Effectivity of *Jatropha curcas* Seed Meal Fermented with Various Moulds as Protein Source for Male Mice (*Mus musculus*)

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ABSTRACT

Jatropha curcas L seed meal (JCSM) is a waste product of seed processing to produce oil as biofuel. This JCSM contains high crude protein (24.3%) leading to its use as protein source for animals. However, the utilization of JCSM is limited by the presence of antinutritional factors, such as phorbolester, curcin, trypsine inhibitor, phytate, saponin, tannin and lectin. Detoxification is needed to improve its utilization. Fermentation with various moulds as biological treatment was applied to reduce phorbolester and curcin in this experiment. This experiment was carried out to evaluate the effectivity of JCSM fermented with various moulds as protein source for mice. JCSM was treated with *Aspergillus niger*, *Rhizopus oryzae*, *Rhizopus oligosporus*, *Trichoderma viride*, or *Trichoderma reesei*. Treatments applied in this experiment were R0 (control diet without JCSM), R1 (95% R0 + 5% JCSM treated with *A. niger*), R2 (95% R0 + 5% JCSM treated with R. oryzae), R3 (95% R0 + 5% JCSM treated with *R. oligosporus*), R4 (95% R0 + 5% JCSM treated with *T. viride*), and R5 (95% R0 + 5% JCSM treated with *T. reesei*). Treatments were allocated in a completely randomized design with five replications and applied to thirty five sexual matured of male mice. Variables measured were feed intake, body weight gain, feed efficiency, nutrient digestibility and mortality. The data were analyzed with descriptive analysis. The results showed that the use of fermented JCSM as protein sources reduced feed intake and feed efficiency. The mice had drastic reduction in body weight. Treatment JCSM with *A. niger* increased nutrient digestibilities such as dry matter, organic matter, protein and energy. Mice consuming JCSM treated with various moulds still had high mortality rate. The use of JCSM treated with *R. oligosporus* was better than that treated with *R. oryzae*. It is concluded that the use of fermented JCSM with various moulds at 5% in ration has not been effective as protein sources for male mice.

Key words: Jatropha curcas L., *Aspergillus niger*, *Rhizopus oryzae*, *Rhizopus oligosporus*, *Trichoderma viride*, *Trichoderma reesei*, *mice* (*Mus musculus*)

INTRODUCTION

Jatropha curcas L seed meal (JCSM) is a waste product of seed processing to produce oil as biofuel. This JCSM contains high crude protein (24.3% DM basis) leading to its use as protein source for animals (Tjakradidjaja *et al.*, 2007). JCSM also contains ether extract in high concentration (15.99% DM basis) that causes high energy content. These protein and other nutrient contents are affected by the presence of seed husk during oil extraction. Exclusion of seed husk increased significantly protein (37.56% DM basis) and lipid (35.02% DM basis) contents, and reduced crude fibre and nitrogen free extract (Tjakradidjaja *et al.*, 2007). However, the utilization of JCSM is limited by the presence of antinutritional factors, such as phorbolester, curcin, trypsin inhibitor, phytate, saponin, tannin and lectin (Makkar and Becker, 1999; Aregheore *et al.*, 2003).

JCSM had been used as protein supplements that substituted control diets (Siagian *et al.*, 2007; Wardoyo, 2007). The maximum use of JCSM was 5%. The use of greater levels of JCSM (7.5-15%) caused weakness, lost of appetite, reduction in feed intake, decrease in body weight gain, presence of yellow colour liquid in anus (rectum), and high mortality rate. These are caused by curcin and phorbolester as the main antinutrients/toxins (Stirpe *et al.*, 1976; Aderibigbe *et al.*, 1997; Evans, 1986; Brodjonegoro *et al.*, 2005). Basically, curcin has similar protein structure to that of ricin which is present in *Ricinus communis*; curcin and ricin are lectin type toxins (Aderibigbe *et al.*, 1997;