

**PENGARUH PENAMBAHAN TEPUNG *MACRO-ALGAE* MERAH
(*Gelidium* sp.) SEBAGAI SUMBER FENOL TERHADAP AKTIVITAS
ENZIM, KECERNAAN PAKAN, DAN TOTAL PRODUKSI GAS
SECARA *IN VITRO***

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INTISARI

Penggunaan rumput laut merah (*Gelidium* sp.) sebagai aditif pakan berfungsi sebagai sumber fenol yang bersifat antimikroba, antioksidan, dan agen pereduksi gas metan. Tujuan penelitian ini adalah mengetahui pengaruh penambahan tepung rumput laut merah terhadap aktivitas enzim, dan total produksi gas. Pakan terdiri atas hijauan berupa rumput gajah dan konsentrat dengan perbandingan 60%:40% serta komposisi konsentrat yaitu *pollard*, bungkil kedelai, dan minyak biji bunga matahari. Konsentrasi tepung rumput laut merah yang digunakan adalah 0%, 2%, 4%, dan 6%. Penelitian ini menggunakan tiga kali ulangan (*batch* fermentasi) pada masing-masing perlakuan dan masing-masing ulangan dilakukan secara *duplo*. Metode yang digunakan adalah metode pencernaan rumen secara *in vitro* Tilley and Terry (1963) dengan inkubasi 48 jam untuk mengevaluasi pencernaan dalam rumen dan inkubasi 96 jam untuk mengevaluasi pencernaan secara total. Metode pengukuran gas total dan aktivitas enzim dilakukan dengan metode Menke and Steingass (1988) menggunakan *syringe* berskala. Beberapa variabel yang dilihat adalah pencernaan bahan kering (KcBK), pencernaan bahan organik (KcBO), pencernaan protein kasar (KcPK), pencernaan serat kasar (KcSK) di dalam rumen dan pasca rumen, produksi gas total, kinetika produksi gas, produksi gas metan, aktivitas enzim CMCCase, dan aktivitas enzim protease. Data yang diperoleh kemudian dianalisis variansinya mengikuti Rancangan Acak Lengkap (RAL) pola searah yang dilanjutkan dengan uji *Duncan's New Multiple Range Test* (DMRT). Hasil penelitian menunjukkan bahwa penambahan tepung rumput laut merah *Gelidium* sp. mulai level 4% mampu menurunkan ($P < 0,05$) produksi gas metan dan aktivitas enzim CMCCase, tetapi apabila penambahan tepung rumput laut dinaikkan hingga level 6% akan menurunkan ($P < 0,05$) KcBO dan KcPK dalam rumen, fraksi b, dan fraksi c, serta meningkatkan ($P < 0,05$) KcPK total. Penambahan tepung rumput laut merah *Gelidium* sp. tidak berpengaruh terhadap KcBK dan KcSK dalam rumen dan total, KcBO total, produksi gas total, aktivitas enzim protease, dan fraksi a. Berdasarkan hasil penelitian dapat disimpulkan bahwa penambahan tepung rumput laut merah *Gelidium* sp. dengan level 4% dapat digunakan sebagai sumber fenol untuk menurunkan produksi gas metan tanpa mengganggu proses fermentasi.

Kata kunci: enzim, fermentasi *in vitro*, *Gelidium* sp., pencernaan, produksi gas

THE EFFECT OF ADDING RED MACRO-ALGAE POWDER (*Gelidium* sp.) AS A SOURCE OF PHENOLICS ON *IN VITRO* ENZYME ACTIVITY, DIGESTIBILITY, AND TOTAL GAS PRODUCTION

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ABSTRACT

The use of red seaweed (*Gelidium* sp.) as a feed additive serves as a source of phenols that are antimicrobial, antioxidant, and methane gas reducing agents. The purpose of this study was to determine the effect of the addition of red seaweed flour on enzyme activity, and total gas production. The feed consisted of forage in the form of elephant grass and concentrate with a ratio of 60%: 40% and the composition of concentrate, namely pollard, soybean meal, and sunflower seed oil. The concentrations of red seaweed meal used were 0%, 2%, 4%, and 6%. This study used three replications (batch fermentation) on each treatment and each replication was done in duplo. The method used was the Tilley and Terry (1963) *in vitro* rumen digestibility method with 48 hours incubation to evaluate digestibility in the rumen and 96 hours incubation to evaluate total digestibility. Total gas and enzyme activity were measured using the method of Menke and Steingass (1988) using a scaled syringe. The variables were dry matter digestibility (DMD), organic matter digestibility (OMD), crude protein digestibility (CPD), crude fiber digestibility (CFD) in the rumen and post rumen, total gas production, gas production kinetics, methane gas production, CMCase enzyme activity, and protease enzyme activity. The data obtained were then analyzed using a one-way analysis of variance continued by Duncan's New Multiple Range Test (DMRT). The results showed that the addition of red seaweed meal *Gelidium* sp. starting at the level of 4% was able to reduce ($P<0.05$) methane gas production and CMCase enzyme activity, but if the addition of seaweed meal was increased to the level of 6%, it would reduce ($P<0.05$) OMD and CPD in the rumen, fraction b, and fraction c, and increase ($P<0.05$) total CPD. The addition of red seaweed meal *Gelidium* sp. had no effect on DMD and CFD in the rumen and total, total OMD, total gas production, protease enzyme activity, and fraction a. Based on the results of the study, it can be concluded that the addition of red seaweed meal *Gelidium* sp. with a level of 4% can be used as a source of phenol to reduce methane gas production without disrupting the fermentation process.

Keywords: digestibility, enzyme, gas production, *Gelidium* sp., *in vitro* fermentation