The 3rd International on Sustainable Animal Agriculture for Developing Countries. 496 pages.

First Published: 2011
700 books

Year 2011
496 pages

Printed at: JAOPRAYA PRINTING Ltd.
312 Soi 66/1, Charan Sanit Wong Rd., Khet Bang Phlat, Bangkok 10700, Thailand

The individual contributions in this publication and any liabilities arising from them remain the responsibility of the authors.

The publisher is not responsible for possible damages, which could be a result of content derived from this publication.

International Advisory Committee
Chairman: Assoc. Prof. Dr. Liang Juan Boo (Malaysia)
Secretary: Prof. Dr. James Chin (Australia)

Committee:
Assoc. Prof. Dr. Pongchan Na-Lampang (Thailand)
Prof. Dr. E.R. Örskov (UK)
Prof. Dr. Ge Changrong (China)
Prof. Dr. Long Ruijun (China)
Prof. Dr. Hsai Liang Chou (Taiwan)
Prof. Dr. Junichi Takahashi (Japan)
Prof. Dr. Reza Valizadeh (Iran)
Prof. Dr. Wiranda G. Piliang (Indonesia)
Prof. Dr. Pietro Celi (Australia)

Organizing Committee: The 3rd International Conference on SAADC 2011

President:
Prof. Dr. Prasart Suebka (Rector of SUT)

Advisor:
Prof. Dr. Medha Wanapat

Chairperson
Assoc. Prof. Dr. Pongchan Na-Lampang

Secretary:
Assist. Prof. Dr. Pramote Paengkoum

International Scientific Committee:

Chairperson:
Assoc. Prof. Dr. Wisitiporn Suksumbhat

Secretary:
Assist. Prof. Dr. Chalermporn Yuangklang

Committee:
Prof. Dr. E.R. Örskov (UK)
Prof. Dr. Reza Valizadeh (Iran)
Prof. Dr. Pietro Celi (Australia)
Prof. Dr. James Chin (Australia)
Prof. Dr. Akio Takenaka (Japan)
Assoc. Prof. Dr. Chalong Wachirapakorn (Thailand)
Assoc. Prof. Dr. Nuanchan Paraksa (Thailand)
Assoc. Prof. Dr. Jatuporn Krajaysri (D.V.M.) (Thailand)
Prof. Dr. Uthairat Na-Nakorn (Thailand)
Assoc. Prof. Dr. Monchais Duangginda (Thailand)
<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Culture</td>
<td>Assoc. Prof. Neung Teamroong</td>
</tr>
<tr>
<td></td>
<td>Dr. Samorn Ponchunchoovong</td>
</tr>
<tr>
<td>Fund-Raising/Finance</td>
<td>Assist. Prof. Dr. Bauchern Likitdecharote</td>
</tr>
<tr>
<td></td>
<td>Dr. Wittawat Molee</td>
</tr>
<tr>
<td>Public Relations</td>
<td>Assoc. Prof. Dr. Rangsan Wongsan</td>
</tr>
<tr>
<td></td>
<td>Assist. Prof. Dr. Surintorn Boonanunntanasarn</td>
</tr>
<tr>
<td>Website manager</td>
<td>Assist. Prof. Dr. Surintorn Boonanunntanasarn</td>
</tr>
<tr>
<td>Accommodation</td>
<td>Dr. Sitis Khempaka</td>
</tr>
<tr>
<td>Registration</td>
<td>Dr. Amomrat Mokce</td>
</tr>
<tr>
<td>Exhibition/Venue/poster displays</td>
<td>Assist. Prof. Dr. Pakanit Kupitayunom</td>
</tr>
<tr>
<td>Transportation/Tour</td>
<td>Assist. Prof. Dr. Pipat Lounglawan</td>
</tr>
<tr>
<td>Treasurer</td>
<td>Warang Weerasakint</td>
</tr>
</tbody>
</table>

Committee:

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assoc. Prof. Dr. Chalang Wachirapakorn</td>
<td>Dr. Siwaporn Paengkoun</td>
</tr>
<tr>
<td>Assoc. Prof. Dr. Anut Chantirakul</td>
<td>Anan Petnum</td>
</tr>
<tr>
<td>Assoc. Prof. Dr. Songsak Chumpawadee</td>
<td>Dr. Onanong Poungchompu</td>
</tr>
<tr>
<td>Assoc. Prof. Dr. Opat Pimpa</td>
<td>Dr. Sasiphan Wongsuthavas</td>
</tr>
<tr>
<td>Dr. Jamlong Mitchaofhaj</td>
<td>Rachakris Lertpatakomol</td>
</tr>
<tr>
<td>Assoc. Prof. Dr. Chalermpont Yangklang</td>
<td>Jiravan Khotsakdee</td>
</tr>
<tr>
<td>Assoc. Prof. Dr. Krausit Vasupen</td>
<td>Dr. Sitis Khempaka</td>
</tr>
<tr>
<td>Dr. Snerjai Bureenok</td>
<td>Sirinthip Traiyakun</td>
</tr>
<tr>
<td>Assoc. Prof. Dr. Surintorn Boonanunntanasarn</td>
<td>Prumart Nooeo</td>
</tr>
<tr>
<td>Tanasaamonwan Punnun</td>
<td>Ratikan Suwannasing</td>
</tr>
<tr>
<td>Dr. Parnada Titabutr</td>
<td>Dr. Onanong Poungchompu</td>
</tr>
<tr>
<td>Suppoena Srisakham</td>
<td>Dr. Kaemwich Jantama</td>
</tr>
<tr>
<td></td>
<td>Saranpong Thonguang</td>
</tr>
<tr>
<td></td>
<td>Kanokwan Kamlakorn</td>
</tr>
</tbody>
</table>
List of Reviewers:

Asstc. Prof. Dr. Joongsoo Chang
Korea National Open University
University of Natural Resources and Applied Life Sciences

Dr. Gábor Mészáros
University of Guelph

Dr. Astrid Koeck

Asstc. Prof. Boonlom Cheva-Isarakul
Emeritus from Chiang Mai University

Asstc. Prof. Dr. Chalong Wachirapakorn
Khon Kaen University

Asstc. Prof. Dr. Chainarong Navanukraw
Khon Kaen University

Asstc. Prof. Dr. Suporn Katawatin

Assoc. Prof. Dr. Wisittiporn Sukombat
Suranaree University of Technology

Assoc. Prof. Dr. Rangsan Panpai
Suranaree University of Technology

Assoc. Prof. Dr. Pramote Paengkoum
Suranaree University of Technology

Dr. Amonrat Molee
Suranaree University of Technology

Assoc. Prof. Dr. Suriyorn Boonanuntanasarn
Suranaree University of Technology

Assoc. Prof. Dr. Charueya Yimrattanaborn
Suranaree University of Technology

Assoc. Prof. Dr. Nopadon Pirarat
Chulalongkom University

Dr. Prapansak Srisapoome,
Kasetsart University

Dr. Nittaya Chaiyanale
Burapha University

Assoc. Prof. Dr. Songsak Chumpawadee
Mahasarakham University

Assoc. Prof. Dr. Anut Chantiratikul
Mahasarakham University

Dr. Khantita Ruangwittayanusom
Mahasarakham University

Dr. Chakrapong Chaikong

Assoc. Prof. Dr. Chalermporn Yaungklang
Rajamangala University of Technology Isan

Assoc. Prof. Dr. Kraisit Vatupen
Rajamangala University of Technology Isan

Dr. Sasiphan Wongsuchavas
Rajamangala University of Technology Isan

Assoc. Prof. Dr. Somchit Guntaprom
Rajamangala University of Technology Isan

Assoc. Prof. Dr. Chummarawit Promkot
Rajamangala University of Technology Isan

Assoc. Prof. Dr. Jakrit Yaeram
Rajamangala University of Technology Isan

Dr. Kacwta Sootsuwan
Rajamangala University of Technology Isan

Dr. Smerjai Burecnok
Rajamangala University of Technology Isan

Dr. Onanong Pongchompu
Rajamangala University of Technology Isan

Dr. Chaluntern Vichasilp
Rajamangala University of Technology Isan
List of Reviewers (cont.)

Assoc. Prof. Dr. Komsan Amneysit
Assoc. Prof. Dr. Panrapee Amneysit
Assoc. Prof. Dr. Warita Sintawewarkul
Assoc. Prof. Dr. Thanongsak Mamorn
Assoc. Prof. Phinidda Cha-unphol
Dr. Jamlong Mitchaothai
Assist. Prof. Dr. Walaiporn Tonpitak
Dr. Yongsriwa Soppibhandhu
Dr. Doungjit Kuanangpcean
Dr. Doungjai Rianratkwong
Suppakit Kaekwkan
Dr. Jetsada Rauprapradit
Dr. Irbananjei Wiengcharoen
Dr. Danai Sangthong
Thanakorn Poirprasath
Thuchadaporn Chaikhan
Dr. Sunpatch Sophon
Rachakris Leetpatamkornol
Tassanee Thiyatapiwan
Dr. Supawadee Manlarinon
Daorung Sila-on
Dr. Siwaporn Paengkouna
Dr. Anan Chaokaur
Dr. Narin Preyavichyapugdee

Assoc. Prof. Rittichai Pilachai
Anan Petum
Walaithuk Kaewwongsa

Assoc. Prof. Dr. Phussakom Nuntapanich

Assoc. Prof. Dr. Opap Pimpa

Dr. Sittisak Khampa

Rajamangala University of Technology Lanna
Rajamangala University of Technology Lanna
Rajamangala University of Technology Lanna
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Mahanakorn University of Technology
Sripakorn University
Sripakorn University
Sripakorn University
Sripakorn University
Sripakorn University
Udon Thani Rajabhat University
Udon Thani Rajabhat University
Udon Thani Rajabhat University
Ubon Ratchathani Rajabhat University
Prince of Songkla University, Surat Thani Campus
Mahasarakham Rajabhat University
Contents

Message from the President of the SAADC 2011.............................................................................. a
Message from President SAADC International Advisory Committee.................................................. b
Message from the President of the SAADC 2011.......................................................................... c
Academic Committee Chairman's Message......................................................................................... d
International Advisory Committee................................................................................................. e
List of Reviewers: ........................................................................................................................... f

SUSTAINABLE / ORGANIC
-OP0001- The implementation of the integrated sustainability farming systems on feedlot beef cattle
farmer groups in Central Java Province, Indonesia ............................................................................. 2
Riyanto, J., A.I. Sari & Lutojo
-OP0002- Locally derived sustainability indicators for Bali cattle farming systems on Ceram Island,
Indonesia ........................................................................................................................................... 3
Attamimi, F., M. Siegmund-Schulze & A. Valle Zarate
-OP0004- Development of sustainable livestock production systems in Sergia ................................... 4
Petrovic, P.M., M.M. Petrovic, V. Caro Petrovic, D. Razic Muslic, M. Zujovic, Z. Tomic & N. Maksimovic
-OP0005- How to improve the Brazilian dairy chain through productivity indicators to get a sustainable supply chain? ......................................................................................... 5
Okato, M.T.; O. Vendrametto & O.S. Santos
-OP0006- Ladies, livestock and social status: Agricultural education of women livestock farmers
towards status anxiety ...................................................................................................................... 6
Litouas, E.D., C. Charatsari, I. Tzimitra-Kalogianni & A. Papadaki-Klavdianou
-OP0008- Improving linear type traits to improve production sustainability and longevity in purebred
Sahiwal cow ....................................................................................................................................... 7
Dubey, A. & S. Mishra
-OP0010- Potential of dairy cattle development in Boyolali Central Java, Indonesia .......................... 8
Hidayah, N., B. Gunatoro, E. Salastri & Y. Suranindyah
-OP0012- Social integration and socio-economic gains of farmers’ associations with cattle dispersal
program in Dolores, Quezon, Philippines ...................................................................................... 9
Dacillo, P.G.
-OP0013- The survey of the production cost and marketing channel for the beef in Taiwan .......... 10
Leu, S.Y. & M.C. Lee
-OP0105- Estimation of economic values for some important traits in native black goat in Iran ....... 11
Vatanakhah, M.
-OP0109- Evolution of the land use efficiency by Brazilian bovine husbandry during the last three
decades .......................................................................................................................................... 12
-OP0115- Exploring collective action among dairy cattle farmers in Getasan Regency, Central Java
Indonesia .......................................................................................................................................... 13
Gayatri, S., J.T. Dizon, C.M. Rebancos & N.J.V.B. Querijero
-OP4123- Effects of enzyme levels in total mixed ration containing oil palm frond silage on intake and growth performance of male goat ................................................................. 230  
Wahyuni, R.D., W. Ngampongsai, C. Wattanachant, W. Visessangchan & S. Boonpayung

-OP4124- Effect of ground krabok seed on feed intake, nutrient digestion and growth performance in sheep ................................................................. 231  

-OP4125- Nitrogen utilization of Thai native cattle fed various metabolizable energy levels .......... 232  
Tangjitwattanachai, N., & K. Sommart

-OP4126- Metabolism and rumen parameters of Taiwan meat goat fed silage made from oyster mushroom (Pleurotus ostreatus) cultivation residue ........................................ 233  
Rangubhet, K.T., N.A. Nguyen & Y.K. Fan

-OP4127- Screening yeasts from ruminal fluid of dairy heifer fed a different ratio roughage to concentrate diets ................................................................. 234  
Sirisan, V. & V. Pattarajinda

-OP4128- Effect of roughage to concentrate ratio on rumen fermentation, bacterial population and microbial protein synthesis in dairy steers .................................................................................. 235  
Gumm, P. & M. Wanapat

-OP4130- Study on the antioxidative activity of beef in Hanwoo Steers (Bos taurus coreanae) fed mulberry silage ................................................................. 236  

-OP4131- Evaluation of polyclonal antibodies in cattle adapted or not to highly fermentable carbohydrates diets ................................................................. 237  

-OP4133- Effect of different protein level on feed intake, average daily gain and feed conversion ration of beef heifers.................................................................................. 238  

-OP4135- Effect of proportion of total mixed ration and fermented total mixed ration on feed intake, nutrient digestion and rumen fermentation in dairy cows .................................................................................. 239  
Yuangklang, C., K. Vasupen, S. Bureenok, S. Wongsuthavas, P. Panyakaew, C. Wachirapakorn & J. Khotsakdee

-OP3137- Exploration of urinary creatinin to determine the carcass and its protein weight in beef cattle .................................................................................. 240  
Purnomoadi, A., T. Wahyuningsih & E. Rianto

-OP4138- Utilization of cassava leaves as supplement to improve Bligon goat performance .......... 241  
Kustantinah, A., H. Hartadi & A.N. Wihowo

-OP4139- Management and productivity of Etawa grade goats in Kaligesing Sub-district, Purworejo Regency, Central Java Province, Indonesia .................................................................................. 242  
Rianto, E., A. Purnomoadi, M. Arifin, C.M. Sri Lestari & S. Dartosukarno
Utilisation of cassava leaves as supplement to improve Bligon Goat performance

Kustantinah A.*, H. Hartadi, A. N. Wibowo
Faculty of Animal Science, University of Gadjah Mada, Yogyakarta, Indonesia
*Address: Faculty of Animal Science, University of Gadjah Mada, Jl. Fauna no 3, Bulaksumur, Yogyakarta 552551 Indonesia
e-mail: kustantinah@ugm.ac.id

Abstract

Agricultural by-products, especially from cassava (Manihot esculenta Crantz), can be easily found all over Indonesia. Parts of cassava that can be used for animal feed are leaves, stem skin covering, tuber (in dry or wet condition, with or without skin). Cassava leaves cannot be used freely as animal feed, because of the persistence of anti-quality, i.e. Cyanide Acid (HCN) and tannin substance. Cassava leaves can be found easily in the dry season, when generally the presence of forage as ruminant's diet is so limited. This research used 24 mature Bligon goats. The goats were divided into 3 treatments, those are: C as Control Diet (conventional diet which usually be given by the farmers); T1 or Treatment 1 (Control Diet + 300 g cassava leaves); and T2 or Treatment 2 (Control Diet + 260 g cassava leaves + 200 dried cassava tuber). The result showed that cassava leaves supplementation increased either extract (EE) and total digestible nutrients (TDN) consumption. From total consumption, cassava leaves and dried cassava tuber increased dry matter (DM), organic matter (OM), crude protein (CP), EE, and TDN digestibility, but reduced crude fibre (CF) digestibility. The effect of anti-coccidiosis did not come up optimally shown no significant differences of the number of coccidial oocyte in the goat faeces.

(Key words: Coccidiostat, Farmer, Feed Supplement, Local feed
You may have to define each of the abbreviations)

Introduction

Indonesia is a large producer as cassava (Manihot esculenta Crantz), in 2008 the total production was 21,756,991 ton, in 2009 the total production was 22,039,145 Ton and in 2010 the total production was 23,908,459 Ton. Cassava has the potential to be used in ruminant nutrition but there are some potential toxic effects due to cyanide acid (HCN). Product of cassava that can be used for feedstuffs are leaves, stem, skin of stem, roots and skin of roots. The percentage of leaves were 8.71%, stem were 32.20% and tuber were 58.81% (Suharsono 2011, unpublished). In using the products of cassava, we have to pay attention to the existence of cyanide (HCN) and tannin. Cassava leaves contain HCN of about 0.77% to 0.84%, while Widyaustiti (2005) found that the content was high namely about 0.58% to 0.63%. Ngamsaeng et al (2006) found that the condensed tannin (CT) was about 2.2% DM and the crude saponin was (SC) 1.7% DM while Kiyongthong and Wanapat (2003) showed that cassava leaves contain CT up to 3.3% (DM). Tannin can be used as anti parasite agent of gastro intestinalis namely coccidia and worm (Seng Sokerya et al. 2003).

The purpose of the research is to study the effects of cassava products (leaves and dried tuber/gapelot) as a protein source supplement and a source of energy of small ruminant and as Coccidiostat of digestion tract.

Material and Method

This research was conducted in Wonolagi village, Gunungkidul Regency, Indonesia. Cassava were planted intercropped with peanut or maize. The treatments were T1: a supplement of 300 g of cassava leaves (CP 21.60% TDN 67.40%) and T2 provided a supplement of 260 g of cassava leaves and 200 g of dried tuber cassava (CP 13.10%, TDN 75%) and the control (without supplement) where basal feed (CP 12% TDN 65%) was given in the proportion usually used by farmer. Each treatment consists of 8 mature Bligon goats in early pregnancy, age 20 month old. average live weight were 24.50 kg. The goats used were raised by Sumber Rejeki Female Farmer Group that is under the supervision of the Animal Science Faculty University of Gadjah Mada. The rations were given for two months, in the last two weeks, the data of feed offered, feed remaining...
and faeces were collected successively. Forage given as the basal were observed and the quantity given was noted daily.

The variables observed were the species of forage given by the farmers, the chemical composition analyses were use proximate (dry matter/DM, orgainc matter/OM, crude protein/CP, extract ether,EE, crude fiber/CF (AOAC., 2005) and calculation of TDN used the equation of Hartadi et al., 1997. Nutrient intake and digestibility were calculated for DM, OM, CP, EE, CF, and TDN, and the number of coccidial oociste found in the faeces. The data obtained were analyzed by one-way variance, and the differences due to different treatments were analyzed by Duncan’s test (Astuti, 1981).

Results and Discussion

The research was conducted in the dry season, namely from August to October. There were 18 forage species used by the farmers. They were classified as grass, leguminous, agricultural waste, and leaves (Table 1). Previous studies conducted by Ernawati (2003) found out that there were 22 forage species used in Kwarasan village in Gunungkidul regency.

Feed Intake and nutrient digestibility

There was no significant difference in terms of the DM, OM, CP and CF consumed by the two treatments (T1 and T2) compared to the C (Table 2). Basal feed added by the source of protein (T1) or added by the source of protein and source of energy did not show different result compared to C, although treatment feed tended to show higher value T1 and T2, showing 35.8 and 40.2 g/kg BW. The DM intake ranged between 36-40 g/kg BW/day. The daily need of DM for a goat with a body weight of about 30-40 kg, in the condition of early pregnancy ranges about 30.25 to 32.7 g/kgBW/day (NRC, 1981). Seen from that point of view, it can be concluded that the consumption of DM both in the treatments groups (T1 and T2) and the control group was higher than the one prescribed in the references. The consumption of OM of T2 (35.5 %) was higher compared to the one in T1 (31.6%). It was probably caused by the effect of adding dry cassava as a supplementary energy source. CP supplement addition (T1) and CP source and energy (T2) did not give a significant difference with the control. It was found that the consumption CP for control group was 4.32 g/kgBW/day, while the value for T1 and T2 were about 5 g/kg BW/day. According to NRC, the requirement of CP is only about 2.5 g/kgBW/day (NRC, 1981). Mulyanti (2004) stated that a Bligon goat with a similar physiology needed 2.77 g/kg BW/day.

<table>
<thead>
<tr>
<th>No</th>
<th>Forage species</th>
<th>DM</th>
<th>OM</th>
<th>CP</th>
<th>CF</th>
<th>Extract Ether</th>
<th>TDN*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>King Grass</td>
<td>17.1</td>
<td>83.4</td>
<td>10.1</td>
<td>30.0</td>
<td>1.5</td>
<td>55.5</td>
</tr>
<tr>
<td>2</td>
<td>Native grass</td>
<td>21.5</td>
<td>81.0</td>
<td>12.4</td>
<td>29.2</td>
<td>1.5</td>
<td>56.3</td>
</tr>
<tr>
<td>3</td>
<td>Imperata cylindrica</td>
<td>33.4</td>
<td>91.8</td>
<td>6.3</td>
<td>40.6</td>
<td>0.9</td>
<td>54.0</td>
</tr>
<tr>
<td>4</td>
<td>Leucaena leucocephala</td>
<td>32.3</td>
<td>89.7</td>
<td>19.1</td>
<td>19.4</td>
<td>2.4</td>
<td>69.1</td>
</tr>
<tr>
<td>5</td>
<td>Gliciridia maculine</td>
<td>18.1</td>
<td>89.1</td>
<td>23.5</td>
<td>24.8</td>
<td>2.82</td>
<td>62.6</td>
</tr>
<tr>
<td>6</td>
<td>Peanut straw</td>
<td>38.6</td>
<td>88.5</td>
<td>13.4</td>
<td>23.2</td>
<td>0.4</td>
<td>51.9</td>
</tr>
<tr>
<td>7</td>
<td>Corn stover</td>
<td>29.8</td>
<td>88.9</td>
<td>6.8</td>
<td>28.8</td>
<td>1.2</td>
<td>49.0</td>
</tr>
<tr>
<td>8</td>
<td>Ke Benguk Leaves</td>
<td>20.5</td>
<td>92.0</td>
<td>17.2</td>
<td>23.2</td>
<td>1.4</td>
<td>65.3</td>
</tr>
<tr>
<td>9</td>
<td>Ke Panjang Leaves</td>
<td>16.4</td>
<td>87.9</td>
<td>20.4</td>
<td>27.0</td>
<td>3.0</td>
<td>58.1</td>
</tr>
<tr>
<td>10</td>
<td>Soybean leaves</td>
<td>49.2</td>
<td>93.2</td>
<td>6.8</td>
<td>43.4</td>
<td>1.7</td>
<td>49.7</td>
</tr>
<tr>
<td>11</td>
<td>Banana Leaves</td>
<td>21.9</td>
<td>87.5</td>
<td>14.1</td>
<td>31.1</td>
<td>4.6</td>
<td>56.1</td>
</tr>
<tr>
<td>12</td>
<td>Beringin Leaves</td>
<td>18.1</td>
<td>85.7</td>
<td>11.1</td>
<td>33.0</td>
<td>2.5</td>
<td>52.0</td>
</tr>
<tr>
<td>13</td>
<td>Sambt Leaves</td>
<td>37.4</td>
<td>95.3</td>
<td>16.3</td>
<td>19.6</td>
<td>0.5</td>
<td>66.2</td>
</tr>
<tr>
<td>14</td>
<td>Mahogany leaves</td>
<td>29.0</td>
<td>92.1</td>
<td>11.1</td>
<td>29.8</td>
<td>2.0</td>
<td>59.7</td>
</tr>
<tr>
<td>15</td>
<td>Sowo leaves</td>
<td>27.4</td>
<td>94.4</td>
<td>17.5</td>
<td>26.6</td>
<td>1.6</td>
<td>65.5</td>
</tr>
<tr>
<td>16</td>
<td>Water apple leaves</td>
<td>32.0</td>
<td>91.9</td>
<td>10.9</td>
<td>34.0</td>
<td>3.1</td>
<td>56.1</td>
</tr>
<tr>
<td>17</td>
<td>Jack fruit leaves</td>
<td>44.0</td>
<td>85.9</td>
<td>12.9</td>
<td>23.5</td>
<td>2.3</td>
<td>60.4</td>
</tr>
</tbody>
</table>
The observation on nutrient digestibility showed that the digestibility of DM and OM for T2 and TDN was always higher than that in control and T1. Due to the effect of adding dried cassava, the T2 crude fiber was lower compared to that in C and T1 namely about 16.3% while C and digestibility of CF in T1 was about 22%. Dried cassava contain high ETN of about 92.9%, so that adding 200 g/day of dried cassava will not be beneficial for the development of cellulolytic microbes and it reduces the fiber digestibility. The finding is in accordance with the study of Orskov and Ryle (1990) that stated cellulolytic microbes are sensitive to the changes of pH. When the pH is less than 6.2 then the population will decrease, and the CF less degraded. Sokerya and Preston (2003) used dried cassava leaves as the sole feed or being mixed with grass (50:50 DM) showed that DM digestibility was 70.3% and increased to 81% when cassava leaves were mixed with grass with the same proportion (50:50). CP increased from 78.6% to 88.6% when the feed was a mixture of cassava leaves and grass.

DM digestibility for C was 71.2% while adding cassava leaves increased the value to 76.5%, slightly higher than that in Sokerya and Preston (2003), which was 70%. It was also higher than the one found in the study of Theng Kouch et al (2003) whose value was 73% where cassava leaves were the only feed given to the goats. Tran Thi Thu Hong (2002) gave 100, 75, 50% cassava leaves to goats. They found that DM digestibility were 79.3, 76.3 and 78.3, successively but the leaves were hung.

| Table 2. Intake and digestibility of nutrient (g/kg BW) |
|-------------------|---|---|---|---|---|---|---|
| Intake of nutrient (g/kg L.W) | DM | OM | CP | CF | EE | TDN |
| C | 34.3±1.79 | 30.3±1.5 | 4.3±0.25 | 8.7±0.49 | 0.26±0.17 | 19.55±1.03 |
| T1 | 35.8±2.22 | 31.6±1.94 | 4.9±0.34 | 9.0±0.57 | 0.63±0.36 | 20.06±1.17 |
| T2 | 40.2±2.02 | 35.5±1.74 | 5.0±0.25 | 80.3±0.34 | 0.60±0.17 | 23.57±1.15 |
| Digestibility of nutrient (g/kg L.W) | C | 22.16±0.4 | 73.23±1.56 | 9.78±0.23 | 22.42±1.15 | 0.48±0.14 | 72.86±2.26 |
| T1 | 46.48±2.4 | 78.90±2.17 | 14.02±0.47 | 20.82±0.90 | 2.19±0.19 | 81.33±2.60 |
| T2 | 51.3±2.47 | 82.95±1.26 | 10.3±0.18 | 16.27±0.94 | 1.49±0.05 | 84.61±1.31 |

\(^{(a)}\) (P<0.05) showed no significant difference
\(^{(b)}\) Different superscript in the same column showed significantly difference (P<0.05)

### Oocyste coccidian

*Coccidia* parasites are usually found in the goat raised in stables as usually done by the farmers in Gunungkidul (Kustantinah, et al., 2008). The value of oocyste coccidian in the faeces was 5000*1443, 3333*833 and 2500*80 respectivly, for goats given control feed T1, and T2 (Picture 1). Lin et al (2003) showed the same pattern when using cassava leaves as the sole feed for the goats. Giving cassava leaves showed the value of 820±45 per g faeces compared to giving Guinea grass.
which showed the existence of oocyste coccidial of 4043±207 per gram faeces. Although there was a decrease in the number of oocyste coccidial in the faeces, it was not a significant one (P=0.05). The research using cassava products showed that coccidiostat effects expected from cassava products (leaves and dried cassava) did not come up optimally. Probably it was caused by the process of drying leaves that took 4 days under the direct exposure of the sun. The tannin expected to have coccidiostat effect has been reduced by the drying process. The fact is in accordance with the studies conducted by Kustantinah et al (2004) who stated that drying process can reduce the tannin of fresh cassava leaves from 11% to 4% when they are dried for 4 days. The research conducted by Sokerya and Rodriguez (2001) showed that cassava leaves contain some components (especially CT) having anti parasitic properties for goats. The findings can also be found in Butter et al (2000) and Kahn et al (2001).

**Conclusion**

The supplements derived from dried cassava (leaves and tuber) given to the goats raised by Sumber Rejeki Female Farmer Organization of Wonolagi District did not show significant differences in the intake of nutrients except for the EE and TDN. The expected effect of much lower coccidiostat from cassava products was not found.

**Acknowledgement**

The research was a part of Higher Education Link cooperation between Gadjah Mada University and IFRU-MLURI – Aberdeen University, UK. It was a program of Department for International Development, UK through The British Council Indonesia.

**Reference**


AOAC. 2005. Official Method of Analysis of the Association of Official Analytical Chemists. Published by the Association of Official Analytical Chemists, Maryland, USA.


4
Tran Thi Thu Hong., 2002. Digestibility and N retention by goats fed graded levels of cassava (Manihot esculenta Crantz) foliage. http://www.mekam.org/proc kk/contents.htm


CERTIFICATE

THIS IS TO CERTIFY THAT

Kustantinah Adiwimarta

has participated in oral presentation

THE 3rd INTERNATIONAL CONFERENCE ON SUSTAINABLE ANIMAL AGRICULTURE FOR DEVELOPING COUNTRIES (SAADC2011)

JULY 26 - 29, 2011

NAKHON RATCHASIMA, THAILAND

ASSOC. PROF. DR. PONGCHAN NA-LAMPANG
CHAIRPERSON OF SAADC 2011