

**PENGARUH LIMBAH BUNGKIL PALA (*Myristica Fragrans* Houtt)  
SEBAGAI PAKAN ALTERNATIF PENGANTI WHEAT POLLARD  
TERHADAP KINETIKA PRODUKSI GAS DAN AKTIVITAS ENZIM  
DALAM RUMEN SECARA IN VITRO**

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**INTISARI**

Penelitian ini bertujuan untuk mengetahui pengaruh limbah bungkil pala (*Myristica fragrans* houtt) sebagai pakan alternatif pengganti *pollard* terhadap kinetika produksi gas dan aktivitas enzim dalam rumen secara *in vitro*. Substrat pakan terdiri dari rumput odot (*Pennisetum purpureum* CV *Mott*), bungkil kedelai, *pollard* dan bungkil pala dengan dengan perbandingan 40:10:50:0 sebagai kontrol, 40:10:35:15, 40:10:20:30 dan 40:10:5:45 dengan ulangan 3 *batch* fermentasi masing-masing perlakuan. Fermentasi pakan dilakukan dengan menggunakan Teknik *in vitro* selama 48 jam. Produksi gas hasil fermentasi diukur pada pada jam ke-1, 2, 4, 6, 8, 12, 24, 36, dan 48. Medium setelah fermentasi digunakan untuk menentukan aktivitas enzim hidrolitik rumen. Produksi gas hasil fermentasi digunakan untuk analisis kinetika produksi gas. Data yang diperoleh dianalisis variansi pola searah, dan dilanjutkan dengan uji *Duncan's New Multiple Range Test* (DMRT) bila berbeda nyata. Hasil penelitian menunjukkan bahwa penggunaan bungkil pala sebagai bahan substitusi *pollard* pada level hingga 45% tidak mempengaruhi aktivitas enzim amilase dan protease ( $P > 0,05$ ), namun pada level 30 dan 45% secara signifikan menurunkan aktivitas spesifik enzim CMC-ase ( $P < 0,05$ ). Produksi gas dari fraksi mudah larut (a) tidak terpengaruh oleh penggunaan limbah bungkil pala. Produksi gas dari fraksi potensial terdegradasi (b) menurun secara nyata ( $P < 0,05$ ) pada substitusi bungkil biji pala 15%, 30%, dan 45%. Jumlah produksi gas dari fraksi mudah dan potensial terdegradasi (a+b), serta laju degradasi pakan (c) menurun secara nyata ( $P < 0,05$ ) seiring peningkatan level penggunaan bungkil biji pala. Kesimpulan yang didapat dari penelitian ini yaitu penggunaan bungkil pala hingga level 15% tidak memberikan efek negatif terhadap aktivitas enzim dan kinetika produksi gas di dalam rumen kacang secara *in vitro*.

Kata Kunci : Substitusi pakan, aktivitas enzim, kinetika produksi gas, dan limbah bungkil pala.

**EFFECT OF NUTMEG MEAL (*Myristica Fragrans* Houtt) AS AN  
ALTERNATIVE FEED WHEAT POLLARD SUBSTITUTION  
ON IN VITRO RUMEN GAS PRODUCTION  
KINETICS AND ENZYMES ACTIVITIES**

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**ABSTRACT**

This study aimed to determine the effect of nutmeg meal (*Myristica fragrans*) pollard substitution on in vitro rumen gas production kinetics and enzymes activity. Feed substrate for in vitro rumen fermentation consisted of dwarf elephant grass (*Pennisetum purpureum* CV Mott), soybean meal, pollard and nutmeg meal in ratios of 40:10:50:0 as a control, 40:10:35:15 (15 BP), 40:10:20:30 (30 BP) and 40:10:5:45 (45 BP), respectively, with 3 fermentation batch as replications. Fermentation was carried out by in vitro gas production technique (Menke and Steingass, 1988) for 48 hours. Fermented gas production was measured at 1, 2, 4, 6, 8, 12, 24, 36, and 48 hours. Medium after fermentation was used to determine the rumen hydrolytic enzymes activity. Gas produced during fermentation was used to determine the gas production kinetics. Data obtained were analysed using one way analysis of variance, and continued by DMRT. The results showed that the substitution of pollard with nutmeg meal at the level of 30% and 45% did not significantly affect the activity of amylase and protease enzymes ( $P > 0.05$ ), but significantly reduced the specific activity of the CMC-ase enzyme ( $P < 0.05$ ). Gas production from the soluble fraction (a) was not affected by the use of nutmeg meal. Gas production from the degraded potential fraction (b) decreased significantly ( $P < 0.05$ ) as the effect of nutmeg meal substitution at all levels. The amount of gas production from the easy and potentially degraded fraction (a + b), and the rate of feed degradation (c) decreased significantly ( $P < 0.05$ ) as the level of use of nutmeg meal increased. The conclusion that can be drawn from this study is the use nutmeg meal to substitute pollard up to a level of 15% does not cause negative effect on enzyme activity and gas production kinetics in rumen fermentation in vitro of Kacang goat.

Keywords: feed substitution, enzyme activity, gas production kinetics, and nutmeg meal, *pollard*.