Dokumen Bukti Korespondensi untuk karya penelitian dengan judul artikel : **Nutrient Digestibility and Productivity of Bali Cattle Fed Fermented Hymenachne amplexia-calis Based Rations Supplemented with Leucaena leucocephala.**

Penulis : ***Riswandi****, a.i.m. Ali, Muhakka, Y. Syaifudin, dan I. Akbar, Nama Jurnal : Media Peternakan (Journal of Tropical Animal Science and Technology), Vol.38 No.3, Hal.156-162, Desember 2015. ISSN(Print) : 0126-0472, ISSN(Online) : 2087-4634. Penerbit : Faculty of Animal Science, IPB University (Bogor Agricultural University). Terindex di Scopus Q4.

Mulai edisi April 2018 diubah menjadi Jurnal Ilmu Hewan Tropis (Tropical Animal Science Journal), yang terdiri dari :

1. Surat Pemberitahuan Submission dan Proses Review
2. Revised Final Paper Oleh Author
3. Surat Pemberitahuan Penerbitan Artikel di Jurnal Media Peternakan (Journal of Tropical Animal Science and Technology)

1. SURAT PEMBERITAHUAN SUBMISSION DAN PROSES REVIEW

Riswandi Wandi <riswandi_dya@yahoo.com>
Kepada: mediapeternakan@ipb.ac.id, mediapeternakan@yahoo.co.id

Sen, 23 Mar 2015 jam 14.44

Yth. Redaksi Media Peternakan
di
Bogor

Berikut saya lampirkan manuskrip artikel penelitian saya untuk diikutsertakan dalam jurnal media peternakan. mohon kiranya dapat diproses lebih lanjut. atas bantuannya diucapkan terima kasih

Hormat saya,

Riswandi

Riswandi .... docx
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media peternakan <mediapeternakan@yahoo.co.id>
Kepada: riswandi_dya@yahoo.com

Rab, 25 Mar 2015 jam 10.52

Bogor, 25 Maret 2015

Perihal: Penerimaan Manuskrip

Kepada Yth.
Bapak/Ibu Riswandi, Asep Indra M. Ali, Muhakka, Yusuf dan Ilham Akbar
Department of Animal Science, Faculty of Agriculture, University of Sriwijaya Research Center for Sub-optimal Lands (PUR-PLSO), University of Sriwijaya.
Jl. Palembang-Prabumulih KM.32, Indralaya, Ogan Ilir, South Sumatera, Indonesia 30662

Redaksi Media Peternakan, Journal of Animal Science and Technology, telah menerima naskah yang Bapak/Ibu kirimkan dengan judul "Evaluasi Nilai Nutrisi Ransum Berbahan Dasar Rumput Rawa Fermentasi Dengan Suplementasi Lamtoro (*Leucaena Leucocephala*) Sebagai Bahan Pakan Berkualitas Terhadap Produktivitas Ternak Sapi Bali". Naskah tersebut akan diproses pada tahap prakualifikasi oleh Dewan Redaksi Media Peternakan. Mohon agar manuskrip juga dilengkapi dengan form pernyataan (form A) terlampir.

Sebelumnya perlu kami sampaikan juga bahwa MP saat ini dalam tahap inisiasi penggunaan aplikasi online *Open Journal System* (OJS) untuk proses pengolahan manuskrip. Oleh karena itu, kami mohon Bapak/Ibu dapat melakukan pengiriman kembali melalui sistem tersebut yang dapat diakses di website MP http://medpet.journal.ipb.ac.id/. Mohon dapat menginformasikan kepada kami apabila Bapak/Ibu mengalami kesulitan dalam proses tersebut.

Demikian surat ini disampaikan, atas perhatian dan kerjasamanya diucapkan terima kasih.

Irma Nuranthy Purnama
Technical Editor
Media Peternakan- Journal of Animal Science and Technology
http://medpet.journal.ipb.ac.id/

---

media peternakan <mediapeternakan@yahoo.co.id>
Kepada: riswandi_dya@yahoo.com

Kam, 26 Mar 2015 jam 16.11

Nomor : 60/MP/03/2015
Lampiran : 1 eks.
Perihal : **Penyampaian Manuskrip Hasil Seleksi Pra Kualifikasi Media Peternakan**

Kepada Yth. : Bapak/Ibu Riswandi, Asep Indra M. Ali, Muhakka, Yusuf dan Ilham Akbar
Department of Animal Science, Faculty of Agriculture, University of Sriwijaya Research Center for Sub-optimal Lands (PUR-PLSO), University of Sriwijaya.
Jl. Palembang-Prabumulih KM.32, Indralaya, Ogan Ilir, South Sumatera,
Indonesia 30662

Berdasarkan hasil pemeriksaan prakualifikasi terhadap manuskrip yang Bapak/Ibu kirimkan dengan judul "Evaluasi Nilai Nutrisi Ransum Berbahan Dasar Rumput Rawa Fermentasi Dengan Suplementasi Lamtoro (*Leucaena Leucocephala*) Sebagai Bahan Pakan Berkualitas Terhadap Produktivitas Ternak Sapi Bali" terdapat beberapa hal yang harus diperbaiki sebelum proses penelaahan lebih lanjut oleh Mitra Bestari (terlampir).

Kami mohon Bapak/Ibu dapat segera memperbaikinya dan hasil revisi dapat diserahkan 14 hari setelah menerima surat ini. Kami mohon Bapak/Ibu dapat melakukan pengiriman perbaikan manuskrip melalui email dan website MP http://medpet.journal.ipb.ac.id/. Mohon dapat menginformasikan kepada kami apabila Bapak/Ibu mengalami kesulitan dalam proses tersebut.

Demikian, atas perhatian dan kerjasamanya diucapkan terima kasih.

Bogor, 26 Maret 2015
Ketua Editor,
ttd

Prof. Dr. Ir. Komang G. Wiryawan

Bogor, 11 Mei 2015

Perihal: Informasi Manuskrip

Kepada Yth.
Bapak/Ibu Riswandi, Asep Indra M. Ali, Muhakka, Yusuf dan Ilham Akbar
Department of Animal Science, Faculty of Agriculture, University of Sriwijaya Research Center for Sub-optimal Lands (PUR-PLSO), University of Sriwijaya.
Jl. Palembang-Prabumulih KM.32, Indralaya, Ogan Ilir, South Sumatera, Indonesia 30662

Manuskrip yang Bapak/Ibu kirimkan dengan judul "Evaluasi Nilai Nutrisi Ransum Berbahan Dasar Rumput Rawa Fermentasi Dengan Suplementasi Lamtoro (Leucaena Leucocephala) Sebagai Bahan Pakan Berkualitas Terhadap Produktivitas Ternak Sapi Bali" telah diperiksa pada tahap prakualifikasi oleh Redaksi Media Peternakan, Journal of Animal Science and Technology. Manuskrip tersebut memiliki nomor registrasi MP-1513.

Manuskrip akan ditelaah oleh dua orang Mitra Bestari yang ditunjuk oleh Dewan Redaksi Media Peternakan. Hasil penelaahan akan disampaikan oleh Ketua Editor kepada Bapak/Ibu melalui email dalam waktu satu bulan.

Sebelumnya perlu kami sampaikan juga bahwa MP saat ini dalam tahap inisiasi penggunaan aplikasi online Open Journal System (OJS) untuk proses pengolahan manuskrip. Oleh karena itu, kami mohon Bapak/Ibu dapat melakukan penginman kembali melalui sistem tersebut yang dapat diakses di website MP http://medpet.journal.ipb.ac.id/. Mohon dapat menginformasikan kepada kami apabila Bapak/Ibu mengalami kesulitan dalam proses tersebut.

Demikian surat ini disampaikan, atas perhatian dan kerjasamanya diucapkan terima kasih.

Irma Nuranthy Pumama
Technical Editor
Media Peternakan- Journal of Animal Science and Technology
http://medpet.journal.ipb.ac.id/

---

media peternakan <mediapeternakan@yahoo.co.id>
Kepada: riswandi_dya@yahoo.com

Rab, 10 Jun 2015 jam 10.43

Nomor : 109/MP/06/2015
Lampiran : 3 eks.
Perihal : **Penyampaian Manuskrip Hasil Telaahan Mitra Bestari**

Kepada Yth. : Bapak/Ibu Riswandi, Asep Indra M. Ali, Muhakka, Yusuf dan Ilham Akbar
Department of Animal Science, Faculty of Agriculture, University of Sriwijaya Research Center for Sub-optimal Lands (PUR-PLSO), University of Sriwijaya.
Jl. Palembang-Prabumulih KM.32, Indralaya, Ogan Ilir, South Sumatera,
Indonesia 30662

Melalui surat ini kami sampaikan bahwa manuskrip yang Bapak/Ibu kirimkan, dengan judul "Evaluasi Nilai Nutrisi Ransum Berbahan Dasar Rumput Kumpai Fermentasi Dengan Suplementasi Lamtoro (*Leucaena leucocephala*) Sebagai Bahan Pakan Berkualitas Terhadap Produktivitas Ternak Sapi Bali" telah ditelaah oleh Mitra Bestari kami. Berdasarkan hasil penelaahan tersebut, masih terdapat beberapa hal yang perlu diperbaiki. Hasil penelaahan manuskrip tersebut kami sampaikan dalam lampiran surat ini. *Tanggapan atas setiap komentar Mitra Bestari dan petunjuk letak perbaikan yang dilakukan mohon disampaikan dalam keterangan yang terpisah dari manuskrip yang telah diperbaiki.*

Kami harap Bapak/Ibu dapat menyerahkan berkas perbaikan dalam waktu 30 hari setelah menerima manuskrip ini. Apabila Bapak/Ibu tidak dapat menyampaikan hasil perbaikan dalam waktu yang telah ditetapkan, mohon dapat mengkonfirmasikan kepada kami. Hal ini untuk mendukung konsistensi penerbitan.

Demikian, atas perhatian dan kerjasamanya diucapkan terima kasih.

Demikian, atas perhatian dan kerjasamanya diucapkan terima kasih.

Bogor, 10 Juni 2015
Ketua Editor,
ttd

Prof. Dr. Ir. Komang G. Wiryawan
NIP 19610914 198703 1 002

Media Peternakan
Journal of Animal Science and Technology
Faculty of Animal Science Building, Bogor Agricultural University
Jln. Agatis, Kampus IPB Darmaga, Bogor 16680, Indonesia
Phone: +62-251-8421692, 8622841,
Fax: +62-251-8421692, 8622842
e-mail: mediapeternakan@yahoo.co.id; mediapeternakan@ipb.ac.id
Website: http://medpet.journal.ipb.ac.id/

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Media Peternakan
Journal of Animal Science and Technology
Faculty of Animal Science, Bogor Agricultural University
Jln. Agatis, Kampus IPB Dramaga, Bogor Indonesia 16680
Telephone: +62 251 8421692, 8622841; Facsimile: +62 251 8622842
E-mail: mediapeternakan@ipb.ac.id, mediapeternakan@yahoo.co.id
Website: http://medpet.journal.ipb.ac.id/, http://journal.ipb.ac.id/index.php/mediapeternakan

TANGGAPAN MITRA BESTARI

Judul: Evaluasi Nilai Nutrisi Ransum Berbahan Dasar Rumput Kumpai Fermentasi Dengan Suplementasi Lamtoro (*Leucaena leucocephala*) Sebagai Bahan Pakan Berkualitas Terhadap Produktivitas Ternak Sapi Bali

Mitra Bestari I

1. Masih terdapat kesalahan pengetikan/penulisan. Penulisan agar mengikuti panduan Media Peternakan.
2. Judul terlalu panjang, seharusnya tidak lebih dari 14 kata.
3. Komposisi nutrient ransum belum ada.
4. Diskusi seharusnya lebih tajam dengan didukung pustaka jurnal terbaru, tidak hanya membandingkan saja.
5. Hijauan apa yang mensubstitusi lamtoro?
6. Beberapa data tidak lengkap, seperti unit, parameter.
7. Tabel 1 dan 3 perlu dicek kembali analisis statistikanya.
8. Daftar Pustaka:
   a) Penulisan Daftar Pustaka agar mengikuti panduan dan ketentuan Media Peternakan.
   b) Jumlah jurnal 10 tahun terakhir agar ditambah menjadi lebih dari 80% sesuai ketentuan. Saat ini baru 50% (11/21).
   c) Agar ditambahkan pustaka dari artikel yang diterbitkan Media Peternakan.
9. Koreksi lengkap terdapat pada teks.

Mitra Bestari II

Koreksi lengkap terdapat pada teks.

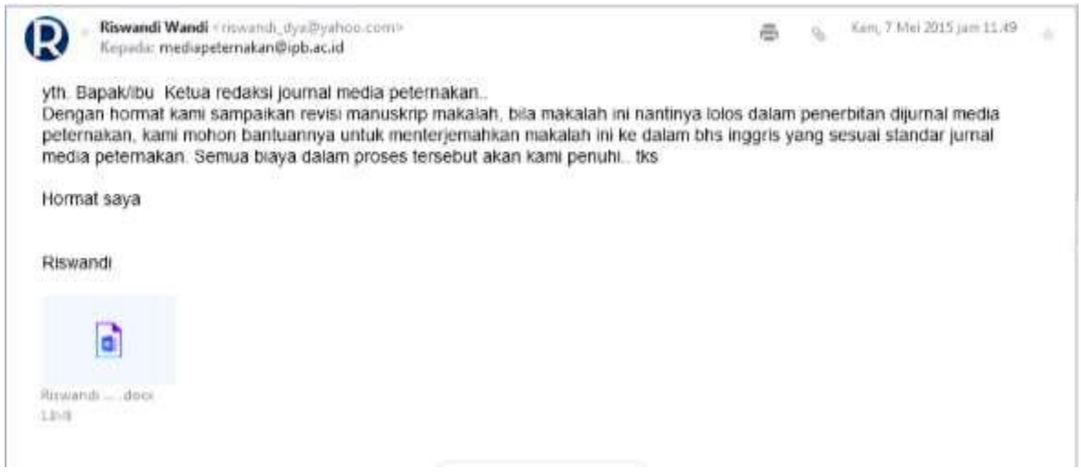
FORM B

Media Peternakan
Journal of Animal Science and Technology
Faculty of Animal Science, Bogor Agricultural University
Jln. Agatis, Kampus IPB Dermaga, Bogor Indonesia 16680
Telephone: +62 251 8621980, 8622931; Facsimile: +62 251 8622940
E-mail: mediapeternakan@ipb.ac.id, mediapeternakan@yahoo.co.id
Website: http://medpet.journal.ipb.ac.id/, http://journal.ipb.ac.id/index.php/mediapeternakan

TANGGAPAN SELEKSI PRAKUALIFIKASI

Judul: **Evaluasi Nilai Nutrisi Ransum Berbahan Dasar Rumput Rawa Fermentasi Dengan Suplementasi Lamtoro (*Leucaena leucocephala*) Sebagai Bahan Pakan Berkualitas Terhadap Produktivitas Ternak Sapi Bali**

	Tanggapan
Judul	Konsistensi istilah yang di pakai Rumput Rawa atau Rumput Kumpai? (Pada abstrak rumput kumpai?)
Abstrak	Perlakuan A kalau dijumlahkan, total mixed ration (TMR)-nya hanya 85%, lalu yang 15% apa? Perlakuan B = TMR 95% ??? Perlakuan C = TMR = 105%??? Perlakuan D = TMR = 115% ??? Maksudnya bagaimana, TMR seharusnya 100% Perlakuan apa yang berbeda nyata? Perlu dinyatakan secara lebih eksplisit perlakuan mana yang berpengaruh nyata pada parameter
Desain Penelitian dan Analisis Data	Perlakuan yang digunakan desainnya agak aneh Perlakuan A kalau dijumlahkan Total Mixed Ration (TMR)-nya hanya 85%, lalu yang 15% apa? Perlakuan B = TMR 95% ??? Perlakuan C = TMR = 105%??? Perlakuan D = TMR = 115% ??? Maksudnya bagaimana, bukannya TMR seharusnya 100%
Tampilan Data (Tabel, Gambar)	Perlakuan D (Lamtoro 30%), konsumsi BK dan BO paling tinggi, kecernaan BK, BO, PK dan serta juga paling tinggi. Tetapi mengapa pertambahan bobotnya lebih rendah dari kontrol dan Perlakuan C? Harus diberikan penjelasan beserta referensinya.
Daftar Pustaka	1. Penulisan Daftar Pustaka agar mengikuti panduan Media Peternakan 2. Jumlah jurnal 10 tahun terakhir harus lebih dari 80% dari total pustaka yang digunakan. 3. Tidak diperkenankan menggunakan pustaka laporan penelitian, maupun buku popular.
Lainnya	Naskah agar ditulis kembali dengan mengikuti panduan penulisan jurnal Media Peternakan



Riswandi Wandi <riswandi_dya@yahoo.com>
Kepada: mediapeternakan@ipb.ac.id
Kam, 7 Mei 2015 jam 11.49

yth. Bapak/ibu Ketua redaksi journal media peternakan..
Dengan hormat kami sampaikan revisi manuskrip makalah, bila makalah ini nantinya lolos dalam penerbitan dijurnal media peternakan, kami mohon bantuannya untuk menterjemahkan makalah ini ke dalam bhs inggris yang sesuai standar jurnal media peternakan. Semua biaya dalam proses tersebut akan kami penuhi.. tks

Hormat saya

Riswandi

Riswandi ... .docx
1.0 kB

Riswandi Wandi <riswandi_dya@yahoo.com>
Kepada: mediapeternakan@ipb.ac.id
Jum, 10 Jul 2015 jam 11.35

Kepada Yth. Tim Redaksi Media Peternakan IPB

Dengan hormat, bersama ini kami sampaikan revisi makalah untuk diproses lebih lanjut atas perhatian dan bantuannya diucapkan terima kasih.

Hormat kami

riswandi

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mediapeternakan@ipb.ac.id <mediapeternakan@ipb.ac.id>
Kepada: riswandi_dya@yahoo.com

Sen, 13 Jul 2015 jam 09.09

Bogor, 13 Juli 2015

Perihal: Penerimaan Manuskrip

Kepada Yth.
Bapak/Ibu Riswandi, Asep Indra M. Ali, Muhakka, Yusuf dan Ilham Akbar
Department of Animal Science, Faculty of Agriculture, University of Sriwijaya Research Center for Sub-optimal Lands (PUR-PLSO), University of Sriwijaya.
Jl. Palembang-Prabumulih KM 32, Indralaya, Ogan Ilir, South Sumatera, Indonesia 30662

Redaksi Media Peternakan, Journal of Animal Science and Technology, telah menerima perbaikan manuskrip yang Bapak/Ibu kirimkan dengan judul "Evaluasi Nilai Nutrisi Ransum Berbahan Dasar Rumput Kumpai (Hymenachne amplexia=calis) Fermentasi Dengan Suplementasi Lamtoro (Leucaena leucocephala) Terhadap Produktivitas Sapi Bali". Manuskrip tersebut akan ditelaah oleh Penyunting Ahli Media Peternakan untuk melihat kesesuainnya dengan saran yang disampaikan.

Demikian surat ini disampaikan, atas perhatian dan kerjasamanya diucapkan terima kasih.

Irma Nuranthy Purnama
Technical Editor
Media Peternakan- Journal of Animal Science and Technology
http://medpet.journal.ipb.ac.id/

---

media peternakan <mediapeternakan@yahoo.co.id>
Kepada: riswandi_dya@yahoo.com

Rab, 9 Sep 2015 jam 14.07

Perihal: **Penyampaian Manuskrip Hasil Penterjemahan**

Kepada Yth.
Bapak/Ibu Riswandi, Asep Indra M. Ali, Muhakka, Yusuf dan Ilham Akbar
Department of Animal Science, Faculty of Agriculture, University of Sriwijaya Research Center for Sub-optimal Lands (PUR-PLSO), University of Sriwijaya.
Jl. Palembang-Prabumulih KM.32, Indralaya, Ogan Ilir, South Sumatera, Indonesia 30662

Melalui surat ini kami sampaikan bahwa manuskrip yang Bapak/Ibu kirimkan, dengan judul "Evaluasi Nilai Nutrisi Ransum Berbahan Dasar Rumput Kumpai *(Hymenachne amplexicalis)* Fermentasi Dengan Suplementasi Lamtoro (*Leucaena leucocephala*) Terhadap Produktivitas Sapi Bali" telah diterjemahkan ke dalam bahasa Inggris oleh Tim Media Peternakan. Bersama surat ini kami sampaikan kembali manuskrip tersebut beserta koreksi pada bab References dan mohon tanggapannya terhadap hasil penterjemahan tersebut. Mohon koreksi perbaikan dapat disampaikan dalam waktu 7 hari setelah menerima manuskrip ini. Hal ini untuk mendukung konsistensi penerbitan.

Demikian, atas perhatian dan kerjasamanya diucapkan terima kasih.

Irma Nuranthy Purnama
Technical Editor
Media Peternakan- Journal of Animal Science and Technology
http://medpet.journal.ipb.ac.id/

---

mediapeternakan <mediapeternakan@yahoo.co.id>
Kepada: riswandi_dya@yahoo.com

Sen, 14 Sep 2015 jam 08.47

Bapak Riswandi,
Kami mengucapkan terima kasih atas konfirmasinya. naskah akan kami proses kembali.

Salam

Riswandi Wandi <riswandi_dya@yahoo.com> wrote:

Yth. Bapak/ibu ketua redaksi media peternakan
Dengan hormat, kami telah menerima hasil terjemahan dan perbaikan dari tim redaksi media peternakan dengan baik. Kami menerima hasil terjemahan tersebut dan perbaikan dari kami tidak ada, mohon manuskrip tersebut diproses lebih lanjut. Demikianlah atas perhatian dan kerjasamanya diucapkan terima kasih.

Hormat kami
An. Penulis

Riswandi

media peternakan <mediapeternakan@yahoo.co.id>
Kepada: riswandi_dya@yahoo.com

Kam, 29 Okt 2015 jam 15.40

Kepada Yth.
Bapak/Ibu Riswandi, Asep Indra M. Ali, Muhakka, Yusuf dan Ilham Akbar
Di
Tempat

Perbaikan manuskrip yang Bapak/Ibu kirimkan dengan judul "Evaluation of Nutritive Values of Fermented Kumpai Grass *(Hymenachne amplexicaulis)* Based Rations Supplemented with Lamtoro (*Leucaena leucocephala*) on Productivity of Bali Cattle" telah didiskusikan pada rapat Dewan Redaksi edisi Desember 2015. Terdapat hal yang perlu dikonfirmasi, yaitu:

1. Tabel 1: Sebaiknya ditambahkan keterangan sumber data, disebutkan Laboratorium tempat analisa dilaksanakan atau penganalisa.
2. Tabel 2: satuan untuk bahan pakan/feed ingredient?
3. Tabel 3: sebaiknya dihilangkan saja karena telah diwakili oleh Tabel 2.

Kami harap Bapak/Ibu dapat segera memperbaiki dan memberikan tanggapannya sebelum 5 November 2015. Mohon perbaikan diberikan pembeda, seperti font yang berbeda warna, dan dilakukan di file yang kami lampirkan.

Demikian, atas perhatian dan kerjasamanya diucapkan terima kasih.

Bogor, 29 Oktober 2015

Ketua Editor,

ttd

Prof. Dr. Ir. Komang G. Wiryawan
NIP 19610914 198703 1 002

Riswandi Wandi <riswandi_dya@yahoo.com>
Kepada: mediapeternakan@yahoo.co.id

Rab, 4 Nov 2015 jam 00.47

konfirmasi manuskrip

Kepada Yth Bapak Ketua Media Peternakan
Bersama ini kami sampaikan hasil revisi makalah, mohon untuk diproses lebih lanjut atas perhatian dan kerja samanya diucapkan terima kasih.

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2. REVISED FINAL PAPER OLEH AUTHOR

Evaluation of Nutritive Values of Fermented Kumpai Grass *(Hymenachne amplexiacalis)* Based Rations Supplemented with Lamtoro (*Leucaena leucocephala*) on Productivity of Bali Cattle

Riswandi, Asep Indra M. Ali, Muhakka, Yusuf Syaifudin dan Ilham Akbar

Department of Animal Science, Faculty of Agriculture, University of Sriwijaya
Research Center for Sub-optimal Lands (PUR-PLSO), University of Sriwijaya.
Jl. Palembang-Prabumulih KM.32, Indralaya, Ogan Ilir, South Sumatera, Indonesia 30662.
e-mail: riswandi_dya@yahoo.com

ABSTRACT

An experiment was conducted to study the effects of lamtoro leaves supplementation in fermented kumpai grass *(Hymenachne amplexiacalis)* based rations on the productivity of Bali cattle. Parameters measured were dry matter and organic matter intakes, nutrient digestibility (dry matter, organic matter, crude protein, and crude fiber), body weight gain, and feed efficiency. The experiment was assigned in a Latin Square design with 4 X 4 with 4 periods of experiment as a row and 4 Bali cattle as a column, and 4 types of ration as a treatment. The types of ration were: Ration A= 45% fermented kumpai grass + 40% benggala grass + 15% concentrate + 0% lamtoro leave, Ration B= 45% fermented kumpai grass + 30% benggala grass + 15% concentrate + 10% lamtoro leave, Ration C= 45% fermented kumpai grass + 20% benggala grass + 15% concentrate + 20% lamtoro leave, and Ration D= 45% fermented kumpai grass + 10% benggala grass + 15% concentrate + 30% lamtoro leave. The data collected were analyzed by Analysis of Variance. The differences among treatments were tested by Duncan multiple range test. The results of experiment showed that the supplementation of lamtoro leaves up to the level of 30% could increase ($P<0.05$) dry matter and organic matter intakes, and crude protein digestibility. The highest body

weight gain and feed efficiency was found in Bali cattle fed ration with 20% lamtoro leave supplementation. The level of lamtoro leave supplementation in the ration did not affect the digestibility of dry matter, organic matter, and crude fiber. It was concluded that the supplementation of lamtoro leaves in the ration could increase dry matter, organic matter, and crude protein intakes. Addition of 20% lamtoro leaves gave the best effect on the increased body weight gain and feed efficiency in Bali cattle.
Keywords: fermented kumpai grass, lamtoro, digestibility, feed efficiency, growth rate, Bali cattle

INTRODUCTION

Feed is the main factor in the animal husbandry business since 60%-70% total operational cost is feed cost. A good quality feed is a feed that meets the nutrient requirement of the animal for maintenance and for growth and productivity. The increased population of animal should be balanced by the increase in the supply of good feed in quality, quantity, and continuity (Haryanto, 2012). Feeds consumed by ruminant animals are mostly grasses and forages that must be available and meet the requirement of animals both in quantity and quality (Fernandes, 2007). Nutritionally, forage is a source of fiber, and the supply and the production of forage and grass are determined by the season and climate. The availability of land for grass and forage production for supplying feed for animal industry is decrease due to the increased use of land for plant agriculture, plantation, and for industrial and residential development.

Wet-land forages have a great potential for feed diversity to sustain the availability and supply of quality feed that does not compete with human need. The use of wet-land forage as a potential source of nonconventional feed resources is needed to

be considered (Syarifuddin & Wahdi, 2010; Akhadiarto & Fariani, 2012). This alternative feed could be used as a main ruminant feed in the future and its use should be increased by optimizing the use of wet-land forage and tree legume as a quality feed for animal industry.

Kumpai grass *(Hymenachne amplexiacalis* (Rudge) Nees*)* is one of forages that mostly found in the wet land. The productivity of this wet-land forage is high but its nutritive value is low. Rostini *et al*. (2014) reported that kumpai grass had crude protein content around 10.88% with crude fiber content around 16.37%, NDF around 62.60% and ADF around 36.75%. Fariani and Evitayani (2008) reported that the content of fiber fraction of wet-land grass was 71% NDF, 47.07% ADF, 36.32% cellulose, and 29.93% hemicellulose, so that the nutritive value of wet-land grass needed to be improved by supplementing the grass with tree legume such as lamtoro (*Luecaena leucocephala)* leaves as a source of by-pass protein.

By-pass protein is a protein in the feed of ruminant animals that is not degraded by the rumen microbes. The result is the protein will be digested enzymatically in the abomasum and intestine to produce amino acids. The increased supply of by-pass protein in the feed that is not degraded in the rumen is designed to increase the amount of protein and amino acids that enter the intestine that will be digested and reabsorbed in the intestine (Widyobroto *et al.,* 2007). By-pass protein is important for ruminant animals since this protein could increase the availability of protein in post-rumen digestion and absorption. In ruminant animals that are in production stage the use of by-pass protein could increase the efficiency of protein use so that increase the number of protein that by pass the rumen into the abomasum and intestine (Sun *et al.,* 2009) that would be digested into amino acids.

Lamtoro is a tree legume that belongs to multipurpose plant with crude protein content of 20.40%, 2.30% Ca, and 0.23% P with carotene content of 530.00 mg/kg and tannin content of 10.15 mg/kg. Lamtoro could be used as a source of by-pass protein in feed formulation since this legume contains tannin that protects the feed protein from degradation and digestion by rumen microbes (Kavana *et al*., 2005) that finally increase nutritive value of a ration. This experiment was designed to analyze the optimum level of lamtoro leaves supplementation in fermented kumpai grass based ration on feed consumption, nutrient digestibility, and body weight gain in Bali cattle.

MATERIALS AND METHODES

Materials

The concentrated used in the formulation of diet was rice bran, corn meals, rice bran, ultra mineral, urea, and salt. The ration was formulated with a final 11%-14% crude protein content and 54%-60% TDN.

The experiment used 4 male Bali cattle with 1 year of age and body weight ranged of 110–140 kg. The experimental cattle were maintained in metabolic cages provided with feed and water. The feces and urine were collected separately so that the urine was not mixed with feces.

Kumpai grass fermentation was conducted to improve and increase the nutritive values of the kumpai grass. Fermentation was conducted by adding 8% probiotic (inoculant) and 5% molasses per weight of kumpai grass. Before fermentation and mixing with prebiotic and molasses, the kumpai grass was cut to the size of 3 cm and then shriveled or dried to decrease the moisture content. Probiotic used was EM-4 (Effective microorganism-4) type (PT. Songgolangit Persada Bali) containing

Lactobacillus casei, *Saccharomyces cerevisiae*, and *Rhodopseudomonas palustris*. Silage materials were put into a plastic bag (silo), compacted, and then the plastic bag was tied tightly so the condition inside the bag was anaerobe. The plastics bags containing silage were maintained in a room with temperature ranged of 26-28 ^{o}C for 21 d (Riswandi, 2014). Silage produced during 21 d incubation was fed to the experimental cattle during the experiment.

Method

Preparation of Pen and Experimental Cattle

Before the experimental Bali cattle were maintained in the pen, the pens were cleaned, limed, and disinfected with disinfectant. Before the experiment, the experimental cattle were administered anthelmintic. The pens were numbered and the experimental cattle were assigned into each pen randomly with the experimental ration.

Feeding and Drinking Water

The feed was given based on dry matter requirement i.e., 3% of body weight. Concentrate was given separately from grass. Concentrate was given at 8.00 WIB in the morning and then followed by administration of forage feed at 11.00 WIB and 15.00 WIB. Drinking water was available *ad libitum*. The drinking water was replaced and added daily.

Data Collection

The experiment was conducted in the experimental pens and Laboratory of Animal Nutrition and Feed, Faculty of Agriculture, University of Sriwijaya from Mei to August 2014. The experiment was conducted in several periods i.e., adaptation, preliminary, growth, and collection. Adaptation period was conducted for 1 month to adapt the experimental cattle to the experimental condition, ration, and animal

maintenance. Preliminary period was conducted to remove the residues of previous feed consumed by the experimental cattle. This period was conducted for 15 days.

Growth period was the period for measuring body weight gain of the experimental cattle. This period was designed to study the effect of experimental ration on the body weight gain of the experimental cattle. The growth period was conducted for 30 days. The experimental cattle were weighed 3 days consecutively in the beginning of the period and 3 days consecutively at the end of the period. Collection period was designed to record and measure the digestibility of nutrients. This period was conducted for 1 week. During this period, the feces were collected daily for 24 hours and the samples of feed were collected daily. The weight of the feces was recorded and 10% of the total weight of the feces was collected for sample analysis.

Procedures of Parameters Measurement

Dry matter consumption. Dry matter consumption was calculated by multiplying the fresh feed fed with dry matter content of the ration and the result was subtracted with dry matter of the unconsumed feed that was calculated in kilogram per day (Imran *et al*., 2012).

Dry matter digestibility. Dry matter digestibility was calculated by subtracting dry matter consumed with dry matter of the feces and the result was divided by the total dry matter consumed and multiplied by 100% (Pond *et al*., 2005). Dry matter consumption was based on the results of proximate analysis and the dry matter of the feces was calculated by averaging the dry matter of feces measured during the last week of experimental period. The digestibility coefficient of dry matter (DCDM) was calculated by the following formula:

DCDM% = [(dry matter consumption – dry matter of feces)/dry matter consumption] x 100%

Organic matter digestibility. Organic matter digestibility was obtained by subtracting the consumption of organic matter with organic matter of the feces and the result was divided by organic matter consumption and multiplied by 100% (Pond *et al*., 2005). Organic matter consumption was based on the proximate analysis and the dry matter of feces was calculated by averaging the organic matter of the feces measured during the last week of the experimental period. The digestibility coefficient of organic matter (DCOM) was calculated by using the following formula:

DCOM %= [(consumption of organic matter – organic matter of the feces)/consumption of organic matter] x 100%

Protein digestibility. Protein digestibility was obtained by subtracting the protein consumed with the protein of the feces and the result was divided with protein consumption and the result was multiplied by 100% (Pond *et al*., 2005). Protein consumption was based on the results of proximate analysis and protein content of the feces was calculated by averaging the protein contents of the feces measured during the last week of experimental period. Digestibility coefficient of crude protein (DCCP) was calculated by the following formula:

DCCP % = [(consumption of crude protein – feces crude protein)/consumption of crude protein] x 100%

Crude fiber digestibility. Fiber digestibility was calculated by subtracting the consumption of crude fiber with crude fiber content of the feces and the result was divided by the consumption of the crude fiber and then the result was multiplied by 100% (Pond *et al*., 2005). The consumed crude fiber was based on the result of

proximate analysis of the ration and feces crude fiber was calculated by averaging crude fiber of the feces measured during the last week of the experimental period. Digestibility coefficient of crude fiber (DCCF) was calculated by using the following formula:

DCCF % = [(consumption of crude fiber – crude fiber of the feces)/consumption of crude fiber] x 100%

Body weight gain. Body weight gain is a difference between the final body weight at the end of experiment and the body weight at the beginning of experiment (Imran *et al*., 2012).

Feed efficiency. Feed efficiency was calculated by dividing the body weight gain with the total feed consumption during the experimental period and the result was multiplied by 100% (Campbell *et al*., 2006).

Data Analysis

The experiment used Latin Square Design with a 4 X 4 arrangement with row as 4 periods of experiment, column as 4 Bali cattle, and 4 types of ration used as a treatment. The treatments used were:

Ration A = 45% fermented wet grass + 40% benggala grass + 15% concentrate + 0% lamtoro leave.

Ration B = 45% fermented wet grass + 30% benggala grass + 15% concentrate + 10% lamtoro leave.

Ration C = 45% fermented wet grass + 20% benggala grass + 15% concentrate + 20% lamtoro leave.

Ration D = 45% fermented wet grass + 10% benggala grass + 15% concentrate + 30% lamtoro leave.

The collected data were analyzed for variance by using ANOVA and if there was a difference between treatment the difference was tested by Duncan (Steel & Torrie, 1991).

RESULTS AND DISCUSSION

Dry Matter Consumption and Organic Matter Consumption

The results of analysis of variance showed that supplementation of various levels of lamtoro leave in ration based on fermented kumpai grass significantly increased ($P<0.05$) dry matter and organic matter consumptions. The range of dry matter consumption in this experiment was 6.72-8.18 kg and the range of organic matter consumption was 6.12-7.47 kg. The significant differences in dry matter and organic matter consumptions among treatments were caused by the nutrient content, especially protein and energy contents of the experimental rations and the materials used in the rations (Lewis & Emmans, 2010; Aregheore, 2006). Lamtoro leave supplementation plays a significant role in increasing protein content of the experimental rations that affect dry matter consumption. Supplementation of lamtoro leave could increase the palatability of the ration. Further test showed that the highest dry matter and organic matter consumptions were found in ration D i.e., ration contained 30% lamtoro and the lowest level was found in ration A i.e., ration without lamtoro leave supplementation (Table 1). This result was caused by the higher crude protein content in the diet D as compared to those in diets A, B, and C. The higher the levels of lamtoro leave supplementation the higher the crude protein content of the ration because lamtoro is a legume with a rich content of crude protein. This result indicated that the higher the crude protein contents of the ration the higher the palatability of the ration. The same

result was also reported by Sanh *et al*. (2002) that found that the higher the level of crude protein of the diet the higher the palatability and digestibility of the ration. Further Parakkasi (1999) stated that the amount of dry matter consumed was affected by several factors i.e., (a) physical or chemical characteristics of the diet, (b) the physiological requirement of the experimental animal for maintenance and production according to the capacity of digestive tract, (c) live body weight that related with the development of the digestive tract, since the capacity of the digestive tract was generally increased with the increase in the live body weight so that the digestive tract could accommodate the higher amount of dry matter.

The Values of Nutrient Digestibility

The analysis of variance showed that the level of lamtoro leave supplementation in the ration did not affect ($P>0.05$) the digestibility of dry matter, organic matter, and crude fiber, but significantly increased ($P<0.05$) crude protein digestibility (Table 2). This result could be related to the increase in crude protein content of the ration with the lamtoro leave supplementation since the lamtoro leave is rich in crude protein. The dry matter digestibility of the experimental diets ranged from 78.66% to 79.75% and the digestibility of organic matter ranged from 80.78% to 81.49%. The results found in the present experiment is in accordance with the result reported by Wanapat *et al.* (2011) that the supplementation of lamtoro leave at the level of 23.7% does not affect the digestibility of dry matter and organic matter in lactating dairy cows fed with ration based on ammoniated straw. The digestibility of dry matter and organic matter in each type of ration did not show a significant difference. Even though the dry matter and organic matter consumptions showed a significant difference, there was no significant difference in the digestibility of dry matter and organic matter. The digestibility of

organic matter decreased due to the increased feed consumption since the retention time of the feed in the digestive tract became shorter that eventually decreased the fermentation of feed by rumen microbes (Church, 1988).

The values of dry matter and organic matter digestibility in the ration without lamtoro leave supplementation tended to be higher as compared to rations with lamtoro leave supplementation. This result indicated that the increased level of lamtoro leave supplementation would increase the amount of tannin in the ration that protect the nutrient such as crude protein and carbohydrate so that the tannin content of the diet would affect the digestibility of dry matter and organic matter of the diet that was tended to decrease with the addition of lamtoro leave. As it is known that tannin is a polyphenol compound that has capacity to bind protein and other compounds (such as carbohydrate, mineral, and vitamin) and form a complex compound. In general, tannin has the ability to decrease the use of feed (Suhartati, 2005; Yulistiani *et al*., 2011). The values of crude fiber digestibility in this experiment ranged from 82.07 to 85.29%. The value of crude fiber digestibility in diet D tended to be higher as compared to diets A, B and C. This result was caused by the higher level of lamtoro leave supplementation that could decrease the crude fiber content of the ration that eventually increased the values of crude fiber digestibility of ration with 30% level of lamtoro leave supplementation (ration D).

The range of crude protein digestibility in this experiment was 67.78%-76.73%. Further test showed that the highest level of crude protein was found in ration supplemented with 30% lamtoro leave (ration D) that was significantly different ($P<0.05$) from rations A, B, and C. There was no significant difference among diets A, B, and C. This result was caused by the higher tannin content of ration D (ration with

30% level of lamtoro leave supplementation) as compared to rations A, B, and C. There was no significant difference in crude fiber digestibility among ration A (0% lamtoro leave), B (10% lamtoro leave), and C (20% lamtoro leave). This result was caused by the level of tannin in rations A, B, and C that were not optimum to protect protein from degradation by rumen microbe so that the crude protein digestibility among treatments were similar. It was known that tannin found in the lamtoro leave would bind with protein, and protein would be protected from degradation by rumen microbes so that the number protein entered post-rumen digestive tract would increase so that the digestibility of crude protein in the intestine would increase. This result indicated that the higher the crude protein contents of the ration the higher the digestibility of nutrients. This result is in accordance with the results reported by Suhartati (2005) and Widyobroto *et al.* (2007) that the increased concentration of by-pass protein is caused by the binding between tannin and protein to form complex compounds that insoluble in the rumen that could be directly digested enzymatically in the post rumen. The effect of tannin on organic matter of the ration is more significant on protein component as compared to the other components of the rations (Getachew *et al.*, 2008).

Body Weight Gain

Further test showed that Bali cattle fed with ration C (supplemented with 20% lamtoro leave) gave a significantly higher ($P<0.05$) body weight gain as compared to those fed with rations A, B, and D. The was also a significant difference in body weight gain among the Bali cattle fed with rations A, B, and D. The highest body weight gain was found in Bali cattle fed with ration C (0.61 kg) and the lowest level was found in those fed with ration B (0.32 kg) (Table 3). This result is probably related to the differences in nutrient contents, consumption or intake and digestibility of dry matter

and nutrient with the lamtoro leave supplementation in the diet. This result is in agreement with the statement of Simanihuruk (2006) that daily body live weight gain is a reflection accumulation of consumption, fermentation, metabolism, and absorption of nutrients in the body (digestive tracts) and is a reflection of feed quality and feed biological value.

The ranges of daily body weight gain were 0.32 to 0.61 kg. The highest average daily body weight gain in cattle fed with diet C was due to the optimal level of lamtoro leave supplementation where the structural and nonstructural carbohydrate contents and protein content met the requirement of the growth of rumen microbes so that the nutrient requirement of the experiment cattle was met with the final result increased daily body weight gain. The low daily body weight gain in cattle fed with diet B is probably caused by the possibility that part of the protected protein or by-pass protein was not digested completely enzymatically in the post rumen digestive tracts (Sun *et al.*, 2009). In addition, the low daily body weight gain in cattle fed with diet supplemented with 30% lamtoro leave is also caused by high content of structural nutrients such as structural carbohydrate (crude fiber) so that when it bound to tannin in post rumen of digestive tract would decrease digestibility and absorption nutrients in general. Therefore, tannin concentration must be formulated optimally. When the concentration of the tannin is not formulated optimally, the digestibility and absorption of nutrients in general will be disturbed since tannin was not only interact with protein, but also with crude fiber and other components such as vitamin and mineral (Jayanegara *et al*., 2009; Makkar *et al*., 2007).

Cattle fed diet without lamtoro leave supplementation (ration A) had higher daily body weight gain as compared to those fed with rations with lamtoro leave

supplementation (rations B and D). This result is caused by the lower content of anti-nutrient compound in ration without lamtoro leave supplementation (ration A) so that the biological value (digestibility) of the ration met the optimal requirement for animal growth.

Analysis of variance showed that the lamtoro leave supplementation up to 20% could increase ($P<0.05$) efficiency values of the ration of Bali cattle. The efficiency values the experimental rations ranged from 3.66% to 6.59%.

The effect of treatment on daily body weight gain is a reflection of efficiency of feed or nutrients utilization. The higher the daily body weight gains the higher the efficiency of feed utilization in the body for growth. The efficiency of feed utilization is the ratio between daily live body weight gains with the amount of feed consumed. Especially in ruminant animals, the efficiency of feed utilization is affected by the high quality and biological values of the feed, the values of daily live weight gain and the digestibility of the feed. The significant difference in efficiency of feed utilization as was shown in Table 3 is caused by the relative difference in daily body weight gain, digestibility, feed consumption and biological values of the feed. Further test showed that ration C gave the significantly different effect ($P<0.05$) as compared to rations A, B, and D, and among rations A, B, and D were also showed a significant difference. The highest efficiency of feed utilization was found in cattle fed with ration C i.e., 6.59 and the lowest was found in cattle fed with ration D i.e., 3.66 kg (Table 3). The highest feed efficiency in cattle fed with diet C showed the optimal level of lamtoro leave supplementation, where the structural and non-structural carbohydrate content as well as protein content has met the requirement of rumen microbe for growth so that the

nutrient requirement of the experimental cattle is also met so the final result is the increased daily body weight gain.

In the treatment of lamtoro leave supplementation at the level of 20%, the experimental cattle had higher efficiency in utilization of the experimental diet that was reflected in higher body growth rate. The efficiency of feed utilization is affected by several factors such as the capacity or ability of the experimental animals to digest the feed materials, the availability of nutrient for basic or maintenance, the growth and the function of the body, and the type of feed used (Campbell *et al*., 2006). Feed with higher quality (high crude protein and low crude fiber) has a higher efficiency of feed utilization for energy formation and production (Pond *et al*., 2005).

CONCLUSION

From the results of this experiment it was concluded that the supplementation of lamtoro leaves in the diet based on fermented kumpai grass could increase feed consumption, protein digestion, body weight gain, and feed efficiency. However, lamtoro leave supplementation could not improve the digestibility of dry matter, organic matter, and crude fiber. The lamtoro leave supplementation at the level of 20% gave the best result in daily body weight gain and feed efficiency in Bali cattle.

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Table 1. Average dry matter and organic matter intakes of Bali cattle fed with different levels of lamtoro leave supplementation in the fermented kumpai grass based ration (4)

No	Intake	Type of Ration			
		A	B	C	D
1	Dry matter Intake (kg)	6.72 ± 0.13[a]	7.34±0.15[b]	8.05±0.22[c]	8.18±0.20[d]
2	Organic Matter Intake (kg)	6.12±0.11[a]	6.68±0.14[b]	6.67±0.20[c]	7.47±0.18[d]

[a,b,c,d]Different superscripts in the same column indicate a significant difference between means (P<0,05). Ration A = (45% fermented kumpai grass + 40% benggala grass) + 15% concentrate + 0% lamtoro leave, B = (45% fermented kumpai grass + 30% benggala grass) + 15% concentrate + 10% lamtoro leave, C = (45% fermented kumpai grass + 20% benggala grass) + 15% concentrate + 20% lamtoro leave, D = (45% fermented kumpai grass + 10% benggala grass) + 15% concentrate + 30% lamtoro leave.

Table 2. Digestibilities of dry matter, organic matter, crude protein, and crude fiber of different types of rations with different levels of lamtoro leave supplementation in the fermented kumpai grass based ration in Balli cattle (5)

No	Digestibility	Type of Ration			
		A	B	C	D
1	Dry Matter Digestibility (%)	79.75 ± 2.93	78.66±4.96	79.45±4.14	79.15±5.36
2	Organic Matter Digestibility (%)	81.49±1.74	80.78±2.24	81.02±3.62	80.98±4.76
3	Crude Protein Digestibility (%)	68.61±4.04[a]	68.36±5.78[a]	67.78±5.40[a]	76.73±4.48[b]
4	Crude Fiber Digestibility (%)	83.33±2.25	82.07±4.74	82.56±3.43	85.29±3.27

[a,b,c,d]Different superscripts in the same column indicate a significant difference between means (P<0,05). Ration A = (45% fermented kumpai grass + 40% benggala grass) + 15% concentrate + 0% lamtoro leave, B = (45% fermented kumpai

grass + 30% benggala grass) + 15% concentrate + 10% lamtoro leave, C = (45% fermented kumpai grass + 20% benggala grass) + 15% concentrate + 20% lamtoro leave, D = (45% fermented kumpai grass + 10% benggala grass) + 15% concentrate + 30% lamtoro leave.

Tabel 3. Average daily live weight gain and feed efficiency of Bali cattle fed with different levels of lamtoro leave supplementation in the fermented kumpai grass based ration (6)

No	Parameters	Types of Ration			
		A	B	C	D
1	Daily Body Weight Gain (kg)	0.38 ± 0.13^{c}	0.32 ± 0.04^{a}	0.61 ± 0.13^{d}	0.36 ± 0.10^{b}
2	Feed Efficiency (%)	4.90 ± 1.61^{c}	3.79 ± 0.48^{b}	6.59 ± 1.27^{d}	3.66 ± 0.97^{a}

^{a,b,c,d}Different superscripts in the same column indicate a significant difference between means ($P<0,05$). Ration A = (45% fermented kumpai grass + 40% benggala grass) + 15% concentrate + 0% lamtoro leave, B = (45% fermented kumpai grass + 30% benggala grass) + 15% concentrate + 10% lamtoro leave, C = (45% fermented kumpai grass + 20% benggala grass) + 15% concentrate + 20% lamtoro leave, D = (45% fermented kumpai grass + 10% benggala grass) + 15% concentrate + 30% lamtoro leave.

Table 1. Nutrient compositions of feeds used for formulation of the experimental rations

No	Feed Materials	CP	CF	TDN
1	Rice brans	11.2	18.513	65
2	Corn meal	10.5	2	83
3	Bekatul	14	7.5	87.6
4	Mineral	0	0	0
5	Salt	0	0	0
6	Urea	261	0	0
7	Fermented Kumpai Grass	11.62	30.16	59.3
8	Benggala Grass	10.5	35.64	45.3
9	Lamtoro Leave	23.2	23.58	63.1

Ket : Hasil analisis laboratorium Nutrisi dan Makanan Ternak Fakultas Pertanian Unsri (2014)

Table 2. Composition and crude protein, crude fiber and total digestible nutrient of experimental rations

Feed Material	Type of Rations			
	A	B	C	D
Fermented Kumpai Grass (%)	45	45	45	45
Benggala Grass (%)	40	30	20	10
Concentrate (%)	15	15	15	15
Lamtoro Leave (Supplement) (%)	0	10	20	30
Crude Protein (%)	11.40	12.48	13.37	14.13
Crude Fiber (%)	30.19	29.59	29.09	28.66
Total Digestible Nutrient (%)	54.92	55.66	56.28	56.80

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3. SURAT PEMBERITAHUAN PENERBITAN ARTIKEL DI JUORNAL MEDIA PETERNAKAN

media peternakan <mediapeternakan@yahoo.co.id>
Kepada: riswandi_dya@yahoo.com

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Media Peternakan Journal of Animal Science and Technology Faculty of Animal Science Building, Bogor Agricultural University Jln. Agatis, Kampus IPB Darmaga, Bogor 16680, Indonesia Phone: +62-251-8421692, 8622841, Fax: +62-251-8421692, 8622842 e-mail: mediapeternakan@yahoo.co.id; mediapeternakan@ipb.ac.id Website: http://medpet.journal.ipb.ac.id/

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