PENGARUH PENAMBAHAN ISOLAT SELULOLITIK DARI CAIRAN RUMEN SAPI PERANAKAN ONGOLE DAN PERANAKAN FRIESIAN HOLSTEIN PADA FERMENTASI BUNGKIL KELAPA SAWIT TERHADAP KECERNAAN *IN VITRO*

Muhammad Reddy Yustisiawan
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INTISARI

Penelitian ini dilakukan untuk mengetahui pengaruh penambahan mikrobia selulolitik dari cairan rumen sapi Peranakan Ongole (PO) dan Peranakan Frisian Holstein (PFH) terhadap peningkatan kecernaan *in vitro* bungkil kelapa sawit fermentasi (BKSF). Pada 200 g bungkil kelapa sawit (BKS) ditambahkan mikrobia selulolitik sebanyak 0%, 5%, 10% dan 15% dari berat bahan keringnya dan difermentasi dalam kondisi anaerob pada suhu ruang selama 21 hari. Mikrobia selulolitik didapat dari cairan rumen yang telah dilakukan pengkayaan dan pertumbuhan. Setiap perlakuan terdiri dari 3 ulangan. Pada akhir fermentasi dilakukan uji kualitas fisik (bau, warna, tekstur, dan pertumbuhan jamur), pH dan kadar asam laktat. Sampel hasil fermentasi dikeringkan dalam oven dengan suhu 55℃, selanjutnya dilakukan analisis komposisi kimia dan uji kecernaan *in vitro* metode Tilley dan Terry. Data yang diperoleh dianalisis variansi pola faktorial 2 x 4 kemudian dilanjutkan dengan uji *Duncan's new multiple range test* (DMRT). Hasil penelitian menunjukkan bahwa aktivitas mikrobia selulolitik cairan rumen sapi PO lebih tinggi dibandingkan dengan PFH, aktivitas spesifik selulolitik dari cairan rumen pada sapi PO adalah 0,608 U/mg dan PFH 0,370 U/mg. Fermentasi BKS menggunakan mikrobia selulolitik menyebabkan bau lebih asam dan tekstur lebih halus, namun demikian tidak berpengaruh terhadap warna BKS. Selain itu penambahan mikrobia selulolitik menyebabkan kadar bahan organik (BO), bahan kering (BK) dan serat kasar (SK) turun sedangkan kadar lemak kasar (LK), kecernaan bahan kering (KcBK), kecernaan bahan organik (KcBO) dan kecernaan serat kasar (KcSK) naik ($P<0,01$). Kadar SK BKSF tanpa penambahan mikrobia selulolitik yaitu 39,01% turun sebanyak 1,61, 2,66, dan 5,87% dengan penambahan mikrobia selulolitik sebanyak 5, 10, 15%. Perbedaan sumber mikrobia selulolitik (PO dan PFH) berpengaruh nyata ($P<0,05$) terhadap kadar BO dan berpengaruh sangat nyata ($P<0,01$) terhadap kadar asam laktat, BK, LK, SK, KcBK dan KcBO. Berdasarkan penelitian dapat diambil kesimpulan bahwa aktivitas mikrobia selulolitik dari sapi PO lebih tinggi dibandingkan dengan PFH, sehingga degradasinya pun lebih tinggi. Fermentasi BKS menggunakan mikrobia selulolitik cairan rumen mampu menurunkan kadar SK dan meningkatkan nilai kecernaan.

Kata Kunci : Bungkil kelapa sawit, Mikrobia selulolitik, Komposisi kimia, Kecernaan *in vitro*.

The Effect of Cellulolytic Isolate Addition from Rumen Fluid of Ongole Crossbred and Friesian Holstein Crossbred Cattle on the In Vitro Digestibility of Fermented Palm Kernel Cake

Muhammad Reddy Yustisiawan
2005/186252/PT/04929

ABSTRACT

This research was conducted to find out the effect of cellulolytic microbes isolate addition of Ongole Crossbred's (OC) and Friesian Holstein Crossbred's (FHC) rumen fluid on the in vitro digestibility of fermented palm kernel cake (FPKC). Cellulolytic microbes isolate were added on 200 g palm kernel cake as much as 0%, 5%, 10% and 15% of its dry matter (DM), then fermented anaerobically at the room temperature for 21 days. Cellulolytic microbes were obtained from rumen fluid which has been grown in enrichment and evolvement process. Each of this treatment was done with three replications. A set of test of physical quality (including odor, colour, texture, and the presence of fungi), pH, and lactic acid value were conducted at the end of fermentation process. The sample of fermented palm kernel cake were dried in oven at 55℃, then later was analyzed for its chemical composition and in-vitro digestibility applying Tilley&Terry method. As the next step, the data were obtained by variance analysis using factorial design (2x4) and later continued with Duncan's new multiple range test (DMRT). The result showed that cellulolytic microbes' activity of OC's rumen fluid is higher compared to FHC's, cellulotic specific activity from PO rumen fluid is 0,608 U/mg and PFH 0,370 U/mg. Palm kernel cake fermentation process using cellulolytic microbes caused a more sour odor and softer texture, although gave no effect towards PKC's color. Another finding indicated that cellulolytic microbes addition decreased the value of organic matter (OM), dry matter (DM), and crude fiber content (CF). At contrast, crude fat content (CF), dry matter digestibility (DMD), organic matter digestibility (OMD), and crude fiber digestibility (CFD) increased ($P<0.01$). The CF value of PKC without the addition of cellulolytic microbes was 39.01%, decreasing perspectively as much as 1.61, 2.66, and 5.87% if added cellulolytic microbes 5, 10, and 15%. Difference in the source of cellulolytic microbes between OC and FHC was real affecting ($P<0.05$) the value of OM and much more affecting ($P<0.01$) the value of lactic acid, DM, crude fat, CF, DMD, and OMD. It could be concluded from this research that cellulolytic microbes activity from OC was higher in the comparison with FHC, thus its degradation was also higher. Palm kernel cake fermentation using cellulolytic microbes of rumen fluid was proved to decrease the value of crude fiber content and at the same time increased the digestibility value.

Keywords: Palm kernel cake, Cellulolytic microbes, Chemical composition, In vitro digestibility .