the Animal Farm at Department of Animal Production, Faculty of Agriculture, University of Kufa, from 13April to 13 May, 2015. Twelves Awassi rams were used with age of 12-18 month. Rams were divided randomly into three equal groups 4 rams per each. The first was group zero dose considered as control, the second and third group were given lettuce leaves powder at rate of 50 and 100 g/head/ day respectively.

lettuce leaves (*Lactuca sativa*) were collected and dried at room temperature, powdered and dissolved in a half liter of water and offered to animals in treatments group 2 and 3, orally by raising the ram head slightly upwards and opened his mouth, using the mouth speculum pouring material inside and waiting until the process of drench was complete.

The experimental ram groups were placed in the half-open barn. They subjected to the same nutritional and environmental circumstances. The concentration diets offered at 2% of live body weight, with two equal meals at 7:00 am and 4:00 pm. Concentrate diet composed of 37% barley grain, 35% wheat bran, 20% yellow corn, 5% soybean meal, 2% limestone and 1% salt. Diet contained % 14.12 crude protein. Alfalfa hay was offered *ad libitum* (Table 1). Drinking water and mineral salts templates were available to the animals for the duration of the experiment.

Animals were weighted at the start and at the end of the experiment. While feed intake were recorded daily before next morning feeding. Blood samples were collected at the start and at the end of the experiment from all rams in the morning. Blood withdrawn from jugular vein and transferred into tube contains heparin to determine the concentration of hemoglobin (Hb), total number of red blood cells (RBCs), and white blood cells (WBCs) using veterinary blood analysis device of GENEX types for the duration of the experiment.

### Statistical analysis

All data analysis was performed using SPSS software program (27). All values were expressed as mean  $\pm$  standard error of mean (SEM). Differences between means were considered significant at  $P < 0.05$  under a following model:  $Y_{ij} = \mu + T_i + e_{ij}$  Where is:  $Y_{ij}$ = the observation  $j$  and treatment  $i$ ,  $\mu$ =overall means,  $T_i$ = Effect

treatment ( $G_0$ ,  $G_1$ ,  $G_2$ ) gm/head/day.  $e_{ij}$ : random error.

### Results and Discussion:

Data in table (2) revealed that there were no significant differences ( $P>0.05$ ) among treatment groups on Hemoglobin concentration (Hb), red blood cells counts (RBCs), and white blood cells count (WBCs). Although there is no significant difference on Hb concentration in blood of rams fed on lettuce leaves, but rams fed 100 g/day of lettuce leave powder were numerically superior on Hb concentration at the end of experiment compared with control. Similar trend were happened with RBCs, but there is a numerical superior in treatments groups with lettuce leaves at last day of trail as compared with control group (0 g/day). This result may due to the increase of level of total antioxidant in serum samples to significant levels caused by lettuce dose, which is agreed with Al-Rawi (2012) (2). Antioxidant

**Table (1) Chemical composition of concentrate diet, Alfalfa hay, and lettuce (on DM% Basis)**

Items	Concentrate diet *	Alfalfa hay**	Lettuce**
Dry Matter (DM)%	91.66	84.23	7.29
Crude protein(CP)%	14.12	17.93	17.13
Ether extract (EE)%	3.24	1.59	2.98
Crude fiber (CF)%	7.52	26.00	11.62
Ash %	6.68	11.52	11.60
Nitrogen free extract(NFE) % **	68.44	42.96	62.07

\* Calculated from chemical analysis table for Iraqi feedstuffs (17)

\*\* obtained from chemical analysis table for Iraqi feedstuffs (17)

\*\*\* Nitrogen free extract was calculated = 100-(CP%+EE%+CF%+Ash %)

**Table (2) Effect of lettuce leaves powder on some hematological blood parameter of Awassi rams (Mean  $\pm$ S.E.)**

groups	Time of sampling	Hb (g/dl)	RBCs( $\times 10^{12}/l$ )	WBCs( $\times 10^9/l$ )
G <sub>1</sub> control	Day 0	8.25 $\pm$ 0.85	3.45 $\pm$ 0.82	8.51 $\pm$ 0.60
	Day 30	9.35 $\pm$ 1.05	3.40 $\pm$ 0.45	8.20 $\pm$ 0.90
G <sub>2</sub> 50g/head/day	Day 0	9.40 $\pm$ 0.25	4.57 $\pm$ 0.70	8.40 $\pm$ 1.10
	Day 30	9.60 $\pm$ 0.50	4.95 $\pm$ 0.43	8.35 $\pm$ 0.95
G <sub>3</sub> 100g/head/day	Day 0	9.50 $\pm$ 0.20	5.16 $\pm$ 0.52	7.95 $\pm$ 0.55
	Day 30	9.80 $\pm$ 0.10	5.39 $\pm$ 1.30	7.55 $\pm$ 0.25
Significant		NS	NS	NS

NS=Non significant; Hb= Hemoglobin; RBCs= Red blood cells; WBCs= White blood cells

activity of lettuce has reported to prevent chronic diseases related to oxidative stress, such as cancer, and made a defense systems plays a key role in protecting against oxidative tissue damage ( 8, 13 and 20). or may be due to the lettuce leaves contain iron (10) Data in table (2) also shows there is no significant difference on WBCs in rams fed lettuce leaves at the end of trail compared with control. The lowest value of WBCs was recorded in lambs fed 100 g/day of lettuce leave powder at last day of experiment as compared with other groups. This finding may be due to that lettuce contains Lettucenin-A(4 and 19). Bennett et al. (4) reported that lettuce accumulate Lettucenin -A during its life, which is highly antimicrobial. It was effective against some Gram-negative and Gram-positive bacteria (25). Moreover, Sayyah *et al.* (26) reported that lettuce exhibited antiviral activity in mice. The blood hematological parameters, obtained in this study were within the normal

physiological ranges on Iraqi Awassi male sheep (1, 2).

Data in table (3) showed the effect addition of lettuce leaves powder on growth performance and dry matter intake in Awassi rams during the experiment period. There were significant ( $P<0.05$ ) increases in the final weight, total weight gain, average daily gain (ADG) and total dry matter intake (TDMI) in rams fed lettuce leaves powder (50 and 100g/day) as compared with the control group. While, there were no significant difference ( $P>0.05$ ) on feed conversion ratio (FCR) among treatment groups. The significant increase total gain, ADG in Awassi rams fed lettuce leaves powder may be due to be because lettuce leaves contains an active constituents, which improve the rumen environment and increase protein creation. Which was explained by Hefnawy (2013), who referred that lettuce have a respectful amount of flavonoids and saponins (16). Cheeke (6) and Francis *et al.* (12) reported that the

dietary saponins to ruminant and other domesticated animals have significant effects on all phases of metabolism, from the ingesting of feeds to the excretion of wastes. These saponins present in medical herbs have been found to improve growth, feed efficiency in ruminants by reducing protozoa count in rumen (9 and 12). Flavonoids and saponins also play important role in manipulation rumen microbial fermentation towards reduce methane production and improve animal performance (9, 12, 18 and 22). The significant increase on dry matter intake in the present study, may be due to that lettuce leaves contain considerable amount of vitamin E. Moreover, its effect on increase sheep palatability and then increase body weight and improve health status (28). The obtained results are in accordance with those reported by Al-Fatyin and Al-Saigh (1), they found that the addition of vitamin E and *Eruca sativa* led to significant increase

Awassi lambs weight as compared with control group with no addition. Presence of high amount of carotene, vitamin E and C in lettuce (14), which was best known as a cofactor for: prolyl and lysyl oxidases in the synthesis of collagen (18). The significant increase on total dry matter intake in the present study may be due also to enhance the digestibility of the ration. Arias *et al.* (3) reported that *in vitro* dry matter digestibility of lettuce leaves was 71.2% using rumen liquor withdrawn from cow. Lettuce is also a herb of common food possesses sedative, hypnotic, analgesic, anticonvulsant, hypoglycemic and significantly raised the number of colonies by protecting the bacteria from oxidative damage (19). In addition, lettuce play important role as antioxidant (15, 24 and 25). Lettuce also used for the treatment of stomach problems, to stimulate digestion and to enhance appetite and relieve inflammation (4).



**Table (3) Effect of lettuce leaves powder on growth performance of Awassi rams (Mean  $\pm$ SE)**

Growth performance	G <sub>1</sub> Control	G <sub>2</sub> 50g /head/day	G <sub>3</sub> 100g /head/day	Sig .
Initial body weight (Kg)	29.50 $\pm 1.70$	30.50 $\pm 1.36$	30.50 $\pm 1.46$	NS
Final body weight (Kg)	32.25 $\pm 1.25^b$	34.75 $\pm 0.86^a$	35.37 $\pm 1.24^a$	*
Total weight gain (Kg)	2.75 $\pm 1.16^b$	4.25 $\pm 0.32^a$	4.87 $\pm 0.06^a$	*
Average daily gain (ADG) (g/day)	91.67 $\pm 3.66^c$	141.67 $\pm 2.07^{ab}$	162.33 $\pm 2.30^a$	*
Total dry matter intake (TDMI) (g/day)	733.30 $\pm 3.34^b$	1090.83 $\pm 1.07^a$	1185.03 $\pm 2.32^a$	*
Feed conversion ratio (FCR) (g TDMI/g ADG)	8.0 $\pm 1.34$	7.9 $\pm 1.18$	7.3 $\pm 0.80$	NS

Means within the same row with different subscripts differ ( $P < 0.05$ ); NS= not significant;

\*= Significant ( $P < 0.05$ ).

**References**

1. Al-Fatyin, M. H. S. and M.N.R. Al-Saigh 2009. Effect of adding *Eruca sativa* L. seed and Vit. E. on the diet of male Awassi lambs on some productive trail. J. Vet. Med.,33(2):50-61.
2. Al-Rawi, S.T.J. and M.N.R. Al-Saigh.2012.Effect of using *Zingiber officinale* and Vitamin E on some reproductive traits of Awassi male lamb. Iraqi J. Vet. Med., 36 special issue (1): 134-141.
3. Arias, L.; J. Contreras ;H. Losada; D. Grande; R. Soriano; J. Vieyra ; J. Cortés and Rivera, J. 2003. A note on the chemical composition and *in vitro* digestibility of common vegetables utilized in urban dairy systems of the east of Mexico City. Livest Res. Rural Develop. 15, Article ID 21
4. Bennett, M.H.; M.D.S. Gallagher, C.S. Bestwick; J.T. Rossiter and Mansfield J.W. 1994. The phytoalexin response of lettuce to challenge by *Botrytis cinerea*, *Bremia lactucae* and *Pseudomonas syringae* pv. *phaseolicola*. Physiol. Mol. Plant. Path., 44:321-333.
5. Cabuk, M.; A. Alcicek ; M. Bozkurt and Imre, N. 2003. Antimicrobial properties of the essential oils isolated from aromatic plants and using possibility as alternative feed additives. 11.National Animal Nutrition Congress, 18-20 September, pp184-187.
6. Cheeke P.R. 1996. Biological effects of feed and forage saponins and their impact on animal production. In Saponins Used in Food and Agriculture. In G. R. Waller and Y. Yamasaki,

<http://www.lrrd.org/lrrd15/2/aria152.htm>.

- editors. Plenum Press New York. USA. pp. 377–386.
7. Chevallier A.1996. The Encyclopedia of Medicinal Plants. Dorling Kindersley, London, UK, pp11-12.
8. Chu, Y.F.; J. Sun and Liu, R. H. 2002. Antioxidant and ant proliferative activities of common vegetables. J Agric. Food Chemist., 50: 6910-6919.
9. Das, T.K.; D. Banerjee; D. Chakraborty; M.C. Pakhira; B. Shrivastava and Kuhad, R.C. 2012. Saponin: Role in Animal system, Veterinary World, 5: 248-254.
10. Dzida, K.; Z. Jarosz; Z. Michałojć, Nurzyńska-Wierdak, R. 2012 .The influence of diversified nitrogen and liming fertilization on the yield and biological value of lettuce. Acta Sci. Pol., Hortorum Cultus., 11(3), 239-246
11. Edziri, H.L., M.A. Smach; S. Ammar; M.A. Mahjoub; Z. Mighri; M. Aouni and Mastouri, M. 2011. Antioxidant, antibacterial, and antiviral effects of Lactuca sativa extracts. Ind. Crops Prod.,34(1): 1182-1185.
12. Francis, G.; Z. Kerem; P. Harinder and Becker, K. 2002. The biological action of saponins in animal systems: a review. Brit. J. Nut., 88: 587-605.
13. Gaikwad, Y.B; S.M. Gaikwad and Bhawane, G.P. 2010. Effect of induced oxidative stress and herbal extracts on acid phosphatase activity in lysosomal and microsomal fractions of midgut tissue of the silkworm, Bombyx mori. J. Insect Sci., 10: 113-116.
14. Garg, M.; C. Garg; P.K. Mukherjee and Suresh,

- B.2004. Antioxidant potential of *Lactuca sativa* L.. Ancient Science of Life, XXVI (1):6-10.
15. Gropper, S.S.; J.L. Smith and Grodd, J.L.2005. Advanced nutrition and human metabolism.4<sup>th</sup> ed. Belmont, CA: Thomson Wadsworth. USA. pp. 260–275.
16. Hefnawy, H.T.M. and M.F. Ramadan. 2013. Protective effects of *Lactuca sativa* ethanolic extract on carbon tetrachloride induced oxidative damage in rats. Asian Pac. J. Trop. Dis., 3(4): 277–285.
17. Khawaja, A.K.;S.A. Matti; R.F. Asadi; K. M. Mokhtar and Aboona S.H. 1978.The composition and nutritive value of Iraqi feed stuff. Division Publication. Ministry of Agriculture. Iraq.
18. Kivirikko, K.I. and R. Myllylä .1985. Post-translational processing of procollagens. Annals of the New York Academy of Sciences. 460: 187–201.
19. Mohammad, S.; N. Hadidi and Kamalinejad, M. 2004. Analgesic and anti-inflammatory activity of *Lactuca sativa* L. seed extract in rats. J. of Ethnopharmacology, 92: 325-329 .
20. Mulabagal, V.; M. Ngouajio; A. Nair; Y. Zhang; A.L. Gottumukkala and Nair, M.G. 2010. *In vitro* evaluation of red and green lettuce (*Lactuca sativa* L.) for functional food properties. Food Chem,118:300-306.
21. Nicolle C.; A. Carnat; D. Fraisse; J.L. Lamaison; E. Rock; H. Michel; P. Amouroux and Remesy, Ch. 2004. Characterization and variation of antioxidant micronutrients in lettuce (*Lactuca sativafolium* L.). J. Sci.

- Food Agric., 84: 2061–2069.
22. Oskoueian, E; N. Abdullah and Oskoueian, A. 2013. Effects of flavonoids on rumen fermentation activity, methane production and microbial population. Bio Med Res. Int., 2013: Article ID 349129, 8 pages.
  23. Patra, A.K. and J. Saxena. 2010. A new perspective on the use of plant secondary metabolites to inhibit methanogenesis in the rumen, Phytochemistry, 71(12):1198-1222.
  24. Peterkofsky, B.1991. Ascorbate requirement for hydroxylation and secretion of procollagen: relationship to inhibition of collagen synthesis in scurvy. Am. J. Clin. Nutr., 54 (6 Suppl): 1135–1140.
  25. Rahman, I.P. and P.T. Lowe. 2006 .Effect of dietary supplementation with oregano essential oil on performance of broilers after experimental infection with *Eimeria tenella*. Archive Tierernahrung, 57:99-106.
  26. Sayyah, M.; N. Hadidi and Kamalinejad, M. 2004. Analgesic and anti-inflammatory activity of *Lactuca sativa* L. seed extract in rats. J. of Ethnopharmacolog, 92: 325-329.
  27. SPSS. 2008. Statistical package of social science, version 16.users guide for statistical, Chicago. USA.
  28. Stephens, L.C.; A.E. Mc Chesney and Nockels, C.F. 1979. Improved recovery of vitamin E. treated lambs that have been experimentally infected with intratracheal Chlamydia. Br. Vet. J.,135:219-293.
  29. Tipu, L.A.; T.N. Pasha and Ali, Z. 2006.Comparative efficacy of salinomycin

sodium and neeni fruit  
(*Aadii acht indica*) as feed  
additive anticoccidials in  
broilers .In. J. Poult.  
Sd.,1(4): 91-93.

30. Wangenstein, H; A.B.  
Samuelsen and Malterud,  
K.E. 2004.Antioxidant  
activity in extracts from  
coriander. Food Chemistry,  
88:293-29.

**تأثير استخدام جرعتين من مسحوق اوراق الخس على بعض المعايير الدموية ووزن الجسم  
للكباش العواسية العراقية**

اثير صالح مهدي

قسم الانتاج الحيواني -كلية الزراعة – جامعة الكوفة – جمهورية العراق

**المستخلص:**

درس البحث الحالي تأثير استخدام جرعتين مختلفتين من مسحوق اوراق الخس 50 و100ملغم اراس ايوم الى الكباش العواسية العراقية بعمر 12-18 شهراً ، أثني عشر كبشا عواسيا تم تقسيمها بصورة عشوائية على ثلاثة مجاميع بصورة عشوائية وكالاتي: المجموعة الأولى مجموعة سيطرة، المجموعة الثانية أعطيت 50 غم اراس اليوم، والمجموعة الثالثة أعطيت 100 غم اراس اليوم. للمدة من 13 نيسان ولغاية 13 ايار 2015. وتم جمع عينات الدم لقياس تركيز الهيموغلوبين وحساب العدد الكلي لخلايا الدم الحمر والعدد الكلي لخلايا الدم البيض. وتم وزن الحيوانات في المجاميع التجريبية الثلاث في بداية التجربة ونهايتها. اظهرت النتائج وجود زيادة معنوية ( $P < 0.05$ ) في الوزن النهائي والزيادة الوزنية الكلية ومعدل الزيادة الوزنية اليومية والمتناول الكلي من المادة الجافة في الاكباش العواسية المغذاة على مسحوق اوراق الخس في مجموعة 100 غم مقارنة بالسيطرة. فيما لم يلاحظ وجود اختلافات معنوية في معايير الدم (تركيز الهيموغلوبين وعدد كريات الدم الحمراء وكريات الدم البيضاء).

الكلمات المفتاحية: اوراق الخس، الكباش العواسية العراقية، صفات الدم، وزن الجسم.