EFEK PROTEKSI FORMALDEHID PADA CAMPURAN BUNGKIL KEDELAI, *CRUDE PALM OIL* (CPO) TERSAPONIFIKASI, DAN MINERAL TERHADAP PARAMETER FERMENTASI RUMEN SECARA *IN VITRO*

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INTISARI

Penelitian ini bertujuan untuk mengetahui parameter fermentasi rumen secara *in vitro* campuran bahan pakan konsentrat sumber protein, lemak, dan mineral yang berupa bungkil kedelai, *crude palm oil* (**CPO**) tersaponifikasi, dan premix mineral *Agromix*® yang diproteksi dengan formaldehid. Dua ekor sapi Bali berfistula rumen digunakan sebagai donor cairan rumen pada penelitian ini. *Crude palm oil* yang digunakan diproteksi dengan metode saponifikasi (penyabunan) dan dicampurkan dengan bungkil kedelai dan *premix* mineral *Agromix*®. Perbandingan CPO tersaponifikasi dengan bungkil kedelai yaitu 1:4 dengan penambahan *premix* mineral *Agromix*® 0,3% dari total pembuatan pakan proteksi. Campuran ketiga bahan tersebut kemudian diproteksi dengan formaldehid (formalin 0,8%) dan digunakan sebanyak 0% (**K**) dan 19% (**P**) dalam ransum. Untuk mengetahui karakteristik fermentasi rumen, kedua pakan perlakuan tersebut diinkubasi selama 48 dan 96 jam dengan mengikuti metode *in vitro* 2-tahap*.* Variabel yang diamati pada 48 jam inkubasi (tahap pertama) yaitu: pH, konsentrasi *volatile fatty acids* (**VFA**), konsentrasi amonia (**N-NH$_3$**), konsentrasi protein mikroba, dan aktivitas enzim karboksi metil selulase (endoglukanase). Variabel yang diamati pada akhir masa inkubasi 96 jam (tahap 2) meliputi pH. Data hasil penelitian yang diperoleh dianalisis menggunakan uji *independent sample t-test.* Hasil penelitian menunjukkan bahwa penurunan ($P<0,05$) konsentrasi VFA total, asam asetat, asam propionat, dan aktivitas enzim endoglukanase, serta peningkatan ($P<0,05$) rasio A:P dan protein mikroba. Proteksi ransum dengan 0,8% formaldehid tidak mempengaruhi nilai pH, konsentrasi asam butirat, dan konsentrasi N-NH$_3$ pada cairan rumen. Dapat disimpulkan bahwa proteksi 0,8% formaldehid pada *total mixed ration* mampu melindungi protein, lemak, dan mineral terhadap degradasi rumen tanpa memberikan pengaruh negatif pada proses fermentasi dan lingkungan rumen.

Kata kunci: Bungkil kedelai, *Crude palm oil*, Formaldehid, *In vitro*, Parameter fermentasi rumen, *Premix* mineral *Agromix*®, Proteksi.

EFFECT OF FORMALDEHYDE PROTECTION ON A MIXTURE OF SOYBEAN MEAL, SAPONIFIED CRUDE PALM OIL (CPO), AND MINERALS ON THE *IN VITRO* RUMEN FERMENTATION PROFILES

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ABSTRACT

This study aimed to determine the *in vitro* rumen fermentation profiles on a mixture of feed ingredients sources protein, fat, and minerals comprised of soybean meal, saponified *crude palm oil* (**CPO**), and *premix* mineral *Agromix*® protected with formaldehyde. Two rumen fistulated Bali cattle were used as rumen fluid donors. *Crude palm oil* was protected by saponification method and mixed with soybean meal and *premix* mineral *Agromix*®. The ratio of saponified CPO with soybean meal was 1:4 with the addition of *premix* mineral *Agromix*® at 0.3% of the total protected feed. The mixture of the three ingredients then protected with formaldehyde 0.8% and used as much as 0% (**T1**) and 19% (**T2**) in the ration. To determine the rumen fermentation characteristics, both dietary treatments were incubated for 48 and 96 hours using 2-stage *in vitro* method. Variables observed at 48 hours of incubation (first stage) were: pH value, volatile fatty acids (**VFA**) concentration, ammonia (**N-NH_3**) concentration, microbial protein concentration, and carboxy methyl cellulase (endoglucanase) enzyme activity. Variable observed at the end of the 96-hour incubation period (stage 2) was pH value. The research data obtained were analyzed using the independent sample t-test. The results showed there was a decrease ($P<0.05$) on concentrations of total VFA, acetic acids, propionic acids, and endoglucanase enzyme activity, as well as an increase ($P<0.05$) of A:P ratio and microbial protein concentration. Protection of ration with 0.8% formaldehyde did not affect the pH value, butyric acids concentration, and the concentration of N-NH_3 in rumen fluid. Therefore, it can be concluded that 0.8% formaldehyde protection in a total mixed ration can protect protein, fat, and minerals against rumen degradation without giving negative impacts on the fermentation process and rumen environment.

Keywords: Soybean Meal, *Crude palm oil*, Formaldehyde, *In vitro*, Rumen fermentation characteristics*, Premix* mineral *Agromix*®, Protection,