IMPROVING ECONOMIC BENEFITS BY MOLASSES SUPPLEMENTATION AS ENERGY SOURCES IN MEAT RABBITS DIETS

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ABSTRACT

Rabbit husbandry has an important role in Vietnam, particularly for the small farmers to earn their livings by using local grasses and supplements. The objective of this experiment was to use the molasses as cheap energy source in growing rabbit diets to improve the income of producer. Sixty growing crossbred rabbits (Local x New Zealand White breeds) from 500 to 850g was arranged in a completely randomized block design with 5 treatments and 3 blocks of live weight, and four rabbits in an experimental unit. The treatments were molasses (ML) supplementation to the sweet potato vine basal diets at levels of 0, 10, 20, 30 and 40 g molasses/day/ rabbit. The results indicated that the growth rate of rabbit was significantly higher for the rabbits fed ML, and the highest values in the ML20 treatment ($P<0.05$) and the higher income was for this treatment. It was concluded that molasses could be used as a energy feed for growing rabbits and supplementing molasses in diets improved economic returns at a level of 20g per rabbit per day.

Keywords*: Daily weight gain, profits, nutrient and energy intakes*

INTRODUCTION

Rabbit production has a considerable potential in the developing countries for the supply of the needed animal protein due to the low capital investment, short generation interval, rapid growth rate and ability to utilize the abundant forages and agro-industrial by products (Joseph et al., 1997). Rabbit meat is also one of the most nutritious meats, due to the highest in protein, lowest in fat and cholesterol. Crossbred rabbits (Local and pure breeds) are popularly raised in the Mekong delta (MD) because of a good adaptation to the local climate and feeds. Sugar production in Vietnam for the 2023-2024 crop totaled over 1.1 million tons, up 18.4% compared to the previous crop. Vietnam's sugar yield for the 2023-2024 crop reached 6.79 tonnes per ha, higher than other key producers in the region such as Thailand, Indonesia and the Philippines (Chu Khoi, 2024). Thus a huge amount of molasses produced as a great source for animal production and other purposes. In previous studies on rabbit production the energy sources supplementation used in diets were mainly from grains such as maize, broken rice, millet, etc., which are high prices. While molasses is a popular by-product from sugar factories with the cheaper cost in Vietnam, however it could give a valuable energy source for animals. Molasses is a sugar by-product from sugar factory, which contain high energy, could be used for supplying energy source to mono-gastric animals. Therefore, the aim of this study was to determine the optimum supplement level of molasses on growth performance and economic returns and then the results could be disseminated to producers for practice.

MATERIALS AND METHODS

Time and location

The experiment was implemented from March to Aug. in 2021, at the Nam Can Tho Farm in Phong Dien District, Can Tho City. While the chemical analysis was done at the laboratory E205, College of Agriculture and the economic analysis was realized at the School of Economics, Can Tho University.

Animals and experimental design

Sixty crossbred rabbits (Local x New Zealand White breeds) were from 50 -70 days of age with live weight range from 500 to 850g. A completely randomized block design was used with 5 treatments and 3 blocks with 3 ranges of live weight and four rabbits with balance of sex per experimental unit. The treatments were molasses (ML) supplementation to the sweet potato vine basal diets at levels of 0 (ML0), 10 (ML10), 20 (ML20), 30 (ML30) and 40 g (ML40) molasses/ day/ rabbit.

Feeds, supplements and chemical analysis

Sweet potato vine (SP) and soya waste were bought daily, while molasses was bought in an occasion for using throughout the trials. The feeds and refusals were daily taken for analysis of dry matter (DM), organic matter (OM), crude protein (CP), ether extraction (EE), neutral detergent fiber (NDF), acid detergent fiber (ADF) and ash.

Measurements taken

Daily feed and nutrient intakes, daily gain, and feed conversion ratios were measured and calculated. The feeding experimental period lasted 9 weeks. At the end of experiment the rabbits were slaughtered for evaluating carcass quality. The economic analysis was also done among the treatments.

RESULTS AND DISCUSSION

Chemical composition of feed ingredients

Table 1. Chemical composition of feed ingredients in feeding experiment (%, DM)

Feed	DM	OM	CP	EE	CF	NDF	ADF	NFE	Ash	ME (MJ/kg DM)
Molasses	69.1	93.0	3.51	-	-	-	-	-	6.99	15.4
Soya waste	11.9	96.2	21.4	9.87	18.0	36.6	27.2	65.0	3.76	11.2
SP	9.72	90.2	19.1	8.40	17.7	43.0	33.8	62.7	9.78	9.55

DM: dry matter, OM: organic matter, CP: crude protein, EE: ether extract, CF: crude fiber, NFE: nitrogen free extract, NDF: neutral detergent fibre, ADF: acid detergent fiber, ME: metabolizable energy (Maertens et al., 2002)

Molasses (ML) had higher ME content as compared to sweet potato vine (SP) and soya waste (SW) to provide energy for the rabbits (Table 1). The SP contained higher NDF and ADF concentrations than those of SW. The DM and CP, NDF and ADF contents of SP in our experiment are similar to the values (9.21% DM and 18.8% CP; 43.1 % NDF and 33.0 % ADF) reported by Cuong *et al*. (2008), respectively. The DM and CP components of SW are consistent with those of 10.4 % DM, 20.5 % CP stated by Dong and Van (2008).

Feed and nutrient intakes

Molasses (ML) had higher ME content as compared to sweet potato vine (SP) and soya waste (SW) to provide energy for the rabbits. Daily intakes were similar among treatments ($P>0.05$). However, there was considerably increase of ML intakes following with the graded levels of ML supplementation in diets ($P<0.05$). Daily intakes of DM, OM and ME clearly enhanced corresponding with the ML intakes in the diets, reaching the highest values for the ML40 diet

(P<0.05), probably due to a high content of DM and ME in ML. The DM intake in a present study is in agreement with the results of 56.3-73.0 g DM/rabbit reported by Binh (2008). The effect of molasses intake on weight gain of rabbits was presented in a regression equation following $y = -106x^2 + 150x - 33.3$ and $R^2 = 0.986$.

Growth rate, feed conversion ratio and economic analysis

The results of daily gain, final weight and economic returns of rabbits are shown in Table 2.

Table 2. Daily weight gain (g/rabbit) and economic returns (VND/rabbit) of rabbits

Item	Treatment					±SE/P
	ML0	ML10	ML20	ML30	ML40	
Final weight	1,768^{a}	2,035^{b}	2,110^{b}	2,045^{b}	1,935^{ab}	36.5/0.001
Daily weight gain	15.2^{a}	19.0^{bc}	20.0^{c}	19.2^{bc}	17.7^{b}	0.36/0.001
FCR	3.35^{ab}	3.08^{a}	3.10^{ab}	3.51^{b}	4.12^{c}	0.09/0.001
Feed cost/ rabbit	43,855	47,710	47,079	49,139	50,902	
Total expense/ rabbit	95,885	99,710	99,079	101,139	102,902	
Income/ rabbit	123,760	142,450	147,700	143,150	135,450	
Profit/ rabbit	27,905	42,740	48,610	42,011	32,548	

ML0, ML10, ML20, ML30 and ML40: 0, 10, 20,30 and 40g molasses. Means with different letters within the same rows are significantly different at the 5% level.

Daily weight gain (DWG) and final live weight (FLW) were significantly higher for the rabbits supplemented ML, and reaching the highest values in the ML20 treatment (P<0.05). The daily weight gains of rabbits in this study were also within the ranges (15.9 to 19.4 g/day*)* reported by Nakkitset (2007). Feed conversion ratio was the significantly highest for the ML40 treatment (P<0.05), as a result of lower DWG and higher DM intake. These values were slightly higher than those of 3.29 - 3.49 by Dong and Thu (2012). The economic analysis shows that the higher total expense and higher income were for the rabbits supplemented ML, and the highest income was for the ML20 treatment, as higher final live weight. This resulted in giving the best profit in this treatment (48,610 VND/rabbit).

Carcass traits of growing rabbits

The live weight, carcass weight and lean meat weight were significantly improved (P<0.05) by ML supplement, the highest values were obtained for the animals supplemented 20g ML/day in the ML20 treatment. The results in our study are consistent with those in a previous study of para grass basal diet supplemented dried cassava chips in the diets reported by Dong et al. (2010) that the percentage of carcass (without head) of growing crossbred rabbits were from 46.1 to 49.8%.

CONCLUSIONS

Molasses could be used as a energy feed for growing rabbits. Supplementing molasses in diets improved economic returns. At a level of 20g per rabbit per day had better growth performance and higher profit.

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