The Performance and Carcass of Local Male Rabbit (*Lepus nigricollis*) Diet Feed Containing Fermented Grape Wastes

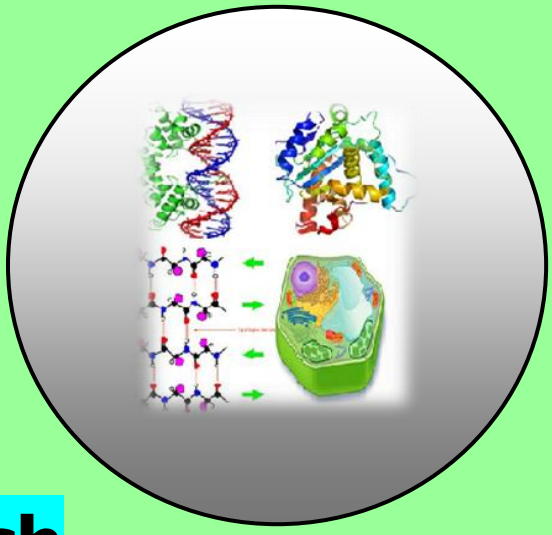
By

Mahardhika-Atmaja I. G., I. M. Nuriyasa and Dan I. K. Budaarsa

ISSN 2319-3077 Online/Electronic
ISSN 0970-4973 Print

Journal Impact Factor: 4.275
Global Impact factor of Journal: 0.876
Scientific Journals Impact Factor: 3.285
InfoBase Impact Factor: 3.66
Index Copernicus International Value
IC Value of Journal 47.86 Poland, Europe

J. Biol. Chem. Research
Volume 33 (1) 2016 Pages No. 488-495



Journal of Biological and Chemical Research

An International Peer Reviewed / Referred Journal of Life Sciences and Chemistry

Indexed, Abstracted and Cited in various International and National Scientific Databases

Published by Society for Advancement of Sciences®

J. Biol. Chem. Research. Vol. 33, No. 1: 488-495, 2016
(An International Peer Reviewed / Refereed Journal of Life Sciences and Chemistry)
Ms 33/2/25/2016

ISSN 0970-4973 (Print)
ISSN 2319-3077 (Online/Electronic)

Mahardhika Atmaja
http:// www.sasjournals.com
http:// www.jbcr.in
jbiolchemres@gmail.com

RESEARCH PAPER

Received: 28/04/2016 Revised: 05/05/2016 Accepted: 07/05/2016

The Performance and Carcass of Local Male Rabbit (*Lepus nigricollis*) Diet Feed Containing Fermented Grape Wastes

Mahardhika-Atmaja I. G., I. M. Nuriyasa and Dan I. K. Budaarsa
Faculty of Animal Husbandry, Udayana University, Denpasar, Indonesia

ABSTRACT

Research on the effect of the addition of fermented grape wastes in the ration of local male rabbit is done in the Village of Tejakula, Buleleng. The design used in this study is a randomized block design, with five ration treatments and four weight groups, thus, there are 20 experimental units. The rabbits were allocated randomly into five treatments, the rabbits received treatment of P_0: Rations were not using the fermented grape waste and non-fermented grape waste (Ration of Control), P1: use 5% of fermented grape waste, P2: use 10% of fermented grape waste, P3: use 5% of non fermented grape waste and P4: use 10% of non fermented grape waste. Rations and drinking water were given ad_libitum. Based on the research results that the performances of local male rabbits that were given extra rations of fermented grape waste and non-fermented grape waste to a level of 10% (P_1, P_2, P_3 and P_4) showed a higher yield than the ration control treatment (P_0). Variable of carcass also showed the same thing that (P_1, P_2, P_3 and P_4) resulted in higher carcass than the control ration (P_0). From the results of this study, it can be concluded that performance and carcass of local male rabbits showed no difference.
Keywords; Grape waste , Fermentation, Performance and Carcass.

INTRODUCTION

Rabbits as one of the animal husbandry commodities, prolific animal, it does not require much capital and does not require large tracts of land, and it can be as pets that rabbits need to be developed. Ruminant's prospect in Bali (cattle) has experienced a major constraint limited size of land, and the low reproductive rate. While poultry and pigs require feed, which is expensive and be competitive with humans (Suradi. 2005). Solution to increase animal protein consumption society is developing rabbit.

At present the prospects of rabbits as meat in Bali is still low, it is because the knowledge of farmers in feeding rabbits do not take into account the minimal nutrient needs and they do not consider to physiological status of livestock. Farmer only provide feed of forage, vegetable waste, agricultural waste and few farmers who provide additional rice bran feed, so it is often found the case of cannibal during birth due rabbits cannot satisfy the needs of nutrients. Utilization of complete feed will result in the addition of higher body weight than it is fed with forage, this is in line with the research conducted by Raharjo (2005) who reported that Rex rabbits fed with field grass ad libitum (100%) increase body weight amounted to only 610 g / head in 12 weeks and rabbit offered of field grass + 60 concentrate, the body weight gain up to 1,191 g / head in the same time. However, the obstacle in feeding the rabbits will complete feed is the price of feed ingredients that keeps on increasing every year, so it will be difficult for rabbit farmer who mostly traditional business.

Mastika (1991) reported one of the alternatives for cheaper and more competitive feeding is through the utilization of waste, both agricultural waste, livestock farming and industrial waste. Buleleng is a center for grapes in Bali of total grape production in 2013 was 9.118 tons of fresh grapes, 50% of them taken into the wine processing industry (BPS Buleleng, 2013). Industrial waste manufacture of wine made from grapes contain sufficient nutrients for rabbit . In addition, the price is cheap and available continuously in an effort to lower production costs.

Waste wine from wine-making industry has a great potential to be used as animal feed because of high production. Processing wine into wine would generate a waste of seeds and the skin by 40%. Based on the observations made by Voisinet *et al*. (1997) the use of diet, with the utilization of wine from the winery by product will produce chemical changes in the meat becomes more tender. Based on the research of Moote (2012) the use of waste wine grape by 7% in the diet of cattle angus bull showed no significant difference in terms of weight gain and meat color score than the control.

This study aims to determine the potential of wine waste, from fermented grapes for diet rabbits that can improve the performance and carcass of the local male rabbits.

MATERIALS AND METHODS

Rabbits

Rabbits that were used in this study were local male rabbits with an average body weight of 491.6 gr ± 76.3 gr conducted in the village of Tejakula, Buleleng.

Cage

Research conducted using battery cages measuring 50 cm long, 50 cm wide, 45 cm high and shaped stage with a height of 50 cm above the ground (Nuriyasa, 2012)..

Diet and Water

Diet used in this study that were given to rabbit in the form of pellets with 16% crude protein and metabolizable energy of 2,500 kcal/kg (NRC, 2001), consisting of 5 types of diet formulas in accordance with the treatment. Diet and water given ad_libitum.

Performance

Variable performance observed in this study include: final body weight, daily weight gain, feed intake and feed conversion.

Carcass

The data of carcasses were obtained by slaughtering the rabbits at the end of the study. Slaughtering rabbits by cutting the jugular veins in the neck to remove the blood (Alhaidary, *et al*., 2010). Carcass percentage was calculated as a fresh carcass weight divided by the weight of the body before being slaughtered multiplied by 100 (Lukefahr *et al*., 1981). Cutting for commercial carcass, the carcass is cut into two pieces left and right rear legs, waist and back one piece, two pieces of the chest and neck as well as two pieces of the left and right front feet (Sartika and Raharjo, 1991).

Design of Experiments and Statistical Analysis

The experimental design used in this study was a randomized block design (RBD), which consisted of five treatments and four blocks or groups of body weight as replication so that there were 20 experimental units. The five treatments were: P_0 Treatment: Rations that whit out use fermented grape waste and non-fermented grape waste (Control Ration). P_1 Treatment: Ration that used 5% of fermented grape waste. P_2 Treatment: The ration that used 10% of fermented grape waste. P_3 treatment: Ration that used 5% of non-fermented grape wine waste. P_4 Treatment: The ration that used 10% of non-fermented grape wine waste. The data obtained were analyzed by variant analyzed, if there are significant differences among treatments ($P < 0.05$), then the analysis proceeded by Duncan's Multiple Range Test with a significant level of 5% (Steel and Torrie, 1991).

RESULTS AND DISCUSSION

The results showed that the treatment ration using fermented grape waste did not cause significant differences ($P > 0.05$) on daily feed intake, daily weight gain and the feed conversion (Table 1). Final body weight of local male rabbits which were offered diet of P_4 was 1750.0 g of the highest and it was statistically different significantly ($P < 0.05$) with P_0. Final body weight is influenced by the amount of feed consumed and the nutrients absorbed in the body of the rabbit. Nutrients that are absorbed more by the rabbits will give a higher final body weight, and this is because the development of the body's tissues of rabbits and fat deposits will be mostly done by the rabbit (McNitt *et al*., 1996).

The use of fermented grape waste and non-fermented grape waste up to 10% in the ration did not change the content of energy and protein in the diet so that there was no significant feed intake. Based on the research of Moote (2012) the use of winery by product 7% in the diet of cattle of angus bull showed no significant differences in terms of body weight gain compared to the controls. These results are consistent with the previous research that the use of wine waste as feed was not able to meet the energy needs to sustain growth and milk production of ruminants, if the use in the form of single feed (Abarghuei *et al*., 2010). The average feed consumption is influenced by the energy contained in the feed. The higher the energy contained in the feed, the lower the consumption, and conversely the smaller the energy contained in the feed, the higher the consumption. If the energy content of diet in each treatment was the same then the rabbit feed intake was the same. According to Parakkasi (1999), the level of consumption is influenced by several factors such as body weight, sex, age, breeds, and the quality of feed nutrients, especially energy and crude protein content. In line with this, Hartadi. *et al*. (2008) states that the energy content in the feed will be inversely proportional to the consumption of feed.

The study of the daily weight gain of the local male rabbits, showed that the treatment diet of P_4 (17.1 g / day) was not significantly different (P> 0.05) with the diet treatments of P_0, P_1, P_2 and P_3. This means the use of fermented grape waste and non-fermented grape waste up to 10% in the diet did not give effect to the rabbits' daily weight gain. The use of fermented grape waste and non-fermented grape waste in the diet of rabbits caused a relatively equal feed intake, so the daily weight gain of rabbits had no significant effect. As said by Soeparno (2005) dry matter intake and nutrient content of feed have a considerable influence on body weight gain of cattle, so that when the dry matter intake and nutrient content of feed between the treatment groups showed no significant differences, it is possible the weight gain did not show the real difference either.

Table 1. Performance of Local Male Rabbits offered diet utilization of Fermented Grape Waste.

Variables	Treatments					SEM
	P_0	P_1	P_2	P_3	P_4	
Final Body Weight (gr)	1.561,0^{b}	1.630,0^{ab}	1.730,0^{a}	1.662,0^{ab}	1.750,0^{a}	47,9
The Consumption of Ration (g / day)	54,6^{a}	55,0^{a}	56,0^{a}	56,7^{a}	57,5^{a}	1,15
Daily Body Weight gain (g / day)	14,70^{a}	15,43^{a}	15,85^{a}	16,95^{a}	17,10^{a}	1,89
Feed Conversions	3,04^{a}	2,95^{a}	2,71^{a}	2,85^{a}	2,66^{a}	0,23

Notes:

1. P_0 : Diet that whit out use fermented grape waste and non-fermented grape waste (Control Ration). P_1 and P_2 Treatments: Diet that used 5% and 10% of fermented grape wastes. P_3 and P_4 : Diet that used 5% and 10% of non-fermented grape wastes.
2. The same superscripts in the same row show no significant difference (P> 0.05) and different superscripts in the same row indicate significant differences (P <0.05)
3. SEM : *Standard Error Of The Treatment Means*

Feed intake and daily weight gain were not significantly different, causing local male rabbit feed conversion diet with the addition of fermented and non-fermented wine wastes of 10% were also not significantly different (P> 0.05) in the five diet treatments. This is in accordance with the opinion of Basuki (2002) who states that the factors affecting the feed conversion is the feed intake and body weight gain. The research results show that the treatment ration of P_4 showed the highest efficient for diet utilization as indicated by the lowest conversion ration rate of 2.66. According to Rasyaf (1996), feed conversion is used as a handle in production because it involves body weight and feed intake. Siregar (1994) adds that the conversion of the feed is used as a measure of production efficiency. The smaller the value of feed conversion, the more efficient in the use of an animal to feed, which means the less the amount of feed needed to achieve one unit of body weight gain.

Results of research on local male rabbit carcass characteristics, offered diet with utilization of fermented grape wastes in general did not show significant differences (P> 0.05), that include the average percentage of the carcass, the average percentage of commercial of carcass, the average physical carcass composition, and meat bone ratio (MBR).

The diet treatments of P_2 and P_4 produce slaughter weight that significantly different ($P<0.05$) (Table 2) with P_0 diet treatment (control). The slaughter weight is closely related to growth. The growth is largely determined by factors of feed that can produce maximum slaughter weight. The condition significantly and directly effects on carcass weight and carcass percentage.

The results showed the slaughter weight of the diet treatment P_4 has the highest average of the slaughter weight (1747.5 grams), was statistically significantly different ($P <0.05$) with the control treatment. This is because the treatment the P_0 ration contains the highest crude fiber. This type of feed, chemical composition and feed intake major effect on growth. At diet containing same level of energy and protein, the higher feed intake will be followed by increased consumption of energy and protein. The consumption of protein and higher energy will generate faster growth rate (Soeparno, 2005).

Table 2. The Carcass of local male rabbits fed with additional ration of fermented grape wastes.

Variables	Treatments					SEM
	P_0	P_1	P_2	P_3	P_4	
Slaughter weight (gr)	1.558,5^{b}	1.627,8^{ab}	1.728,0^{a}	1.659,5^{ab}	1.747,5^{a}	49,4
Carcasses (%)	46,42^{a}	46,64^{a}	47,10^{a}	47,63^{a}	47,77^{a}	0,41
Fore leg (%)	16,22^{a}	16,86^{a}	16,99^{a}	16,87^{a}	17,16^{a}	0,52
Hind leg (%)	30,63^{a}	31,04^{a}	30,67^{a}	30,17^{a}	31,22^{a}	0,98
Loin (%)	30,46^{a}	30,37^{a}	30,31^{a}	30,26^{a}	30,37^{a}	0,67
Thorax (%)	23,21^{a}	23,17^{a}	22,41^{a}	23,68^{a}	23,43^{a}	0,75
Meat (%)	66,39^{a}	67,55^{a}	67,02^{a}	67,03^{a}	67,27^{a}	0,56
Fat (%)	4,58^{a}	4,51^{a}	3,91^{a}	4,04^{a}	4,02^{a}	0,26
Bone (%)	30,82^{a}	29,79^{a}	29,90^{a}	30,11^{a}	29,84^{a}	1,14
Meat to Bone Ratio (MBR)	2,1^{a}	2,21^{a}	2,22^{a}	2,26^{a}	2,28^{a}	0,02

Notes:

1. P_0 : : Diet that whit out use fermented grape waste and non-fermented grape waste (Control Ration). P_1 and P_2 Treatments: Diet that used 5% and 10% of fermented grape wastes. P_3 and P_4 : Diet that used 5% and 10% of non-fermented grape wastes.
2. The same superscripts in the same row show no significant difference ($P> 0.05$) and different superscripts in the same row indicate significant differences ($P <0.05$)
3. SEM : *Standard Error Of The Treatment Means*

The highest percentage of carcass produced by rabbits given the P_4 treatment was 47.77%, which is statistically not show significant differences ($P>0.05$). Moote (2012) state the use of winery by product 7% in the diet of cattle of angus bull showed no significant differences in terms of hot carcass weight of produced.

The production of carcass is reflected in the components of meat, fat, and rabbit bones that are very influenced by the slaughter weight (Bram Brahmantiyo and Raharjo, 2009). The results of this research are not much different from the research of Nuriyasa (2012) which found the carcass percentage of the 84-day raised local rabbits that were no significant different of 45.82%.

There were no significant differences occurred in all treatments to variable of commercial of carcass of the local male rabbits given offered diet utilization fermented grape waste to a level of 10% (Table 2). The study found that the average percentage of the fore legs, hind legs, loin, and thorax were respectively by 16.82%; 30.75%; 23.18% and 30.35%. The results of this study are consistent with the results of the research of Budiari (2014), which found the same of percentage commercial carcass, respectively 16.29%, 30.90%, 27.81% and 25.01% As well as the research results of the study by Nuriyasa (2012) which found the same order of percentage commercial carcass, respectively 15.79%, 31.28%, 26.17% and 26.76%.

Results of research on the use of fermented wine waste to a level of 10% in the diet of local male rabbits against physical of carcass composition (meat, bones and fat) did not significant differences (P> 0.05). Cunningham and Acker (2001) state that younger rabbit age will produce relatively higher meat and bone and lower fat percentages. In contrast to the older age of rabbit, the meat and bone percentage will be lower while the percentage of fat will be relatively higher, which in this study rabbits were slaughtered at the same age so that the percentage composition of the resulting physical showed no significant difference. According to Rihi (2004) state that the same of carcass percentage will provide no significant effect on the meat and bone ratio of the carcasses.

The results of research on the use of fermented wine waste to a level of 10% in the diet of local male rabbits on the meat bone ratio did not show statistically significant differences (P> 0.05). Aberle *et al*. (2001) states that the higher the value of meat bone ratio the better the carcass quality, because the meat bone ratio may indicate the high and low results of the meat and bones of the carcass. High meat bone ratio indicates that the results of carcass meat are higher. The results of this study were lower than the results obtained by Dewi *et al*. (2012) which states that the value of MBR of the local male rabbits aged 6 and 12 months ranged from 2.77 to 2.98 and from 2.83 to 3.04, because rabbit slaughtering age was younger (at the age of 4 months), so the resulting carcass weight will lower that effected on the carcass physical composition, where at a young age, the growth of bone and meat of rabbits were nearly balanced when compared with older rabbits.

CONCLUSION

Based on from the results of this study, it can be concluded that performance and carcass of local male rabbits offered diet P4 was higher than the other treatments.

ACKNOWLEDGEMENTS

The authors wish to thank to the Indonesian government through the Faculty of Animal science, Udayana University and Faculty of Post Graduate Study who had provided equipment and research facilities during this study.

REFERENCES

Abarghuei, M. J., Y. Rouzbehan and D. Alipour (2010). The influence of the grape pomace on the ruminal parameters of sheep. Livestock Science, 132, 73–79.

Alhaidary, A., H.E. Mohamed and A.C. Beynen (2010). Impact of Dietary Fat Type and Amount on Growth Performance and Serum Cholesterol in Rabbits. *American J. of Animal and Veterinary Sciences* 5(1): 60-64.

Aberle, E. D., C. J. Forest, H. B. Hedrick, M. D. Judge dan R.A. Merkel (2001). *The Principle of Meat Science*. W.H. Freeman and Co. San Fransisco.

Basuki, P. (2002). *Dasar Ilmu Ternak Potong dan Kerja*. Bahan Ajar. Fakultas Peternakan Universitas Gadjah Mada. Yogyakarta.

BPS (2013). Produksi Buah Anggur di Kabupeten buleleng. Badan Pusat Statistik Kabupeten Buleleng. (serial online) [cited 2015 Jul 8]. Available from: http:/www.buleleng.bps.go.id.

Bram Brahmantiyo dan, Y.C. Raharjo (2009). Pengembangan Pembibitan Kelinci Di Pedesaan dalam Menunjang Potensi dan Prospek Agribisnis Kelinci. Seminar Nasional Teknologi Peternakan dan Verteriner. Balai Penelitian Ternak, Bogor. Hal 688-691.

Cunningham, M. and D. Acker (2001). *Animal Science and Industry*. 6th edition. Prentice Hall. New Jersey.

Dewi, S.H.C., Edi, P., M. Djalil (2012). Produksi karkas dan non karkas kelinci lokal pada umur dan jenis kelamin berbeda. (*prosiding*): Membangun ketahanan pangan berbasis kearifan lokal untuk menopang perekonomian rakyat. Yogyakarta, 12 September 2012. Seminar nasional Fakultas Agro Industri, Universitas Mercu Buana.

Hartadi, H., Kustantinah, Zuprizal, E. Indarto and N.D. Dono (2008). *Nutrisi dan Pakan Ternak*. Fakultas Peternakan Universitas Gadjah Mada. Yogyakarta.

Lukefahr, S.D., W.D. Hohenboken, P.R. Cheeke, N.M. Patton and W.H. Kennick (1981). Carcass and Meat Characteristics of Plemish Giant and New Zealand White Purebreed and Terminal – Crossbred Rabbits*. J. Of Appl, Res.* 4(3): 66-72.

Mastika, I.M. (1991). Potensi Limbah Pertanian dan Industri Pertanian serta Pemanfaatannya untuk Makanan Ternak. Makalah Pengukuhan Guru Besar Ilmu Makanan Ternak Pada Fakultas Peternakan UNUD-Denpasar.

McNitt, J.I., N.M. Nephi, S.D. Lukefarh and P.R.Cheeke (1996). *Rabbit production.* Interstate Publishers, Inc.p. 78-109.

Moote, P., J. Church, K. Schwartzkopf-Genswein and Van Hamme (2012). Effect of fermented *wine*ry waste supplemented rations on beef cattle temperament, feed intake, growth performance and meat quality. Submitted Article, Kamloops, BC, Canada: Thompson Rivers University.

NRC (2001). *Nutrient Requirement of Rabbits*. National Academy of Sciences, Washington, D.C.

Nuriyasa, M. (2012). "Respon Biologi Serta Pendugaan Kebutuhan Energi dan Protein Ternak Kelinci Kondisi Lingkungan berbeda Di Daerah Dataran Rendah Tropis" (*disertasi*). Program Pasca Sarjana. Universitas Udayana. Denpasar.

Parakkasi, A. (1999). *Ilmu Nutrisi dan Makanan Ternak Ruminansia*. UI Press. Jakarta.

Rasyaf, M. (1996). *Beternak Ayam Pedaging.* Penebar Swadaya. Jakarta.

Rihi, J.L. (2004). Produksi karkas dan kualitas fisik daging kelinci lokal yang diberi kosentrat dengan level protein berbeda. *Buletin Peternakan* 28 (2): 65-71.

Sartika, T. and Y.C. Raharjo (1991). Pengaruh Berbagai Tingkat Serat Kasar Terhadap Penampilan, Persentase Karkas pada Kelinci Rex. (*prosiding*). Seminar Nasional Usaha Peningkatan Peternakan dan Perikanan. *Vol. 1. Bidang Peternakan*. Badan Penerbit Univ. Diponogoro, Semarang.

Siregar, S. (1994). *Ransum Ternak Ruminansia*. Penebar Swadaya. Jakarta.

Soeparno (2005). *Ilmu dan Teknologi Daging. Cetakan ke-4*. Gadjah Mada University Press, Yogyakarta.

Steel, R.G.D. and J.H.Torrie (1991). *Principle and Procedure of Statictic.*Mc Grow Hill Book Bo.Inc,New York.

Suradi, K. (2005). Potensi dan peluang Teknologi Pengolahan Produk Kelinci. (*prosiding*) Lokakarya Nasional Potensi dan Peluang Pengembangan Usaha Kelinci. *Pusat Penelitian dan pengembangan Peternakan.Badan penelitian dan pengembangan Pertanian dan Fakultas Peternakan Universitas Padjadjaran.* Bandung 30 September 2005.

Voisinet, B. D., T. Grandin, J.D. Tatum, S.F. O'Connor and J.J. Struthers (1997). Feedlot cattle with calm temperaments have higher average daily gains than cattle with excitable temperaments. *Journal of Animal Science*, 75, 892– 896.

Corresponding author: Mahardhika-Atmaja, Faculty of Animal Husbandry, Udayana University, Denpasar, Indonesia.
E-mail: mahardhikaatmaja@ymail.com
Hp; +6281337875308