

## THE EFFECT OF COCONUT SEED MEAL FERMENTATION WITH EFFECTIVE MICROORGANISM-4 ON THE BROILER PERFORMANCE

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### ABSTRACT

The objective of this research is to investigate the quality of coconut seed meal fermented with **effective microorganism-4 (EM-4)** and its effect on the broiler performance. One hundred Platinum broiler at the age of 3 days were used subjected to 5 ration treatments containing different levels of fermented coconut seed meal (5%, 10%, 15%, 20% and 25%) in a completely randomized design. Variables measured were feed consumption, body weight and ration conversion. The results of this study showed that the use of fermented kapok seed meal in the ration affected ( $P < 0,05$ ) ration consumption and weight growth. There were no significant effect on feed consumption. It could be concluded that fermented coconut seed meal can be used up to 15% of the broiler ration.

*Keywords: coconut seed meal fermentation, ration consumption, weight growth*

### INTRODUCTION

Coconut oil cake is a by-product of palm oil processing industry. Seed meal has not been used as poultry feed, in optimum amount. This is due to high fiber content in coconut oil cake, resulting in low availability of nutrients (Sinurat et al, 1995). According to Hutagalung (1978), the rate of using coconut oil cake in poultry feed in Malaysia is only 4% while research in Indonesia indicated that the use of coconut oil cake in broiler feed shall not exceed 15% (Creswell and of Zainuddin, 1979).

Zamora et al. (1989) reported that coconut oil cake generally contains crude protein about 20% and high crude fiber content (23.5-25.5), consisting of cellulose fraction of 13%, galaktomanan 61% and paradise fruits 26%. Fiber fraction is constraint factor in poultry feed because the compound will bind protein and lower the value. Fermentation using effective microorganism (EM-4) will be able to elaborate the fiber fraction because EM-4 compound of microorganism has the character of cellulolytic.

EM-4 is a mixture of various microorganism especially photosynthetic sour bacterium and lactate, *actinomyces*, yeast and mushroom. EM-4 in liquid media with pH of 4.5 contains some types of microorganism *i.e Lactobacillus sp, khamir*, cellulolytic microorganism and of *actinomyces* (Hadijaya, 1994 in Sumadja et al., 1999). Sour bacterium of lactate in EM-4 yields lactate of sugar. This bacterium can

depress growth of microorganism (APNAN, 1995). Fermentation is a process of chemical change of organic matter because of biochemical catalyst action of enzyme produced by selected microbes. Fermentation can improve the value of low quality of nutrients as well as pickling the materials in feed-stuff ( Fardiaz, 1992).

It is reported (Mairizal et al., 2003) that coconut oil cake fermentation using mould of *Aspergillus niger* can improve protein content and degrade crude fiber. However, improvement of protein at the research level cannot improve the quality of protein. This condition caused broiler can not use protein in an optimal amount indicated by low body weight. Sinurat *et al.* (1995) also reported making-up of coconut oil cake protein content resulted from bioprocess using *Aspergillus niger* from 21.65% to 35.19% and followed by degradation of crude fiber content from 16.22 % to 10.08%. However, this was not shown in duck feeding

This study was conducted to to investigate the quality of coconut seed meal fermented with EM-4 and its effect on the performance of broiler.

## MATERIALS AND METHOD

One hundred 3-day old male broiler chicks were placed in 100x100x50 cage units, with 5 chicks per unit, accomplished with feed, drinking water and light facilities. Feeding treatments comprised of ration containing 0, 5, 10, 15 and 20% coconut oil cake fermented with EM-4 (R0, R1, R2, R3, and R4), with four replications. Fermentation was done according the procedure of Rotib (2000). Variables measured were feed consumption, body weight and feed conversion. Analysis of variance in a completely randomized design was performed followed by Duncan's multiple range test (Steel and Torrie, 1989). Chemical composition of feed ingredients and rations were depicted in Table 1, 2 and 3.

Table 1. Chemical composition feed ingredients

| Component     | Commercial feed | Coconut seed meal | Coconut seed meal fermented with EM-4 |
|---------------|-----------------|-------------------|---------------------------------------|
| Dry matter    | 88.69           | 92.29             | 82.96                                 |
| Crude protein | 19.83           | 16.44             | 19.02                                 |
| Crude fiber   | 5.07            | 21.68             | 15.37                                 |
| Crude fat     | 5.56            | 10.69             | 8.76                                  |
| GE (kcal/kg)  | 4103.38         | 3756.73           | 3845.48                               |
| ME (kcal/kg)  | 2974.95         | 2723.63           | 2787.97                               |

Result of chemical analyses in Animal Nutrition and Feed Science Laboratory, Faculty of Animal Husbandry, University of Jambi (2005)

Table 2. Ration composition (%) of feeding treatments

| Feed ingredients                      | Feeding trial (%) |     |     |     |     |
|---------------------------------------|-------------------|-----|-----|-----|-----|
|                                       | R0                | R1  | R2  | R3  | R4  |
| Commercial feed                       | 100               | 95  | 90  | 85  | 80  |
| Coconut seed meal fermented with EM-4 | 0                 | 5   | 10  | 15  | 20  |
| Total                                 | 100               | 100 | 100 | 100 | 100 |

Table 3. Chemical composition of diet treatment<sup>1</sup>

| Chemical feed | Feeding treatments (%) |       |       |       |       |
|---------------|------------------------|-------|-------|-------|-------|
|               | R0                     | R1    | R2    | R3    | R4    |
| Dry matter    | 88.69                  | 88.40 | 88.12 | 87.83 | 87.54 |
| Crude protein | 19.83                  | 19.79 | 19.75 | 19.71 | 19.67 |
| Crude fiber   | 5.07                   | 5.59  | 6.11  | 6.63  | 7.15  |
| Crude fat     | 5.56                   | 5.72  | 5.88  | 6.04  | 6.20  |

<sup>1</sup>Calculated based on Tables 1 and 2.

## RESULTS AND DISCUSSION

Average feed consumption, body weight and feed conversion can be seen in Tables 4.

Table 4. Average feed consumption, weight gain, and feed conversion of broiler at research

| Treatments | Average feed consumption,<br>g/broiler/d | Weight gain,<br>g/broiler/d | Feed conversion |
|------------|--|-----------------------------|-----------------|
| R0         | 60.23                                    | 39.11                       | 1.54            |
| R1         | 60.84                                    | 38.96                       | 1.56            |
| R2         | 58.67                                    | 37.13                       | 1.58            |
| R3         | 57.84                                    | 36.03                       | 1.61            |
| R4         | 55.85                                    | 34.26                       | 1.63            |

The use of coconut oil cake fermented with EM-4 in the feed affected ( $P < 0.05$ ) feed consumption. Feed consumption in R4 was lower than those in R0, R1, R2 and R3. This has something to do with high crude fiber content in R4 (7.15%). NRC (1994) recommended that crude fiber content should not exceed 6% of the ration. There were no significant differences in feed consumptions among R0, R1, R2 and R3. This could be related with the facts that there were no significant differences in chemical composition among the first four treatment groups.

Effect of the use of coconut oil cake fermented with EM-4 in the feed on body weight was similar to that on feed consumption. Body weight of broiler in R4 was lower ( $P < 0.05$ ) than those in R0, R1, R2 and R3. This was also due to high fiber content in R4. Wahyu (1997) stated that high-fiber feeds are less or undigestible, due to unavailability of cellulolytic enzyme in poultry.

Similar effects on feed consumption and body weight, indeed, resulted in no effect on feed conversion. There were no significant effect of the use of coconut oil cake fermented with EM-4 in the feed.

It is concluded that coconut oil cake fermented with EM-4 can be used in ration for male broiler up to 15%.

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