

KAJIAN PENGGUNAAN SINAMALDEHID KULIT KAYU MANIS  
(*Cinnamomum burmanni* Ness ex Bl) UNTUK PROTEKSI  
PROTEIN PAKAN SECARA *IN VITRO*

INTISARI

Ikhwan Hadiananto  
17/422324/PPT/00998

Sinamaldehyd merupakan senyawa metabolit sekunder tanaman kayu manis yang digunakan untuk proteksi protein pakan. Penelitian ini dilakukan untuk mengetahui pengaruh penambahan kulit kayu manis sumber sinamaldehyd terhadap aktivitas enzim, parameter fermentasi rumen, produksi gas, pencernaan nutrisi secara *in vitro* dan keragaman bakteri rumen. Perlakuan terdiri dari tanpa penambahan kulit kayu manis (kontrol) dan penambahan kulit kayu manis masing-masing sebesar 1,16; 2,3; 3,5 dan 4,6% dari bahan kering (BK) pakan atau setara dengan penambahan sinamaldehyd sebesar 200, 400, 600 dan 800 mg/kg bahan kering (BK) pakan. Pakan terdiri dari 60% rumput gajah, 30% pollard dan 10% bungkil kedelai. Penelitian ini menggunakan rancangan acak lengkap dengan tiga kali ulangan. Penelitian ini terdiri dari tiga bagian. Penelitian pertama yaitu pengamatan terhadap aktifitas enzim CMCase, amilase, protease, pH, konsentrasi amonia (NH<sub>3</sub>), *volatile fatty acid* (VFA), proporsi VFA, protein mikrobial, produksi gas secara *in vitro gas test*. Penelitian kedua yaitu pencernaan nutrisi meliputi pencernaan bahan kering (KcBK), pencernaan bahan organik (KcBO), pencernaan protein kasar (KcPK) dan pencernaan serat kasar (KcSK) secara *in vitro* inkubasi 48 jam dan 96 jam. Penelitian ketiga yaitu keragaman bakteri rumen dianalisis dengan metode *terminal restriction fragment length polymorphism* (T-RFLP). Data yang diperoleh dari penelitian pertama dan kedua dianalisis menggunakan analisis variansi dan perlakuan yang berbeda secara nyata, diuji lanjut dengan *Duncan's new multiple range test* (DMRT) untuk mengetahui perbedaan nilai rata-rata pada masing-masing perlakuan. Data dari T-RFLP ditampilkan secara deskriptif dalam bentuk tabel dan gambar. Hasil penelitian menunjukkan bahwa penambahan kulit kayu manis sumber sinamaldehyd sampai level 4,6% (penambahan sinamaldehyd 800 mg/kg BK pakan) tidak berpengaruh secara nyata ( $P>0,05$ ) terhadap CMCase dan amilase, pH, NH<sub>3</sub>, VFA protein mikroba dan produksi gas, KcBK, KcBO dan KcSK tetapi menurunkan ( $P<0,05$ ) aktivitas protease dan pencernaan protein inkubasi 48 jam dan meningkatkan pencernaan protein pada inkubasi 96 jam. Penambahan kulit kayu manis sebagai sumber sinamaldehyd tidak berpengaruh terhadap keragaman bakteri rumen. Berdasarkan hasil penelitian dapat diambil suatu kesimpulan bahwa penambahan kulit kayu manis sampai level 4,6% atau setara dengan penambahan sinamaldehyd 800 mg/kg bahan kering (BK) mampu melindungi protein dari proses degradasi di rumen tanpa menimbulkan efek negatif terhadap keragaman mikroba dan proses fermentasi rumen.

Kata kunci : Kayu manis, Sinamaldehyd, Aktivitas enzim, Parameter fermentasi rumen, *T-RFLP*

## STUDY OF CINNAMON BARK (*Cinnamomum burmanni* Ness ex Bl) AS IMPACT OF CINNAMALDEHYDE ADDITION FOR FEED PROTEIN PROTECTION

### ABSTRACT

Ikhwan Hadiananto  
17/422324/PPT/00998

Plant secondary metabolites such as cinnamaldehyde have been used to manipulate protein metabolism in the rumen. The study aimed to observe the effect of cinnamon bark addition as a source of cinnamaldehyde on activity of enzymes, fermentation parameters, gas production, *in vitro* digestibility and rumen bacterial diversity. This research was consisted of the diet without cinnamon bark meal (control) and addition cinnamon bark meal with 1.16, 2.3, 3.5, and 4.6% of dry matter (DM) feed or equivalent to cinnamaldehyde with 200, 400, 600 and 800 mg per kg DM feed. The feed was consisted of 60% elephant grass, 30% wheat bran and 10% soybean meal. The experiment was conducted using a completely randomized design with three replications. This study was divided into 3 steps. The first step used *in vitro* gas production technique for activity of enzymes (CMCase, amilase and protease) and rumen parameters (pH, NH<sub>3</sub>, VFA, microbial protein) analysis. The second step was conducted for nutrient digestibility (DMD, OMD, CPD and CFD) analysis using *in vitro* two stage technique (48 h and 96 h). The third step was diversity and relative abundance of rumen bacterial using T-RFLP analysis. Data activity of enzymes, fermentation parameters and nutrient digestibility were analyzed by one-way analysis of variance (ANOVA) continued by Duncan's New Multiple Range Test (DMRT). The data of TRFLP analysis was showed descriptively on table or image. The results showed that the addition of cinnamon bark meal up to 4.6% of DM feed did not affect CMCase, amilase, rumen parameters, kinetics of gas production, dry matter, organic matter and crude fiber digestibility but significantly ( $P < 0.05$ ) decreased protease, rumen crude protein digestibility in incubation 48 h and increased crude protein digestibility in incubation 96 h. Based on TRFLP analysis, the rumen bacterial diversity was not affected by the addition of cinnamon bark meal as cinnamaldehyde source. T-RFLP analysis had a potency to detect community structure in response and to show rumen bacterial diversity in the rumen. Addition of cinnamon bark meal up to 4.6% of DM feed or equal to cinnamaldehyde with 800 mg per kg DM feed could be used as the feed additive for protected protein without any negative effects on rumen bacterial population dan rumen fermentation.

Keywords : Cinnamon bark, Cinnamaldehyde, Activity of enzyme, Fermentation parameters, T-RFLP