

EFEK IMBANGAN LAMTORO DAN RUMPUT GAJAH DALAM RANSUM  
DENGAN PENAMBAHAN MINYAK JAGUNG TERHADAP PRODUK  
FERMENTASI RUMEN DAN KECERNAAN NUTRIEN  
SECARA IN VITRO

**INTISARI**

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Penelitian ini bertujuan untuk mengkaji pengaruh imbangan lamtoro dan rumput gajah dalam ransum dengan penambahan minyak jagung terhadap produk fermentasi rumen dan pencernaan nutrisi secara *in vitro*. Kombinasi level lamtoro dan rumput gajah (*Pennisetum purpureum*) dengan level masing-masing 0, 25, 50, dan 75 (L0, L25, L50, dan L75, berurutan) yang dicampur dengan konsentrat dengan proporsi 75:25 mendapat penambahan minyak jagung dengan level 0, 1, dan 2 (M0, M1, dan M2, berurutan) sehingga diperoleh 12 unit perlakuan model *factorial design*. Analisis regresi dan korelasi dilakukan untuk mengetahui hubungan antara pencernaan bahan organik (KcBO) metode *in vitro* 2 tahap dengan metode produksi gas. Selanjutnya, seluruh variabel penelitian diuji menggunakan ANOVA pola faktorial yang dilanjutkan dengan uji lanjut Tukey *honest significant difference* (Tukey's HSD test) apabila terdapat perbedaan antar perlakuan ( $P < 0,05$ ). Hasil penelitian menunjukkan bahwa terdapat hubungan linier ( $R^2 = 0,60$ ) dan korelasi yang kuat ( $R = 0,78$ ) pada KcBO rumen yang diperoleh pada metode Tilley dan Terry dengan metode produksi gas. Pengukuran KcBO metode produksi gas menunjukkan nilai yang lebih tinggi dibandingkan KcBO metode Tilley dan Terry. Imbangan lamtoro dan rumput pada level 50% (L50) meningkatkan pencernaan bahan kering (KcBK), pencernaan bahan organik (KcBO), Kecernaan Protein Kasar (KcPK), produksi gas, nilai PF, konsentrasi total VFA dan seluruh molar VFA, sintesis protein mikroba, dan asam lemak tak jenuh rantai panjang (PUFA) yang meliputi LA, ALA, dan TFA, yang disertai penurunan total sel protozoa, produksi gas  $CH_4$ , dan asam lemak jenuh (SFA) cairan rumen. Penambahan minyak jagung sebanyak 2% (M2) secara nyata menurunkan pencernaan nutrisi (KcBK, KcBO, dan KcPK), produksi total VFA, nilai PF, dan sintesis protein mikroba rumen. Perlakuan M2 secara nyata menurunkan produksi gas  $CH_4$ , total protozoa, dan sebagian besar asam lemak jenuh (SFA) cairan rumen, serta meningkatkan konsentrasi PUFA cairan rumen yang meliputi LA, LNA, DPA, dan DHA sehingga meningkatkan rasio PUFA: SFA. Pengaruh interaksi antara kedua faktor terlihat pada produksi  $CH_4$ , konsentrasi  $NH_3$ , konsentrasi protein mikroba, seluruh MUFA dan PUFA (TFA, LA, ALA, DPA, DHA), total SFA, total PUFA, dan rasio PUFA: SFA. Disimpulkan bahwa kombinasi antara suplementasi lamtoro sebanyak 50% serta penambahan minyak jagung sebanyak 2% (L50M2) mampu menurunkan  $CH_4$ , total sel protozoa, dan SFA, serta meningkatkan KcBK, KcBO, KcPK dalam rumen dan total, MUFA dan PUFA *in vitro* secara efektif. Lamtoro pada level 75% tidak lagi efektif dalam meningkatkan pencernaan nutrisi.

Kata kunci: Fermentasi rumen, pencernaan nutrisi, lamtoro, minyak jagung, produksi gas metan, profil asam lemak rumen *in vitro*

THE EFFECT OF *Leucaena leucocephala* AND NAPIER GRASS RATIO WITH CORN OIL ADDITION ON PRODUCTS OF RUMINAL FERMENTATION, METHANE PRODUCTION, AND NUTRIENTS DEGRADABILITY IN VITRO

**ABSTRACT**

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The objective of this study was to investigate the effect of inclusion different levels of *leucaena leucocephala* (LL) and corn oil (CO) on in vitro nutrient digestibility, ruminal fermentation characteristics, methane production, and rumen fatty acids profile. A diet consist of nappier grass and concentrate with ratio 75:25 were randomly assigned to receive four levels of LL and three levels of CO treatments according to a 4x3 factorial design. Treatments were as followings: LL levels (0, 25, 50, and 75%, respectively) on DM basis and CO levels (0, 1, and 2%, respectively) on ethanol: corn oil solution basis. Regression and correlation analysis were conducted to determine the relationship between IVOMD obtained from Tilley and Terry and gas production methods. Experiments data also were analyzed using ANOVA for 4x3 factorial design using the general linier models (GLM) procedures of SAS then subjected to Tukey's HSD test to compare the differences among the treatments. The results showed there were a linier relationship ( $R^2= 0,60$ ) and strong correlation ( $R= 0,78$ ) between IVOMD from Tilley and Terry method and gas production method. There were also a significant increased on in vitro dry matter digestibility (IVDMD), in vitro organic matter digestibility (IVOMD), in vitro crude protein digestibility (IVCPD), gas production, PF value, VFA total, acetate, propionate, butyrate concentration, microbial protein synthesis, MUFA and PUFA profile (LA, ALA, TFA, VA) which is accompanied a decline in protozoa cells number, CH<sub>4</sub> production, and SFA components in rumen fluid by inclusion of 50% *Leucaena* (L50). Added 2% of CO (M2) significantly decreased IVDMD, IVOMD, IVCPD, gas production, VFA total, PF value, and microbial protein synthesis. On the other hand, M2 significantly decreased CH<sub>4</sub> production, protozoa cells, and most of SFA components, and increased the amount of MUFA and PUFA (LA, LNA, TFA, DPA, DHA) so the percentage of PUFA and SFA ratio also increased. The interaction effect of the two factors was observed on CH<sub>4</sub> production, NH<sub>3</sub> concentration, microbial protein synthesis, all MUFA and PUFA components, total SFA, total PUFA, and PUFA: SFA ratio. Based on this study, it can be concluded that the combination of inclusion of 50% LL and 2% CO (L50M2) is the most effective treatment that could decrease CH<sub>4</sub> production, total of protozoa cells, SFA formation, increase MUFA and PUFA components formation without adversely affecting nutrient digestibility and ruminal fermentation in vitro. Inclusion 75% *Leucaena* is no longer improving nutrient degradability.

**Keywords:** In vitro ruminal fermentation, nutrient digestibility, *leucaena leucocephala*, corn oil, methane production, rumen fatty acids profile