EFFECT OF MORINGA OLEIFERA LEAF MEAL ON NUTRIENTS DIGESTIBILITY, BLOOD COMPOSITION, CARCASS CHARACTERISTICS AND GROWTH OF NEW ZEALAND WHITE RABBITS

H.A.F. Rahmy; S. Allam and Randa, R. El-Elaime

Animal Production Department, Faculty of Agriculture, Cairo University, 12613, Giza, Egypt.

(Received 1/12/2023, accepted 21/12/2023)

SUMMARY

The aim of this study was to compare the effect of adding :10g of *Moringa oleifera* leaf meal /head /day (T2), 20g of *Moringa oleifera* leaf meal /head /day (T3), 30g of *Moringa oleifera* leaf meal head /day (T4), versus an supplemented ration (T1) control group which consists of 70% concentrate and 30% alfalfa hay on the nutrient digestibility, carcass characteristics, blood composition and growth performance of New Zealand White rabbits. The study involved 48 growing New Zealand White rabbits aged about 6 weeks divided into four experimental treatments (12 rabbits per treatment), each in four replicates. The obtained results revealed that final body weight and body weight gain significantly increased in T3 and T4 compared to T2 and the control. Rabbits in the T3 and T4 groups consumed a higher amount of feed compared to the other groups. The experimental groups had no significant differences in feed conversion ratio and carcass traits. Adding different levels of *Moringa oleifera* leaf meal improved nutrients digestibility (DM, OM, EE, and NFE) and nutritive values as TDN, DCP compared with control group. Furthermore, The WBC, PCV, and Hemoglobin values were affected by dietary treatments with significant differences ($p < 0.05$). Referring to the obtained result, it could be recommended that feeding growing rabbits with 20g of *Moringa oleifera* leaf meal /head /day (T3), 30g of *Moringa oleifera* leaf meal head /day (T4) which improved economic efficiency and growth performance without harming the health of rabbits.

Keywords: *Moringa, growth, digestibility, carcass, feed intake, NZW rabbits*

INTRODUCTION

The development of low-cost substitute feed sources to augment or swap out grain or protein sources in rabbit diets is necessary to increase the profitability of rabbit farming and attract small-scale company owners. One of the main issues in both industrialised and developing nations is the high expense of the plant protein sources that are traditionally used. One plant in the Moringaceae family that grows well in a range of soil types is *Moringa oleifera*.

Since *Moringa oleifera* leaves have more than twice the protein content of spinach (2.8 g/100 g fresh weight), they are a natural source of protein with a lot of promise (Olugbemi *et al*., 2010). Furthermore, according to Ozumba (2000), *Moringa oleifera* leaves have twice the protein in milk, four times the calcium in milk, seven times the vitamin C in oranges, three times the potassium in bananas, and four times the vitamin A in carrots. In addition to having all of the essential amino acids plus magnesium, potassium, and other nutrients, therefore, moringa leaves may be considered the best vegetable in tropical climates. According to El-Harairy *et al.* (2016), phytochemical tests have revealed that the plant's leaves are abundant in numerous nutrients and antioxidants, including vitamin C, flavonoids, and β-carotene. These attributes offer the plant a unique potential for a range of home uses.

In growing rabbits, particularly after weaning, digestive disturbances are the main cause of the morbidity and mortality that create important economic losses for rabbit farmers (Marlier *et al*., 2006; Licois, 2004). Weaning is the period in which the kits are separated from their mothers, milk is substituted with solid feed, and the kits' immune system is still immature (Carabaño *et al*., 2006; Gidenne *et al*., 2005).

The objective of the study was to determine the growth response of weaned rabbits fed *Moringa oleifera* leaf meal.

MATERIALS AND METHODS

The experiment was conducted in Rabbits Experimental Unit, Animal Production Department, Faculty of Agriculture, Cairo University, Giza, Egypt. This study was carried out after obtaining ethical approval from the Animal Production Research Institute, Egypt. The experiments were in compliance with the guidelines of Institutional Animal Care and Use Committees (IACUCs).

Feeding trials:

Experimental rations:

All animals were fed on the control ration that consisted of 70% concentrate feed mixture (CFM) and 30% alfalfa hay , respectively. Concentrate feed mixture (CFM) consisted of barley 17.5% , yellow corn grain 9%, soya bean meal 14 % ,wheat bran 25 % , sodium chloride 0.3 %, Di-calcium phosphate 1.8 %, minerals and vitamins mixture 1 %, anti-coccidia and fungi 0.20 and molasses 1%.

The experimental groups were fed on:
T1 (Control) without adding Moringa oleifera leaf meal.
T2 (Control +10 g Moringa oleifera leaf meal /h / day).
T3 (Control +20 g Moringa oleifera leaf meal /h / day).
T4 (Control +30 g Moringa oleifera leaf meal /h / day).

According to AOAC (2000), feed ingredients were obtained in fresh form from fields in the Giza governorate, sun-dried, hammer-milled, and chemically analyzed. Digestible Energy (DE) was calculated according to Schneider and Flatt (1975). DE (kcal/kg) = 4.36 – 0.049 * [28.924 + 0.657 (CF %)].

The components were combined and pelleted at Cairo University's Faculty of Agriculture plant. In order to satisfy all of the vital nutrient needs of developing rabbits, all experimental diets (Table 1) were designed to be isonitrogenous and isocaloric (Lebas, 2004). *Ad libitum* supplies of fresh water and meals were given out.

Table (1): Chemical analysis of experimental ration, on DM basis.

Item	TMR
DM (%)	90.50
OM (%)	92.83
CP (%)	17.20
CF (%)	13.87
EE (%)	2.17
NFE (%)	59.59
DE (kcal/kg2)	2.49
Calcium (%)	0.96
Total phosphors (%)	0.86

*TMR**:** Total mixed ration DM: Dry Matter, OM: Organic Matter, CP: Crude Protein, CF: Crude fiber, EE: Ether Extract, NFE: Nitrogen Free Extract.*

Experimental animals:

This study involved 48 growing New Zealand White rabbits aged about 6 weeks divided into four experimental treatments (12 rabbits per treatment), each in four replicates.

Experimental management and data collection:

All rabbits were kept under the same managerial and hygienic conditions and housed in metal battery cages supplied with separated feeders. All rabbits were kept under veterinary control and vaccinated against rabbit hemorrhagic disease and rabbit pasteurellosis. Final body weight (FBW), feed intake (FI), and body weight gain (BWG) were recorded weekly. Feed conversion ratio (FCR) was calculated as FI divided by BWG during the whole experimental period.

Rabbits were used in the digestion trial and divided into 4 groups. Rabbits were placed in individual metabolism cages (56×38×28 cm). Feces were collected daily before the morning meal and weighed fresh and dried at 60 °C for 24 h in an air-drying oven (Perenz *et al*., 1995). Using a 4 mm mesh for collecting feces and a lower polyethylene layer to collect urine into a 1-liter bottle, the two materials were collected separately. Each rabbit's urine was collected and stored separately in a plastic container. To prevent nitrogen volatilization, 100 millilitres of 50% sulphuric acid (H2SO4) was added to the container. After the feces were dried for 24 hours at 70° C, the ground samples were stored for chemical analysis. The experimental diets and feces were prepared to determine moisture, ash, nitrogen, Ether Extract (EE), and Crude Fiber (CF), according to AOAC (2000). Data of quantities and chemical analysis of feed and feces were used to calculate the nutrient digestion coefficients and nutritive value for each dietary treatment, as described by Fekete (1985).

Digestion coefficients were determined using the AIA method (the acid-insoluble ash) as described by Lee and Hristov (2013) using the following formula:

$$\text{Digestion coefficient} = 100 - \left[100 \times \frac{\%\ \text{idicator in feed}}{\%\ \text{indicator in feces}} \times \frac{\%\ \text{nutrient in feces}}{\%\ \text{nutrient in feed}}\right]$$

The nutritive values of the diets (TDN and DCP) were calculated as recommended by Cheeke et al. (1982). Digestible energy was calculated as described by Schneider and Flatt (1975) as follow:

DE (kcal/kg) TDN * 44.3

At the end of the growing period (14 weeks of age), Blood (5 ml) was sampled during the slaughtering into a test tube containing ethylene diamine tetra-acetic acid (EDTA) as anticoagulant (Radostits *et al*.,1994) for the blood parameters assay. Three rabbits were taken randomly from each treatment. The rabbits fasted about 16 hours before slaughtering and individually weighed as pre-slaughtering weight. Animals were slaughtered according to the Islamic religion instructions with a sharp knife. The empty carcass was weighed without head and giblets. The giblets (liver, heart, and kidneys) were separated and weighed. The edible giblets percentage, total edible parts (TEP) and dressing percentage were calculated according to the following equations presented by Steven *et al*. (1981):

Dressing percentage (%) = (carcass weight/ pre-slaughter weight) × 100

Economic efficiency:

According to the price at the time of the experiment, the total cost and selling price were computed in Egyptian pounds; in February 2023, the cost of one kilograms of live body weight was 90 LE.

The economic efficiency was calculated according to the following equation:

Economic efficiency = Net revenue / total costs

Net revenue = (selling price/rabbit) – (total costs/rabbit).

Relative Economic efficiency = (Economic efficiency of treatment / Economic efficiency of control) x 100

Statistical analysis:

General Linear Models (GLM) were used in a statistical analysis of the data using the SAS computer program from (SAS, 2004). Tests of significance were conducted between treatment means at (P≤0.005), utilizing the New Multiple Rang Test developed by Duncan (1955).

RESULTS AND DISCUSSION

Digestion coefficients of nutrients and nutritive value of experimental treatments:

Data in table 2 displayed the nutritional value and digestion coefficients impacted by the experimental diets. Among the several experimental diets, there were significant differences (p < 0.05) in the DM, OM, EE, and NFE , however, CP and CF's digestibility remained unaffected. In rabbits fed MOLM, the amount of digestible crude protein rose considerably (p<0.05). When compared to other diets, rabbits fed high amounts of MOLM (T3 and T4) had significantly (p < 0.05) higher Total Digestible Nutrients (TDN) and DE. The digestibility of DM, OM, and NFE varied significantly (p<0.05) among the MOLM substitution levels. The TDN and DE in the T3 and T4 groups that were fed MOLM were considerably (p <0.05) higher than those in the other groups.

Table (2): Nutrient digestibility of growing rabbits fed different experimental diets.

Item	Experimental group				SEM	P value
	T1	T2	T3	T4		
DM	60.15^{d}	61.81^{c}	64.76^{b}	67.18^{a}	0.16	0.025
OM	63.60^{c}	62.07^{c}	66.70^{ab}	68.70^{a}	0.26	0.020
CP	75.15	75.24	75.59	76.19	2.17	0.300
CF	44.82	45.21	45.47	44.68	1.02	0.318
EE	75.27^{bc}	73.03^{c}	75.69^{b}	78.16^{a}	0.35	0.046
NFE	73.73^{c}	72.19^{cd}	78.51^{b}	81.63^{a}	0.28	0.021
Nutritive value						
DCP	12.92^{ab}	12.94^{b}	13.00^{a}	13.10^{a}	0.24	0.030
TDN %	65.22^{b}	62.87^{c}	68.12^{a}	67.14^{a}	0.15	0.040
DE Kcal/kg	2892.70^{b}	2788.19^{c}	3018.85^{a}	2977.93^{a}	3.4	0.050

*T1, control diet without MOLM; ,10g of Moringa oleifera leaf meal /head /day (T2), 20g of Moringa oleifera leaf meal /head /day (T3), 30g of Moringa oleifera leaf meal head /day (T4) *a, b: Means in the same row bearing different superscript are significantly different (P <0.05).*

Blood parameters:

All blood parameters in table 3 showed significant difference (P<0.05) between the rabbits, with the exception of hemoglobin, packed cell volume (PCV), and white blood cell (WBC). Although all of the values were within the normal range for rabbits, the control diet-fed rabbits had higher hemoglobin concentration and PCV than the other treatments. This result in agreement with (Medirabbit, 2011), who reported that despite being higher in the rabbits fed the tested diets, the WBC was still within the usual range of 5-19 * 10/L. However, was greater in the diets containing MOLM compared to the control. In general, the hemoglobin levels measured in this study were comparable to those previously documented by Ansah *et al*. (2014) for rabbits kept in the same agro-ecological zones and given agro-industrial byproducts. Moreover, cholesterol, total protein, albumin and Globulin were recorded in the normal range without any significant difference between the experimental groups.

Table (3): Blood parameters for growing rabbits fed different experimental diets.

Parameter	Experimental group				SEM	P value
	T1	T2	T3	T4		
WBC(×109L)	6.63^{c}	8.83^{b}	9.17^{b}	9.57^{a}	0.04	0.047
PCV (%)	41.23^{b}	35.73^{a}	37.77^{ab}	35.77^{a}	0.03	0.013
RBC(×1012L)	5.25	5.17	5.78	5.29	0.032	0.609
Hemoglobin (g/dL)	13.27^{b}	11.47^{a}	12.30^{ab}	11.83^{a}	0.581	0.034
Lymphocytes (%)	68.6	44.3	48.8	46.1	2.3	0.625
Cholesterol (mg/dl)	35	36	35.5	35	1.6	0.091
Total protein (g/dl)	6.2	6.5	6.6	6.5	0.03	0.086
Albumin (g/dl)	3.5	3.7	3.8	3.7	0.08	0.384
Globulin (g/dl)	2.7	2.8	2.8	2.8	2.5	0.572

*T1, control diet without MOLM; ,10g of Moringa oleifera leaf meal /head /day (T2), 20g of Moringa oleifera leaf meal /head /day (T3), 30g of Moringa oleifera leaf meal head /day (T4)*a, b: Means in the same column bearing different superscript are significantly different (P<0.005).*

Carcass characteristics:

Data in table 4 presented data indicating that there were no significant differences found in any of the carcass features, Body weight gain and feed conversion ratio between the experimental groups, with the exception of dressing percentages and the improvement in carcass weight (P<0.05). These result in agreement with Ahmed 2017 who found that the dietary therapy of New Zealand-developing rabbits with 12.5 and 19% MLM improved dressing percentage considerably (P<0.05). In comparison to the results of the current investigation, he achieved a lower dressing percentage (52.34, 54.04, and 53.435 with the control, 12.5, and 19% groups, respectively). Furthermore, as reviewed and discussed by Abd-Allah (2017), the results of this experiment are consistent with the conclusions of multiple writers, who determined that *Moringa oleifera* can be added to the diets of growing rabbits without having a negative impact on the weights of the carcass and organs. These results are in accordance with the finding of Sulliman *et al.* (2016) who found that hot carcass weight and dressing percentage of lambs that fed rations supplemented with *Moringa olifera* were higher than those fed control ration. Also, the finding that supplementation with *Moringa olifera* leaves in rabbit feeding increases carcass weight and slaughter weight and improved growth performance (William *et al.*, 2023) and Bhatt *et al*. (2023).

Table (4): Features of the carcasses and the percentage of carcass weight attained by the rabbits fed varying amounts of Moringa oleifera leaf meal.

Experimetal groups	Live weight (g)	Carcass weight (g)	Head weight (g	Liver weight (g)	Heart weight (g)	Kidney weight (g)	Abdomen fat weight (g)	Dressing percentage*
T1	2125.25	1270.25	126.87	87.23	7.40	12.97	11.19	59.88[b]
T2	2184.00	1362.75	126.01	97.41	7.26	15.00	13.54	62.41[a]
T3	2219.00	1389.00	126.63	105.75	7.37	17.10	15.61	62.60[a]
T4	2221.00	1390.00	126.53	105.65	7.37	16.98	15.35	62.62[a]
SEM	111.58	64.44	5.45	10.12	0.45	0.72	2.54	0.60
P value	0.0959	0.068	0.0589	0.065	0.097	0.089	0.097	0.021

*T1, control diet without MOLM; ,10g of Moringa oleifera leaf meal /head /day (T2), 20g of Moringa oleifera leaf meal /head /day (T3), 30g of Moringa oleifera leaf meal head /day (T4) *a, b: Means in the same row bearing different superscript are significantly different (P<0.005).*

Performance characteristics:

Data in table 5 presented that the MOLM level increased in tandem with an increase in the Feed intake (FI) and Body weight gain (BWG), although there was no statistically significant difference in the treatment means (P>0.05). Along with the rise in MOLM level, the daily FI and FCR values also improved, however, the treatment differences were not statistically significant (P>0,05). Along with the rise in MOLM level, the daily BWG also increased, and the control group (T1) did not do well (p<0.05). in contrast to those who were fed the inclusive diets of MOLM. The cost per utilized feed unit went up due to the MOLM. No animals perished in the experiment. This claim is generally supported by the report of (Odetola *et al.,* 2012), which found that higher FI was associated with a higher level of CF in rabbit diets. A possible contributing factor to the observed increase in FI could be the higher palatability of the MOLM meals in contrast to the control diet.

Table (5): The parameters of performance in weaned rabbits fed dried MOLM

Experimental groups	FI (g/head/day)	BWG (g/head/day)	FCR
T1(Control)	104.96	18.87	5.57
T2	109.06	21.35	4.85
T3	108.34	20.60	5.07
T4	106.04	20.51	5.05
SEM	0.05	0.93	0.28
P value	0.829	0.715	0.084

T1, control diet without MOLM; ,10g of Moringa oleifera leaf meal /head /day (T2), 20g of Moringa oleifera leaf meal /head /day (T3), 30g of Moringa oleifera leaf meal head /day (T4).

Economic efficiency:

The economic analysis of including MOLM into the diets of weaned rabbits was shown by the data in Table (6). The total feed intake (kg/rabbits) of growing rabbits increased non-significantly in T2, T3 and T4 groups as compared to T1 group (control). The total feed cost per rabbit reduced as the amount of moringa in the weaned rabbits' diets, but the total return per rabbit, net return, economic efficiency, and relative economic efficiency all increased and showed the highest results with T4, which was followed by T3 and T2, in that order. From an economic perspective, the current study's findings generally concur with those of Owen *et al*. (2013), who examined the economics of rearing rabbits by substituting *Moringa oleifera* leaf meal for soybeans in the rabbits' diet. Furthermore, Abd-Allah (2017) found that feeding NZW rabbits moringa hay at levels of 10 and 15% increased their economic efficiency and relative economic efficiency.

Table (6): Economic efficiency attained by the rabbits fed varying amounts of Moringa oleifera leaf meal.

Parameter	Experimental group			
	T1	T2	T3	T4
Price of weaned rabbit (LE)	40	40	40	40
Total average weight (kg)	1.45	1.56	1.59	1.68
Price of 1 kg body weight (LE)	90	90	90	90
Selling price/rabbit (LE)	130.5	140.4	143.1	151.2
Total feed intake (kg)	4.44	4.76	4.83	4.58
Price/kg feed(LE)	12.15	11.75	11.50	11.35
Total feed cost/rabbit (LE)	53.94	55.93	55.54	51.98
Total costs/rabbit	44.4	44.76	44.83	44.58
Net revenue(LE)	86.1	95.64	98.27	106.62
Economic efficiency (ratio)	1.93^{c}	2.13^{b}	2.19^{b}	2.39^{a}
Relative economical efficiency (%)	--	106.4	111.04	134.5

T1, control diet without MOLM; ,10g of *Moringa oleifera* leaf meal /head /day (T2), 20g of *Moringa oleifera* leaf meal /head /day (T3), 30g of *Moringa oleifera* leaf meal head /day (T4) *a, b: Means in the same row bearing different superscript are significantly different (P≤0.005).

CONCLUSION

Referring to the obtained results, it could be recommended that growers of rabbits can utilize *Moringa oleifera* leaf meal in their animals' feed without worrying about negative impacts on animal performance, even if the diets require expensive protein sources.

REFERENCES

Abd-Allah, M.S.M. (2017). Productive performance of rabbits fed Moringa oleifera. M.Sc. Thesis, Faculty of Technology and Development, Zagazig University, Egypt.

Ahmed, R.M.A. (2017). Evaluation of moringa (Moringa oleifera) as a new feed for rabbits. M.Sc. Thesis, Faculty of Technology and Development, Zagazig University, Egypt.

Ansah A.E., J.R. Mellon, F.A., and A.T. Mayowa (2014). Reproductive Performance of Rabbit Does Fed Graded Levels of Moringa oleifera Leaf Meal Based Diet. Int. J. of Sci., 3 (3): 60-73.

AOAC (2000). Association of official analytical chemists. Official methods of analysis.14th Edition. Washington, D.C.

Bhatt. R.S., Srobana S., Sharma S.R. and Arvind S. 2023. Use of Moringa oleifera leaves (sole or combined with concentrate) in rabbit feeding: Effects on performance, carcass characteristics and meat quality attributes. Meat. Science (198). 109..

Carabaño, R., Badiola, I., Licois, D., Gidenne, T., 2006. The digestive ecosystem and its control through nutritional or feeding strategies. In: Maertens, L., Coudert, P. (Eds.), Recent Advances in Rabbit Sciences. ILVO, Merebleke, Belgium, pp. 221–227.

Cheeke, P.R.; Patton, N.M. and Tempelton, G.S. 1982. Rabbit Production. 5th Edition, Interstate printers and publishers, Inc. Danville II., USA.

Duncan, D.B. (1955). Multiple range and multiple F. Test. Biometrics, 11: 1-42.

El-Harairy, M.A., Shamiah, Sh.M. and Ghodaia, A.E. (2016). Influence of Oral Whole Extract from Moringa oleifera on Semen Characteristics of Rabbits. J. Animal and Poultry Prod., Mansoura Univ., Vol. 7 (6): 217-224.

Fekete S (1985). Rabbit feeds and feeding with special regard to tropical condition. Journal of Applied Rabbit Research, 8:167-173.

Gidenne, T., Jehl, N., Perez, J.M., Arveux, P., Bourdillon, A., Mousset, J.L., Duperray, J., Stephan, S., Lamboley, B., 2005. Effect of cereal sources and processing in diets for the growing rabbits. II effects on performances and mortality by enteropathy. Anim. Res. 54, 65–72.

Lee, C. and Hristov, A.N. 2013. Short communication: Evaluation of acid-insoluble ash and indigestible neutral detergent fiber as total-tract digestibility markers in dairy cows fed corn silage-based diets. J. Dairy Sci., 96(8):5295-5299.

Licois, D., 2004. Domestic rabbit enteropathies. In: Proceedings of the 8th World Rabbit Congress. Puebla, Mexico, pp. 385–403.

Marlier, D., Dewrée, R., Lassence, C., Licois, D., Mainil, J., Coudert, P., Meulemans, L., Ducatelle, R., Vindevogel, H., 2006. Infectious agents associated with epizootic rabbit enteropathy: isolation and attempts to reproduce the syndrome. Vet. J. 172, 493–500.

Medirabbit S., Mueller, M. and Jungbauer, A. 2011. Potential Health-modulating effects of isoflavones and metabolites via activation of PPAR and AhR. Nutrients, 2 (3): 241–279.

Odetola O M, Adetola O O, Ijadunola T I, Adedeji O Y and Adu O A 2012. Utilization of moringa (moringa oleifera) leaves meal as a replacement for soya bean meal in rabbit's diets Schol. J. Agric. Sci. 2 12 pp 309-13.

Olugbemi, T.S., Mutayoba, S.K. and Lekule, F.P. (2010). Effect of Moringa (Moringa oleifera) Inclusion in Cassava based diets to broiler chickens. In: International J. Poultr. Sci., 9 (4): 363-367.

Owen, O.J. Alikwe, P.C.N. Okidim, I.A. (2013). The economic potential of compounding rabbit diets with graded levels of Moringa oleifera leaf meal. Journal of Environmental Issues and Agriculture in Developing Countries, 5 (2): 34-40.

Ozumba, N.A. (2000). Moringa Research Workshop, Nnamdi Azikwe University Akwa.

Perenz JM, Lebas F, Gidenne T, Mertens L, Xiccato G, Parigi-Bini R, Dalle ZA, Cossu ME, Carazzolo A, Villamide MJ et al. (1995). European reference method for In vivo determination of diet digestibility in rabbits. World Science, 3(1): 41-43. DOI: https://doi.org/10.4995/wrs.1995.239

Radostits, O. M., Blood, D. C. & Gay, C. C. (1994). Veterinary Medicine, A textbook of the diseases of Cattle, Sheep, Pigs, Goats, and Horses. Eighth edition. Baillere Tindall, London, pp 66.

SAS (2004). SAS Institute Inc. SAS User's Guide, Statistics. Cary, NC.

Schneider BH and Flatt WP (1975). The evaluation of feeds through digestibility experiments. University of Georgia Press. Available at: https://lib.ugent.be/catalog/rug01:001983743

Steven WD, Hohenboken WD, Cheeke PR, Patton NM and Kennick WH (1981). Carcass and meat characteristics of Flernish Giant and New Zealand White purebred and terminal cross rabbits. The Journal of Applied Rabbit Research, 4: 66. DOI: https://doi.org/10.2527/jas1982.5461169x

Sulliman, A.I.A, Soliman, A.A.M and Ahmed, A. A. M. 2016. Productive performance of Growing Lambs fed Diets supplemented with Different levels of diet Moringa oleifera Leves. 11:3. 1-12.

William M., Mokoboki H.K., Manyeula F., Mabelebele M. and Sebola N. A. 2023. Carcass characteristics and meat quality of weaned New Zeland rabbits supplemented with Moringa oleifera leaves meal. (22).463-471.

تأثير مسحوق أوراق المورينجا على تكوين وهضم العناصر الغذائية، الدم، خصائص الذبيحة ومعدلات النمو في الأرانب النيوزيلندية

حسن عوني فؤاد رحمي، صباح علام و راندا العليمي

قسم الإنتاج الحيواني - كلية الزراعة- جامعة القاهرة

لقد كان الهدف من إجراء هذه الدراسة هو مقارنة تأثير أضافة مستويات مختلفة من المورينجا (١٠ جم / رأس / اليوم، ٢٠ جم / رأس / اليوم، ٣٠ جم / رأس / اليوم) لعلائق الارانب النيوزلندي المكونة من ٧٠% مركزات و٣٠ % دريس برسيم على هضم العناصر الغذائية، مواصفات الدم، مواصفات الذبيحة ومعدلات النمو في الأرانب النيوزيلندية .شملت الدراسة 48 أرنباً نيوزيلندياً أبيضاً نامياً بعمر حوالي 6 أسابيع مقسمة إلى أربع معاملات تجريبية (12 أرنباً لكل معاملة) .أظهرت النتائج المتحصل عليها أن وزن الجسم النهائي والزيادة في وزن الجسم زادت بشكل معنوي عند اضافه ٢٠ جم / رأس / اليوم و ٣٠ جم / رأس / اليوم من مسحوق أوراق المورينجا مقارنة بإضافة ١٠ جم مسحوق مورينجا و عليقة الكنترول كما زاد معدل استهلاك الغذاء للأرانب عند اضافه ٢٠ جم / رأس / اليوم و ٣٠ جم / رأس / اليوم من مسحوق أوراق المورينجا مقارنة بالمجموعات الأخرى .لم تكن هناك فروق معنوية في نسبة التحويل الغذائي وصفات الذبيحة بين المجموعات التجريبية .أظهرت معاملات الهضم تحسنا ملحوظا لكل من DM ، OM ، EE، NFE، فى العلائق T3,T4والذي انعكس علي القيمة الغذائية في صورة TDN و DCP فكانت أعلي معدلات لها عند التغذية على العلائق T3, T4علاوة على ذلك، تأثرت قيم WBC، PCV، والهيموجلوبين معنويا بالمعاملات الغذائية عند التغذية على العلائق T3, T4 . بالرجوع الي النتائج التي تم الحصول عليها يمكن التوصية بإضافة مسحوق أوراق المورينجا الي علائق الارانب بمعدل ٢٠ جم / رأس / اليوم و٣٠ جم / رأس / اليوم م الذي اظهر تأثير إيجابي على الكفاءة الاقتصادية وأداء النمو دون الإضرار بصحة الأرانب.

الكلمات المفتاحية: *المورينجا، النمو، الهضم، الذبيحة، المأكول، أرانب نيوزيلندياً*