

The Changes of Chemical Composition of Rice Straw Treated by a Biodecomposer Developed from Rumen Bacterial of Buffalo

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Abstract : In tropical countries such as in Indonesia, rice straw plays an important role in fulfilling the needs of feed for ruminant, especially during the dry season in which the availability of forage is very limited. However, the main problem of using rice straw as a feedstuff is low digestibility due to the existence of the links between lignin and cellulose or hemicellulose, and imbalance of its minerals content. One alternative to solve this problem is by application of biodecomposer (BS) derived from rumen bacterial of the ruminant. This study was designed to assess the effects of BS application on the changes of the chemical composition of rice straw. Four adults local buffalo raised under typical feeding conditions were used as a source of inoculum for BS development. The animal was fed for a month with a diet consisted of rice straw and elephant grass before taking rumen fluid samples. Samples of rumen fluid were inoculated in the carboxymethyl cellulose (CMC) media under anaerobic condition for 48 hours at 37°C. The mixture of CMC media and microbes are ready to be used as a biodecomposer following incubation of the mixture under anaerobic condition for 7 days at 45°C. The effectiveness of BS then assessed by applying the BS on the straw according to completely randomized design consisted of four treatments and three replication. One hundred g of ground coarse rice straw was used as the substrate. The BS was applied to the rice straw substrate with the following composition: Rice straw without BS (P0), rice straw + 5% BS (P1), rice straw +10% BS (P2), and rice straw + 15% BS. The mixture of rice straw and BS then fermented under anaerobic for four weeks. Following the fermentation, the chemical composition of rice straw was evaluated. The results indicated that the crude protein content of rice straw significantly increased ($P < 0.05$) as the level of BS increased. On the other hand, the concentration of crude fiber of the rice straw was significantly decreased ($P < 0.05$) as the level of BS increased. Other nutrients such as minerals did not change ($P > 0.05$) due to the treatments. In conclusion, application of BS developed from rumen bacterial of buffalo has a promising prospect to be used as a biological agent to improve the quality of rice straw as feeding for ruminant.

Keywords : biodecomposer, local buffalo, rumen microbial, chemical composition

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