

# Effect of using King Grass and Water Hyacinth Fed Banana Stem Ensiled with Rice Bran or Yeast on Growth Performance of Local Goats

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**Abstract:-** The research experiment was conducted at the agricultural station on the campus of Svay Rieng University and was carried out from April 11 to June 19, 2023 with the title “Effect of using king grass and water hyacinth fed banana stem ensiled with rice bran or with Yeast on growth performance of local goat”. This experiment has three objectives: 1. Compare the feed intake of local goat, 2. Compare the growth performance of local goat, and 3. Compare the feed conversion ratio of local goat. A total of 12 goats were selected and designed in 2\*2 factorial arrangement in Randomized Complete Block Design (RCBD) with 3 replications. The factors were the energy source (ensiled banana stem with rice bran or ensiled banana stem with yeast) and the protein source (king grass or water hyacinth). The objectives of the experiment are i) to compare the feed intake of goats, ii) to compare the growth performance of goats, and iii) to compare the feed conversion ratio of goats. The treatments of the study are: T1: King Grass of 65%+Ensiled Banana Stem with Yeast of 35%, T2: King Grass of 65%+Ensiled Banana Stem with rice bran of 35%, T3: Water Hyacinth of 65%+Ensiled Banana Stem with Yeast of 35%, and T4: Water Hyacinth of 65%+Ensiled Banana Stem with rice bran of 35%. The experiment period for 60 days, and all data were collected daily for feed offer and feed residues. The goats were weighed every 10 days from the beginning of the experiment to the end of experiment. The findings of the experiment were resulted that DM intake on the energy sources were non-significant different for the ensiled banana with rice bran compared with the ensiled banana with yeast ( $P>0.05$ ) while DM intake on the protein sources were higher significant for king grass as compared with water hyacinth ( $P<0.01$ ). Growth rate and feed conversion on the energy sources were slightly high for the ensiled banana with yeast rather than the ensiled banana with rice bran ( $P>0.05$ ), and were slightly high for king grass rather than water hyacinth ( $P>0.05$ ). In conclusion, when using the protein source of king grass mixed with the energy source of the ensiled banana stem with rice bran or with yeast, it was increased on DM intake, growth rate and better improvement of feed conversion of goats rather than using water hyacinth plus ensiled banana stem with rice bran or with yeast. The

efficiency of protein utilization from then study is well performance on using the king grass rater than water hyacinth once mixed with either the ensiled banana stem with rice bran or with yeast.

**Keywords:-** King Grass, Water Hyacinth, Banana Stem, Rice Bran, Yeast.

## I. INTRODUCTION

Goat is the most common animal have been raised in rural of Cambodia. The most of people raising goats for meat consumption and a source of extra income. However, day by day both of ruminant extensive and intensive are challenges by decreasing pasture area and alternative feed source for feeding to those ruminants husbandry.

King grass [*Cenchrus purpureus* (Schumach.) Morrone] is commonly used as feed for ruminant husbandry in the tropics and subtropics of countries, and it is the major roughage for ruminants in these regions (Li et al. 2014, 2019). King grass would be harvested and produced by season, which results in the poor nutritional status of the ruminants. Therefore, it is necessary to exploit potential alternative feed sources. King grass is one among that foliage has chemical composition such as dry matter 20.1%, crude protein 8.67%, crude fiber 33.0% and Organic matter 84.9% (Mohammad et al., 2021).

Water hyacinth is a major environmental concern in many countries. It quickly invades large water areas, due to a high rate of vegetative propagation, and forms dense mats that obstruct waterways. It affects all water-based economic activities, including fishing, irrigation, traffic, water quality, hydraulic and hydroelectric infrastructures (Hasan & Chakrabarti, 2009). Water hyacinth was already causing concern in 1908 in Vietnam, Laos and Cambodia, and water hyacinth have been investigated, including as a source of pigments for poultry nutrition (Lareo & Bressani, 1982), and leaf protein concentrates for food and feed (Wu Wenbiao & Sun Yanling, 2011). Water hyacinth many compounds such as dry matter 8.10%, crude protein 18.4%, organic matter 84.1% (Thu Hang et al., 2011).

Banana foliage is a useful source of roughage in many tropical countries. Particularly, it can be used as an emergency feed in case of drought or feed shortage (Reynolds, 1995). Banana Pseudostems and leaves can be fed separately or mixed together. They can be fed in fresh or dried form, whole or chopped. Pseudostems are easily ensiled if chopped and mixed with an easily fermentable source of carbohydrates such as molasses or rice bran and the silage is of good quality (Göhl, 1982). Banana foliage cannot meet animal requirements alone and must be supplemented with nitrogen and energy, or be part of a diet containing other feeds and forages (Ffoulkes & Preston, 1978). Banana stalks have been fed to goats (20% of diet DM) and to sheep up to 50% with no adverse effects, but daily weight gains were low. Their value was comparable to that of other crop residues such as cereal and rice straws and sugarcane tops (Poyyamozhi & Kadirvel, 1986; Viswanathan et al., 1989). Banana stem ensiling with urea was preferable to dry when feeding banana foliage to sheep (Shoukry et al., 1999).

Yeast is a by-product from the breweries, which use the micro-organism and fungal yeast *Saccharomyces cerevisiae*. yeast is obtained by the removal of yeast after the brewing process and subsequent inactivation by means of organic acids, and the yeast is mainly a source of protein, vitamins and minerals, and is used as a flavoring ingredient in the food industry, and as feedstuff for pigs, ruminants, poultry and fish (Hertrampf & Piedad, 2000). Yeast inactivation is necessary to prevent further fermentation after consumption by animals, that may cause severe gastro-intestinal problems in pigs, and inactivated yeast is a highly valuable source of protein, phosphorous and B vitamins, and yeast may be fed fresh (liquid form) or dried, which is costly and thus only used in speciality feeds (Crawshaw, 2004).

Rice bran is the most important rice by-product. The bran fraction contains 14-18% oil. Rice bran that has not been defatted is a useful binder in mixed feeds. Defatted rice bran can be used at higher levels than ordinary rice bran. Rice bran is often adulterated with rice hulls, as it should have a crude fiber content of 10-15% (Göhl, 1982). And, Rice bran has chemical compound such as dry matter 91.0%, crude protein 12.6%, crude fiber 11.9% and Ash 10.2% (Chiv Phiny et al., 2008).

The aim of this experiment was to determine the effect of using king grass and water hyacinth fed banana stem ensiled with rice bran or yeast on the growth performance of local goats.

## II. MATERIALS AND METHODS

### ➤ Location and Climate

The experiment was conducted at the center of Agricultural Station of Svay Rieng University, located in Chambak village, Sangkat Chek, Svay Rieng town, Svay Rieng province. The environmental temperature during the trial was ranged from 38 to 40 degrees centigrade.

### ➤ Experimental Design and Treatments

A total of 12 goats with an average of body weight of 17 kg was selected and housed in the individual pen. This experiment was designed in 2\*2 factorial arrangement in Randomized Complete Block Design (RCBD) with 3 replications. There were 12 pens totally and each size of the experimental pen is 1-meter-length, 0.8-meter-width, and 1.8-meters-height. Those pens were made from square wood and saplings. Each pen had waterer and feeder individually. All goats were vaccinated and de-wormed for 15 days before starting the experiment. The period of this experiment for sixty days of which from April 11 to June 19, 2023. The experimental factors, feeds and layout of the experiment are showed as following below:

- Energy Source

- ✓ Ensiled banana stem with rice bran
- ✓ Ensiled banana stem with yeast

- Protein Source

- ✓ King Grass
- ✓ Water Hyacinth

- Treatment (T)

- ✓ T1: King Grass of 65% + Ensiled Banana Stem with Yeast of 35%
- ✓ T2: King Grass of 65% + Ensiled Banana Stem with Rice bran of 35%
- ✓ T3: Water hyacinth of 65% + Ensiled Banana Stem with Yeast of 35%
- ✓ T4: Water hyacinth of 65% + Ensiled Banana Stem with Rice Bran of 35%

Table 1 Experimental Layout

Block	I		II		III	
Pens	T2	T4	T1	T2	T4	T2
	T1	T3	T4	T3	T1	T3

Table 2 Feed Formulation and Chemical Composition of the Goat Diets

Treatment	T1	T2	T3	T4
King Grass (KG)	65	65	-	-
Water Hyacinth (WH)	-	-	65	65
Ensile Banana Stem with Yeast (EBY)	35	-	35	-
Ensile Banana Stem with Rice bran (EBR)	-	35	-	35

Chemical composition of the feed (%)				
Dry Matter (DM)	15.8	16.7	11.1	12.0
Crude Protein (CP)	13.5	14.1	13.5	14.2
Organic Matter (OM)	88.8	87.8	89.6	18.8
Crude Fiber (CF)	24.3	25.0	18.1	18.8

#### ➤ *Experimental Feeds and Feedings*

The feed materials of the experiment included king grass, water hyacinth, banana stem, rice bran and yeast. However, the king grass and banana stem were bought from the households who living closed to the Center of Agricultural Station of Svay Rieng University. Water hyacinth was collected from the canals and ponds where far from the research center about 2km. For rice bran and yeast were purchased from the storing shops at the local market in the Svay Ring Province.

#### ➤ *Ensiling the banana stem*

The banana stem was chopped into 0.5-1cm by chopping machine and leaves these materials for 1 hour to reduce moisture content and then mixed with the yeast or rice bran of 5 % by hand, and after that put into the plastic bag with pressing to remove the air inside of plastic containers and tied for storing properly. The ensiled materials were used and offered to the goats after 7 days interval.

#### ➤ *Feeding System and Live Weight*

The amount of feed offers was calculated and weight depending on the expectation daily of feed intake during adaptation period. For water offer was freely accessed via water container in each pen. Moreover, all feeding materials to the goats were divided into three times per day at 08.00, 12.00 and 16.00. The goats were weighed at the beginning of the experiment and then at every 10 days until the end of 60 days. The 5 kg scale was used for weighing the feed offer and feed residues, and 100kg scale was used for weighing the goats during the period of the experiment.

#### ➤ *Sample Collection*

All goats were weighed at the beginning and at every 10 days interval in the morning prior providing the feed offer. The feed offers and feed residues were collected and weighed every day, and then 10% of total amount of feed offers and residues were selected and kept frozen at -20°C in plastic bags for doing different parameter analysis. At the end of each 10 days period, those samples of feed residues and offers were mixed thoroughly by hand and homogenized in a coffee grinder before analysis within different parameter at Animal Feed Laboratory.

#### ➤ *Chemical Analysis*

The feed offers and feed residues were undertaken by following the methods of AOAC (1990) in order to analyze for Organic Matter, Nitrogen and Crude Fiber. Anyway, for the parameter in Dry Matter of feed offers and residues were determined by using the microwave or oven method of Undersander et al. (1993) accordingly.

#### ➤ *Statistical Analysis*

The data of the experiment included the feed intake, growth rate and feed conversion were prepared and entered onto Microsoft Excel and used the software program of Minitab Version 16 to analyze ANOVA through General Linear Model in the Minitab program. All mean values were compared by using turkey method in Minitab version 16. The sources of variation were energy feed, protein feed, interaction of energy feed\*protein feed, and error.

### III. RESULT S AND DISCUSSIONS

#### A. *Feed Intake Of Goats*

##### ➤ *Feed intake in dry matter (DM)*

A total of DM intake on the energy sources were non-significant different for the ensiled banana stem with rice bran (EBR) compared with the ensiled banana stem with yeast (EBY) ( $P>0.05$ ). However, DM intake on the protein sources were higher significant when the king grass compared with the water hyacinth ( $P<0.01$ ) (Table 3 and Figure 1).

The results are lower than the finding of Mao Li et al. (2020) who reported that the daily intake of 646.7g/day to 650.2g/day when the goats were fed the king grass with or without the exogenous enzymes respectively. However, this result is agreed to the finding of Sunarso (2012) who reported that the total intake was from 328.7 g/day to 471g/day when the goats fed field grass plus different levels of king grass silage mixed with energy source of rice bran. Moreover, the present result is similar with the finding of Bui Phan et al. (2011) when the goats were fed ad-libitum of water hyacinth mixed with 2% of LW on DM basic of Sesbania while the goats in present study was used water hyacinth at 65% plus the ensiled banana stem mixed with rice bran or yeast. By the way, the result is lower than the finding of Aswanimiyuni et al. (2018) who reported the goats increased amount intake in dry matter when those goats fed either Guinea grass or Napier grass as protein supplementation mixed with palm kernel cake or molasses in the diet. The differences among the finding were found that when mixture of Guinea grass or Napier grass with palm kernel cake or molasses is really caused the goats increased the feed consumption rather than the experimental diets of the present experiment. However, the result is similar to the report of Azeez et al. (2021) who showed that a total intake in dry matter of 340.1g/day when the goats were fed water hyacinth of 5% as protein supplement combined with energy sources from maize of 15%, palm kernel cake of 20%, cassava peel of 30% and wheat bran of 25% on the growth performance of goats.

Table 3 Mean Values of Feed Intake of Goats

	EBR	EBY	P-value	KG	WH	P-value	SEM
<b>DM intake, g/day</b>							
KG	162	159	0.41	321	0.00	<0.001	2.73
WH	106	92.8	<0.001	0.00	200	<0.001	2.60
EBY	0.00	160	<0.001	89.3	70.8	<0.001	1.44
EBR	154	0.00	<0.001	83.0	72.1	<0.001	1.68
<b>Total</b>	422 <sup>a</sup>	413 <sup>a</sup>	0.22	492 <sup>a</sup>	343 <sup>b</sup>	<0.001	5.27
<b>DM, g/kg LW</b>	25.5 <sup>a</sup>	24.3 <sup>b</sup>	<0.001	28.4 <sup>a</sup>	21.3 <sup>b</sup>	<0.001	0.20
<b>Total CP, g/day</b>	46.5 <sup>a</sup>	41.1 <sup>b</sup>	<0.001	43.1 <sup>a</sup>	44.5 <sup>a</sup>	0.12	1.62
<b>Total CF, g/day</b>	95.6 <sup>a</sup>	91.2 <sup>b</sup>	0.01	121 <sup>a</sup>	65.7 <sup>b</sup>	<0.001	2.95
<b>Total OM, g/day</b>	372 <sup>a</sup>	369 <sup>a</sup>	0.58	435 <sup>a</sup>	306 <sup>b</sup>	<0.001	4.67

ab Mean values within row without a common letter are different at P<0.05

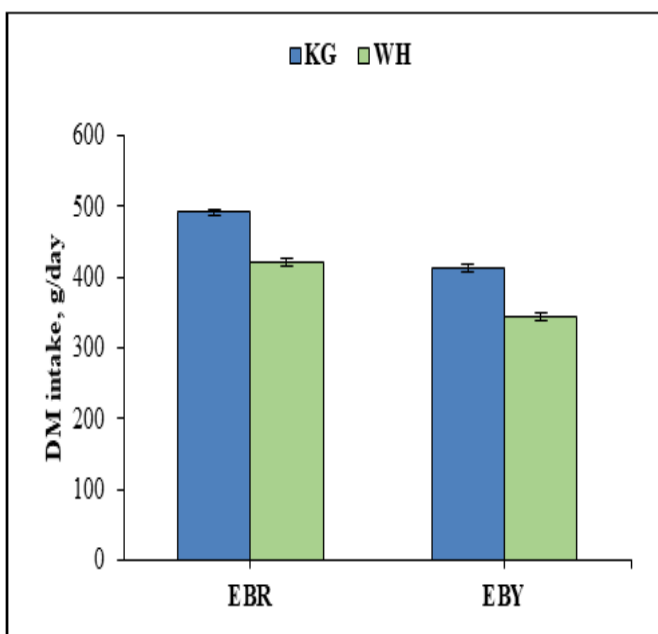


Fig 1 DM Feed Intake of Goats from 0-60 Days

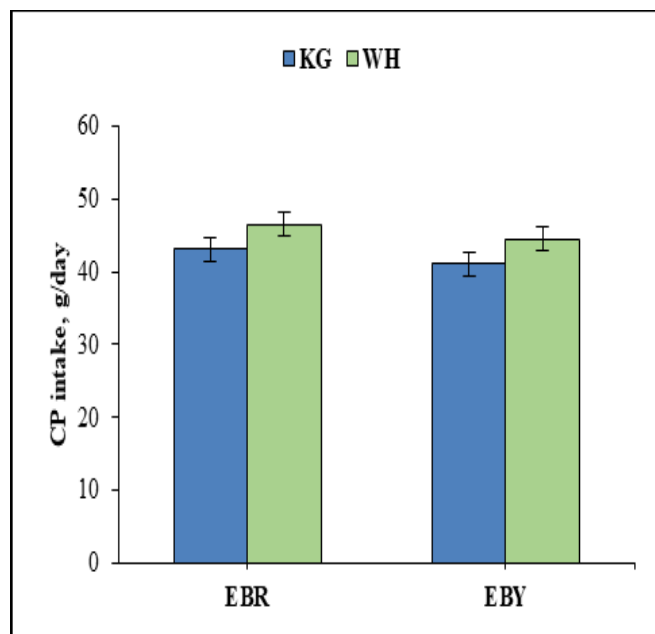


Fig 2 Crude Protein Intake of Goats from 0-60 Days

➤ Intake of Crude Protein (CP)

There were highly significant different on the ensiled banana stem with rice bran (EBR) as compared with the ensiled banana stem with yeast (EBY) (P<0.01). However, there were no difference to DM intake on the protein source of the king grass compared with the water hyacinth (P>0.05) (Table 3 and Figure 2).

This result is similar to the finding of Sunarso (2012) who reported that the total intake of crude protein is from 47 g/day when the goats were fed ad-libitum of the field grass plus king grass silage of 300 g/day mixed with energy source of rice bran of 200g/day. However, the result is lower than the finding of Bui Phan et al. (2011) when the goats were fed ad-libitum of water hyacinth mixed with 2% of Sesbania while the goats in the present study was used water hyacinth of 65% plus the ensiled banana stem mixed with rice bran or yeast. The factor of this different is probably caused by combination of the protein sources of water hyacinth and sesbania in the goat diet as the present study used only water hyacinth as protein source.

➤ Intake of Crude Fiber (CF)

Total of Crude Fiber (CF) intake on the energy sources were higher for the ensiled banana stem with rice bran (EBR) compared with the ensiled banana stem with yeast (EBY) (P<0.05), and also CF intakes were higher when feeding the king grass as compared with the water hyacinth (P<0.01) (Table 3 and Figure 3).

This result is lower than to the study of Bui Phan et al. (2011) when the goats were fed ad-libitum of water hyacinth mixed with 2% of Sesbania while the goats in the present study was fed water hyacinth at 65% mixed with the ensiled banana stem with rice bran or yeast. The different is probably due to these Authors used water hyacinth combined with sesbania in the diet composition and to that caused the diet composition reaching high fiber, while the present study used only water hyacinth into the dietary composition of goats.



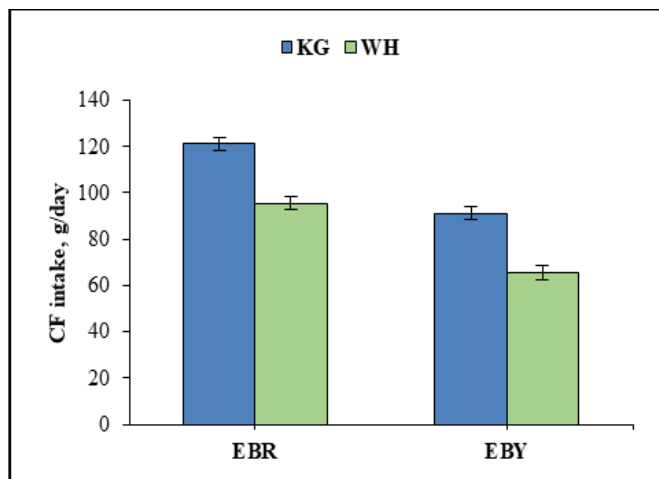


Fig 3 Crude Fiber Intake of Goats from 0-60 Days

➤ Intake of Organic Matter (OM)

A total of OM intake on the energy sources were non-significant different for the ensiled banana stem with rice bran (EBR) compared with the ensiled banana stem with yeast (EBY) ( $P>0.05$ ). However, the intake of Organic Matter on the protein sources were higher significant different for the king grass compared with the water hyacinth ( $P<0.01$ ) (Table 3 and Figure 4).

This finding is slightly lower than the report by Bui Phan et al. (2011) when the goats were fed ad-libitum of water hyacinth mixed with 2% of LW on DM basic of Sesbania while the goats in present study was used water hyacinth at 65% plus the ensiled banana stem mixed with rice bran or yeast. However, the finding is higher than the report of this Authors as the goats were fed ad-libitum of water hyacinth with sesbania forage by decreasing from 2% to 1% level in the diet. In addition, the result is lower than the study of Nguyen Van Thu. (2016) who reported that the intake of organic matter (OM) of 558 g/day when the sheep was fed the ensiled water hyacinth of 45% mixed with para grass, soybean cake and coconut meal in the diet. The differences of both reports is that the diet of current study was used the protein source of sole water hyacinth mixed with ensiled banana stem with rice bran or yeast, while this author used two protein sources such as the ensiled water hyacinth and para grass mixed with soybean cake plus coconut meal in the diet.

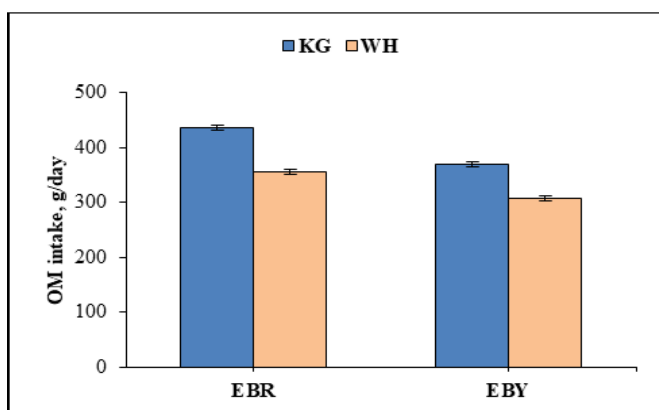


Fig 4 Intake of Organic Matter of Goats from 0-60 Days

B. The Growth Performance of Goats

The overall of live weight gain on the energy sources were slightly high for the ensiled banana stem with rice bran (EBR) compared with the ensiled banana stem with yeast (EBY) ( $P>0.05$ ), and also the live weight gain was slightly high on using king grass compared with water hyacinth ( $P>0.05$ ). However, the both of energy and protein sources were non-significant effect (Table 4 and Figure 5).

This result is lower than the report by Mao Li et al. (2020) who reported that the daily weigh gain of 89.3g/day and 88g/day when the goats were fed the king grass with or without the exogenous enzymes respectively. The different of this result due to the effect of faster rate of digested passage when adding the exogenous enzymes in the dietary composition while the present study which used king grass or water hyacinth mixed with the different of energy sources. However, this result is higher than the report of Nieta et al. (2019) who fed the bull calves with different levels of water hyacinth at 10%, 20% and 40% without supplementing energy sources as the present study was used king grass or water hyacinth mixed with either of the ensiled banana stem with rice bran or yeast respectively. However, the result is supported with the study of Bui Phan et al. (2011) who reported that good performance of goats once feeding a basal diet of water hyacinth leaves and supplements of sesbania forage or water hyacinth leaves plus sweet potato vine in the dietary composition of the goats. Anyway, based on the result of Aswanimiyuni et al. (2018) found that the goats got higher than the present findings on daily weight gain per day, when those goats fed either Guinea grass or Napier grass as protein supplementation mixed with palm kernel cake or molasses in the diet. The differences among the finding due to utilize Guinea grass or Napier grass with palm kernel cake or molasses and then it was really caused the goats prefer to consume mores as compared to the experimental diets of the present study. Moreover, the current result is higher than the report of Azeez et al. (2021) who reported that live weight gain of 30.6g/day once the goats were fed water hyacinth of 5% mixed with other ingredients included maize of 15%, palm kernel cake of 20%, cassava peel of 30% and wheat bran of 25% in the diet.

Anyway, the growth curves between the live weight gain and the days of experiment showed that when increased the period of the experiment and then the live weight gain of goats in treatments which using the king grass mixed with EBR or EBY were increased than the treatment using water hyacinth mixed with EBR or EBY (Figure 6). By the way, the relationship between DM intake and live weight gain of goats were expressed that the live weight gain was increased linear by following the dietary intake of goats (Figure 7).

Table 4 Mean Values for the main Effects on the Growth Performance and Feed Conversion Ratio of Goats

	EBR	EBY	P-value	KG	WH	P-value	SEM
<b>Live weight, kg</b>							
Initial	15.3	15.6	0.83	16.0	14.8	0.48	1.15
30 days	16.8	16.9	0.94	17.3	16.3	0.64	1.42
60 days	17.7	18.3	0.77	18.9	17.1	0.41	1.43
Final	18.4	19.2	0.33	19.9	17.8	0.33	1.45
<b>Live weight gain, g/day</b>							
0-30 days	50.0	42.6	0.72	42.6	50.0	0.72	14.0
30-60 days	55.6 <sup>b</sup>	77.2 <sup>a</sup>	0.04	85.5 <sup>a</sup>	47.2 <sup>b</sup>	<0.001	6.35
0-60 days	52.8	59.9	0.53	64.0	48.6	0.19	7.61
<b>FCR, kg/kg of body weight</b>							
0-30 days	6.50	5.77	0.77	7.03	5.24	0.47	1.66
30-60 days	8.71 <sup>a</sup>	6.62 <sup>a</sup>	0.11	5.47 <sup>b</sup>	9.86 <sup>a</sup>	0.01	0.82
0-60 days	9.29	7.34	0.32	6.49	10.1	0.08	1.31

ab Mean values within row without a common letter are different at P<0.05

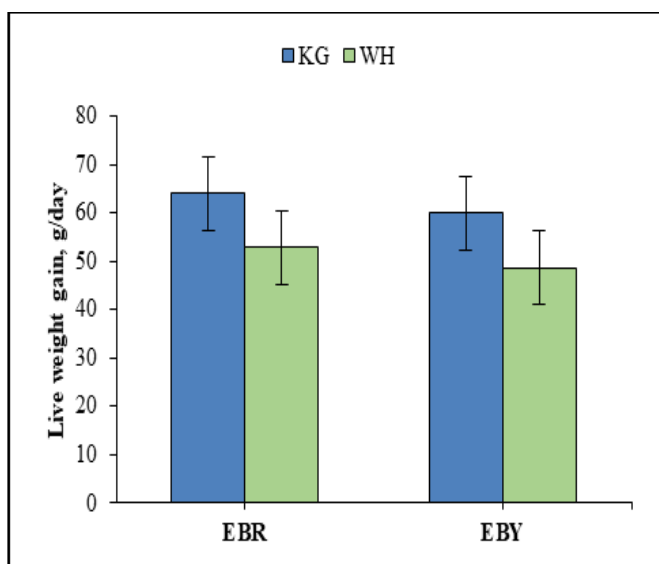


Fig 5 Growth Performance of Goats from 0-60 Days

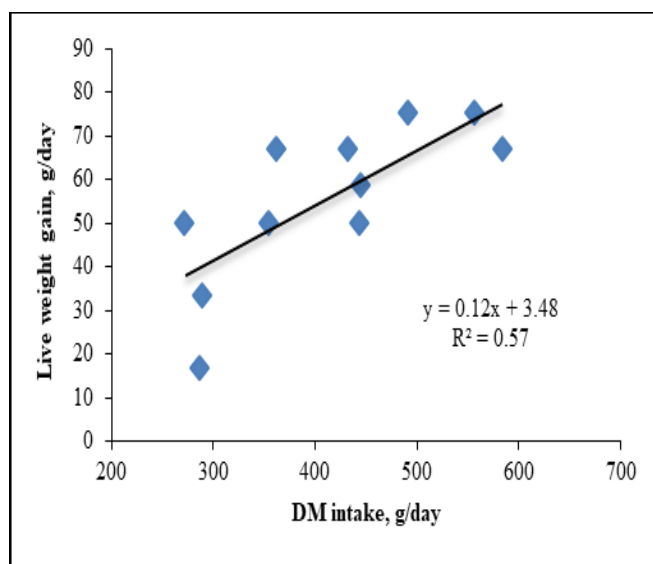


Fig 7 Relationship between Live Weight Gain and DM Intake of Goats from 0-60 Days

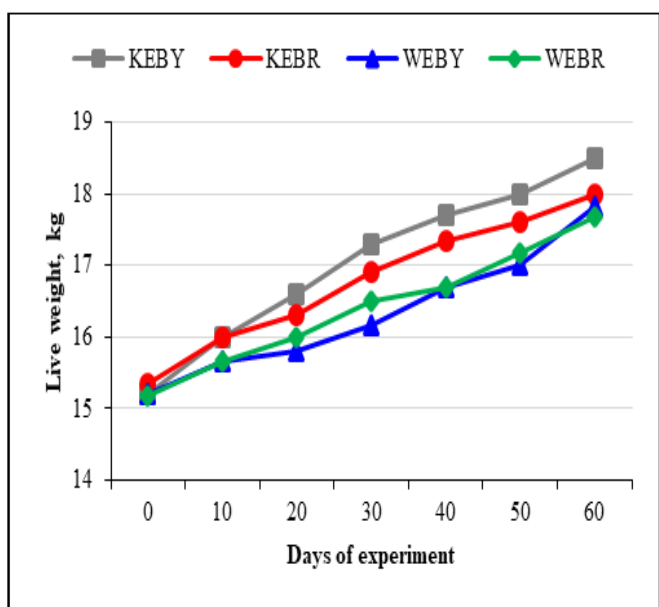


Fig 6 Growth Curves of Live Weight with Days of Experiment of Goats from 0-60 Days

C. Feed Conversion Ratio of Goats

The overall of feed conversion on the energy source were non-significant different for the ensiled banana stem with rice bran (EBR) compared with the ensiled banana stem with yeast (EBY) ( $P>0.05$ ), and were non-significant different too for using the king grass compared with water hyacinth ( $P>0.05$ ). However, it was better performance on the treatment of which using the king grass mixed with EBR or EBY compared with the water hyacinth mixed with EBR or EBY (Table 4 and Figure 8).

The current finding is better than the report with Mao Li et al. (2020) who reported that the feed conversion ratio of 7.24 and 7.39 when the goats were fed the king grass with or without the exogenous enzymes respectively. According to the report of Sunday and Dada (2002) was indicated that the feed conversion of goats was better improvement rather than the result recently, as goats were fed the water hyacinth of 40% by mixing with cowpea pods of 30% and groundnut stubbles of 30% in the experimental diet. The difference of both reports is due to high content of fiber when the current

study used the whole plant of water hyacinth and ensiled banana stem with rice bran while the dietary composition by these authors used water hyacinth with cowpea pods and groundnut stubbles which are low in fiber content but high protein in the diet. In addition, the result of Aswanimiyuni et al. (2018) found that the feed conversion of goats was better improvement rather than the report of the present trial. The differences among the finding due to utilization of Guinea grass or Napier grass with palm kernel cake or molasses and then this diet was caused the goats increased the feed consumption if compared with the dietary consumption of the diets currently. However, the current result is accepted with the report of Azeez et al. (2021) who reported that better feed conversion when the goats were fed water hyacinth of 5%, maize of 15%, palm kernel cake of 20%, cassava peel of 30% and wheat bran of 25% were mixed in the dietary composition prior fed to the goats.

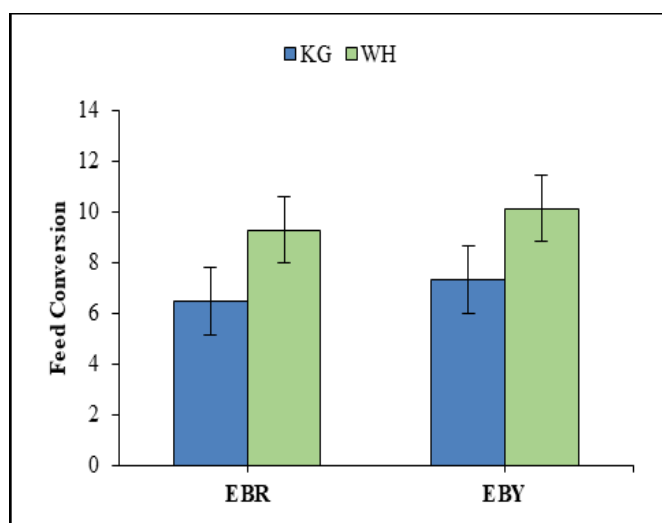


Fig 8 Feed Conversion Ratio of Goats from 0-60 Days

#### IV. CONCLUSIONS AND RECOMMENDATIONS

As implementation of the experiment on effect of using king grass and water hyacinth fed banana stem ensiled with rice bran or yeast on growth performance of local goats, it was concluded as following:

The intake in dry matter (DM) on the energy sources were non-significant different for the ensiled banana stem with rice bran (EBR) compared with the ensiled banana stem with yeast (EBY) while on the protein sources were higher significant for the king grass compared with the water hyacinth.

The live weight gain on the energy sources were slightly high for the ensiled banana stem with rice bran (EBR) compared with the ensiled banana stem with yeast (EBY), and were slightly high as king grass compared with water hyacinth. However, either energy sources or protein sources were non-significant.

The feed conversion on either the energy sources or the protein sources were non-significant different. However, it was better improvement on the treatment which feeding king

grass mixed with EBR or EBY compared with water hyacinth mixed with EBR or EBY.

In conclusion, when offering the protein source of king grass combined with the energy source of the ensiled banana stem with rice bran or yeast in the goat diets, it was increased on DM intake, growth rate and better improvement of feed conversion of goats as compared to the use of water hyacinth plus ensiled banana stem with rice bran or with yeast.

The recommendation from the research results is feeding the natural resources likely the king grass and water hyacinth are good sources of protein supplementation for goat feeding materials with the energy feeds. In regard to this, it would be further tested in the next research with the research title of effect of king grass alone or king grass combined with water hyacinth fed basal diets of either ensiled banana stem with rice bran or ensiled banana stem with yeast as energy sources on the digestibility study and the growth performance of growing goats.

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