Effect Sacharomyces cerevisiae and Sapindus rarak supplementation in diet based of Oil Palm Frond (OPF) on nutrient digestibility and daily weight gain of Goat

Mardiati Zain,J. Rahman, Khasrad

Department of Animal Nutrition,
Faculty of Animal Science,
Andalas University, Padang - Indonesia

Introduction

- OPF has the potential to be used as a source of fiber feed or as a component of a complete ration for ruminants but it is contain low protein and high fiber content.
- To overcome these problems, a strategy to maximize the utilization of it in the rumen is required; i.e by providing an optimum condition for microbe growth.
- Ruminant nutrition depends on a fermentative digestive system involving a complex mix of microorganisms

Priorities in Ruminant Nutrition in this researh

Balance the nutrition of the rumen microbes to ensure maximum growth

- Supplement with direct fed microbial (DFM)
- Suplement with defaunating agent

DIRECT FEED MICROBIAL

- Viable microbes used as dietary supplements having potential for improving health or nutrition of the host upon ingestion

DFM for ruminant

- Bacteria
  Lactobacilli, Bifidobacteria, Enterococci streptococci

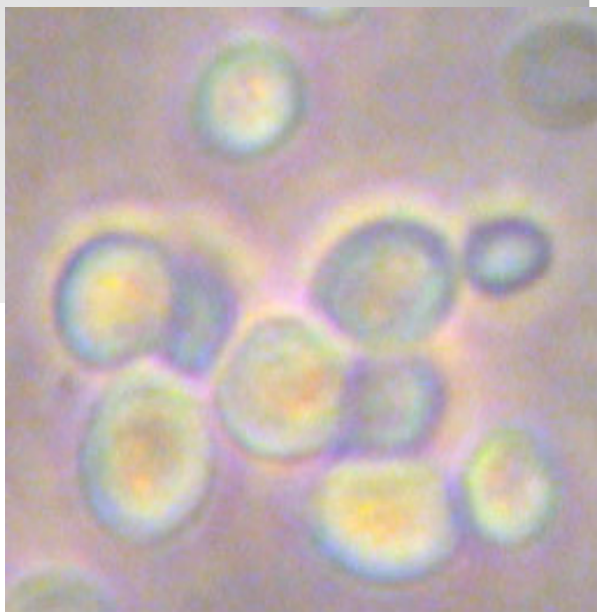
- Yeast
  Sacharomyces cerevisiae
  Aspergillus oryzae

During recent years have been used to improve the nutritive value and utilization efficiency of low-quality roughages.

Saccharomyces cerevisiae

Effects:

- ↑ stability of the rumen environment
- ↑ fermentation
- ↑ VFA production
- ↓ lactate production
- ↑ utilization of ammonia
- ↑ microbial protein synthesis



DEAFUNATING AGENT

- **Protozoa would predation and digestion of bacteria when fed low-quality.**
- ***Sapindus rarak* fruit pericarp extract used to reduce the number of rumen protozoa because its contain high saponin that have a potency to suppress growth of the protozoa and increasing the rumen bacteria and change fermentation patterns in the rumen system**

- This study was designed to investigate the effect of direct addition of *Sacharomyces cerevisiae* and Sapindus rarak of feed based on OPF in Goat diet on nutrient digestibility and live weight gain.
-

MATERIAL AND METHOD

- Six teen male Ettawa Goat (45 ± 13.5 kg (SEM) liveweight) were allocated to four treatments in a randomised block design, with four replicates per treatment.
- The four treatments were

  (A). native grass + concentrate

  (B). OPF(previously treated with 3% urea) + concentrate,

  (C). Diet B + 1% *S.cerevisae* and

  (D). Diet C + 0.4% *sapindus rarak*.

- The animals were adjusted to their treatments over a 2 week preliminary period which was followed by an 8 weeks experimental period.
- Feed intake was determined daily and liveweight was measured once each week.
- Digestibility was measured by total faecal collection over 5 consecutive days on during last week of the experimental period.
- Data were analysed using the General Linear Model procedure in Statistical Analysis Software (SAS, version).

- Live *Sacharomyces cerevisiae* cells srtain Meyen ex Hansen (Collection of Biotechnology Laboratory of Gajah Mada University, Jokyakarta Indonesia) were used as a DFM, and contained 4×10^9 live organisms/g, plus the carrier (medium) on which it was grown.

- The *Sapindus rarak* fruits were dried in an oven at 60°C until they consisted of 90% dry matter. After drying, the whole fruits (including seed) were ground immediately.

Ingredient composition and nutrition of experimental diet

Item	Diet			
	A	B	C	D
OPF	-	50	50	50
Grass	50	-	-	-
Rice brand	28	28	28	28
corn	10	10	10	10
Coconute cake	11	11	11	11
Salt	0.5	0.5	0.5	0.5
Mineral	0.5	0.5	0.5	0.5
Total	100	100	100	100
Suplementation				
S. cerevisiae	-	-	1	1
Sapindus rarak	-	-		0.4
Nutrition (%)				
Protein	12.66	12.01	12.01	12.01
TDN	6273	60.83	60.83	60.83
Lemak	3.60	3.95	3.95	3.95
BETN	49.91	48.66	48.66	48.66
NDF	43,14	46,75	46,75	46,75
ADF	35,24	37,55	37,55	37,55

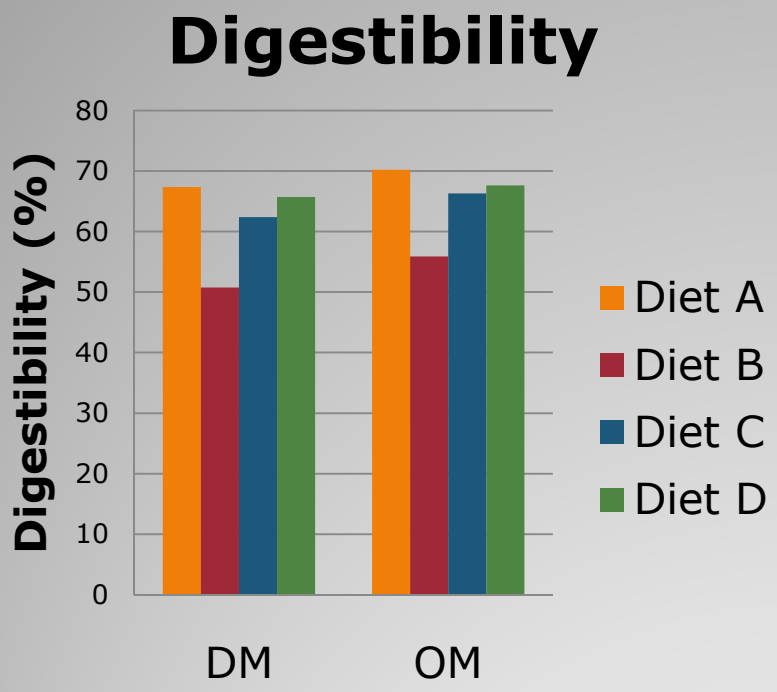
- Feed and fecal were ground to pass through a 1-mm screen and composited. Dry matter, organic matter and nitrogen were analyzed by standard methods (AOAC, 1990). Neutral detergent fiber (NDF), acids detergent fiber (ADF), cellulose were determined by procedures outlined by Gorieng and Van Soest (1970).

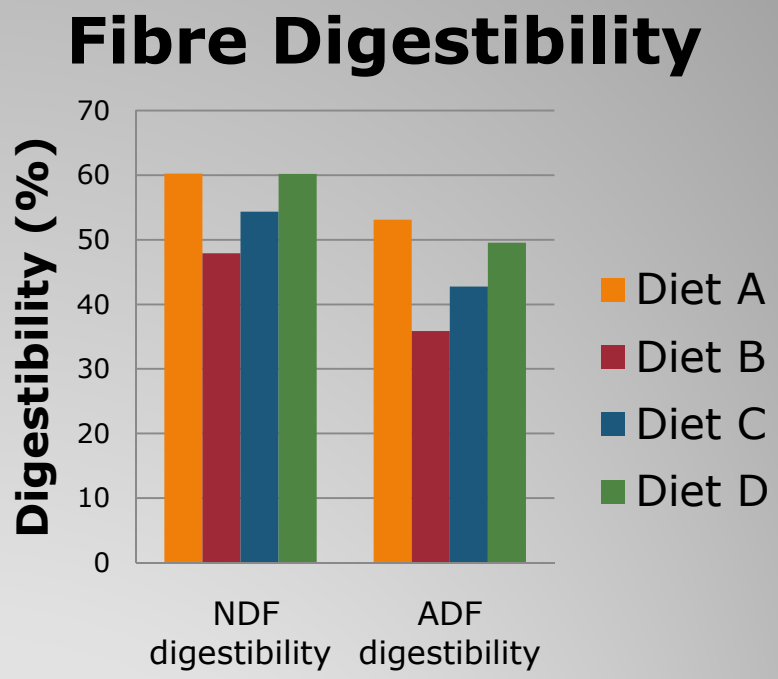
RESULT AND DISCUSSION

Nutrient Digestibility of experimental diets

Item	Treatment			
	A	B	C	D
Dry matter digestibility (%)	67.37^{a}	50.74^{c}	62.38^{b}	66.71^{a}
Organic matter digestibility (%)	70.20^{a}	55.90^{c}	66.33^{b}	67.64^{b}
NDF digestibility (%)	60.22^{a}	47.90^{c}	54.34^{b}	60.21^{a}
ADF digestibility (%)	53.12^{a}	35.89^{c}	42.74^{b}	51.52^{a}

Value with columns without common letters (a,b,c) differ ($P< 0.01$)
A = grass and concentrate
B = OPF ammoniated + concentrate C = B supplemented with 1% S.ceresiviae
D = C supplemented with 0.4% Sapindus rarak


Digestibility
Digestibility (%)
80
70
60
50
40
30
20
10
0
DM
OM
Diet A
Diet B
Diet C
Diet D


Fibre Digestibility
Digestibility (%)
70
60
50
40
30
20
10
0
NDF digestibility
ADF digestibility
Diet A
Diet B
Diet C
Diet D

Feed intake and live weight gain of cattle with experimental diet

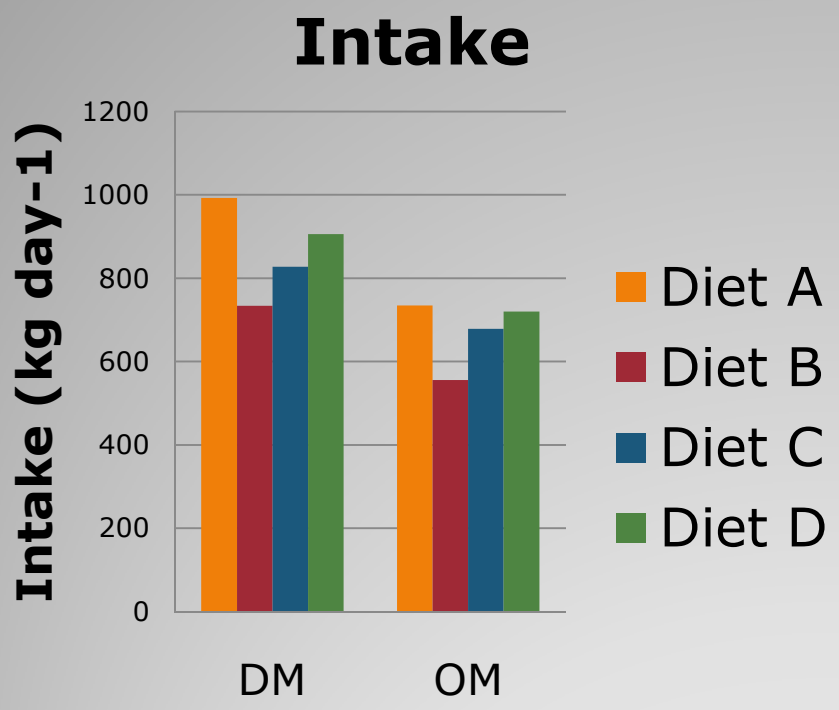
Item	Treatment			
	A	B	C	D
Dry matter intake (g/d)	993[a]	734[b]	828[ab]	906[a]
Organic matter intake (g/d)	735[a]	556[b]	679[ab]	720[a]
Live weight gain (g/d)	132[a]	80[b]	108[c]	123[a]

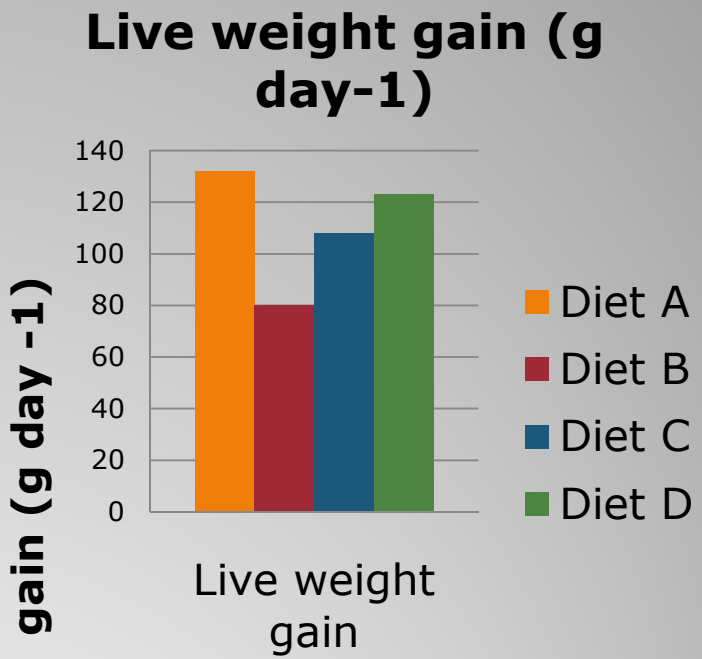
Value with columns without common letters (a,b,c) differ (P< 0.01)

A = grass and concentrate

B = OPF ammoniated + concentrate C = B supplemented with 1% S.ceresiviae

D = C supplemented with 0.4% Sapindus rarak


Intake
Intake (kg day-1)
1200
1000
800
600
400
200
0
DM
OM
Diet A
Diet B
Diet C
Diet D


Live weight gain (g day-1)
gain (g day -1)
140
120
100
80
60
40
20
0
Live weight gain
Diet A
Diet B
Diet C
Diet D

CONCLUSION

According to the results of this experiment, Oil palm fronds can be used to replace the field grass in formulation of complete feed for Goat if supplemented with 1% Sacharomyces cerevisiae and 0.4% Sapindus rarak.

AKNOWLEGNMENTS

This work was supported by National Strategic Research Grant by Directorat General Higher Education, Department of National Education Republic of Indonesia contract no. 06/UN.16/PL-SN/2013.

The study would not have been possible without the cooperation of technical assistance of Laboratory Ruminant Nutrition of Animal Science Faculty of Andalas University

Thank you for your attention