

# CASSAPRO IN BROILER RATION: INTERACTION WITH RICE BRAN

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## ABSTRAK

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Satu percobaan dengan rancangan faktorial 3 x 3 (kadar cassapro 0, 5 dan 10% x kadar dedak padi 0, 21 dan 42%) dilakukan untuk mempelajari pengaruh cassapro dan dedak padi, serta interaksinya terhadap penampilan ayam pedaging. Semua ransum percobaan disusun dengan kandungan nutrisi yang sama. Setiap ransum diberikan pada 40 ekor anak ayam berumur 3 hari, yang dibagi dalam 4 kandang (10 ekor/kandang). Ransum dan air diberikan secara bebas selama 4 minggu masa percobaan. Pemakaian cassapro dalam ransum secara nyata ( $P < 0,05$ ) meningkatkan pertambahan bobot badan, tetapi tidak mempunyai pengaruh yang nyata terhadap nisbah konversi pakan (FCR). Kadar dedak padi dalam ransum secara sangat nyata menurunkan pertambahan bobot ( $P < 0,001$ ) dan efisiensi penggunaan ransum ( $P < 0,01$ ). Ada pengaruh interaksi yang nyata antara kadar cassapro dan kadar dedak padi baik terhadap pertambahan bobot badan ( $P < 0,01$ ) maupun terhadap FCR ( $P < 0,001$ ). Disimpulkan bahwa cassapro mengandung unsur-unsur yang diperkirakan berbagai enzim pencernaan, yang dapat meningkatkan kecernaan dedak padi.

**Kata kunci:** Cassapro, *Aspergillus niger*, dedak padi, ayam pedaging

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A three by three factorial experimental design (cassapro levels 0, 5 and 10% x rice bran levels 0, 21 and 42%) was employed to study the effect of cassapro and rice bran and their interaction on boiler performance. All rations were formulated to be isonutrients. Each ration was fed to 40 three days old chicks, divided into 4 cages (10 birds/cage). Feed and water were given *ad libitum* during the 4 weeks trial. Feeding cassapro significantly ( $P < 0.05$ ) improved body weight gain, with no significant effect on feed conversion ratio (FCR). Rice bran significantly ( $P < 0.001$ ) reduced body weight gain and caused poorer FCR ( $P < 0.01$ ). There was a significant interaction effect of cassapro and rice bran on body weight gain ( $P < 0.01$ ) as well as FCR ( $P < 0.001$ ). It is concluded that cassapro contained some factors, which are most likely digestive enzymes, which enhance digestibility of rice bran.

**Key words:** Cassapro, *Aspergillus niger*, rice bran, broiler

## INTRODUCTION

Previous experiments showed that cassapro, a protein enriched cassava, could be included in a ration formulation for broiler up to 10%, layer up to 7.5% and for laying duck up to 20% without detrimental effect (KOMPIANG *et al.*, 1994, SINURAT *et al.*, 1995). In fact, they also observed that feed efficiency ratio was tend to be better with the inclusion of cassapro. This improvement has been suggested to the possibility that cassapro contained some enzymes which could enhance nutrients digestibility such as amylase, protease, cellulase, phytase etc. It has been reported that *Aspergillus niger*, micro fungi used for cassapro production, is able to produce those enzymes (OGONDERO, 1982, SANI *et al.*, 1992). To elucidate this hypothesis, the effect of cassapro supplementation on high rice bran diet for broiler was evaluated in an

experiment, and the result is described below. The rice bran was chosen for this experiment since it is known to contain some anti-nutritive factors such as phytic acid and high fibre that limit its inclusion in broiler ration (KRATZER *et al.*, 1974).

## MATERIALS AND METHODS

Cassapro was prepared from peeled-cassava tuber and *A. niger* as an inoculum as described before (Kompiang *et al.*, 1992).

Three hundred and sixty, 3-day old broiler chicks were randomly distributed into 36 experimental cages. A three by three factorial designed experiment was employed to study the effect of cassapro levels (0, 5 and 10%) and rice bran levels (0, 21 and 42%) and their interaction. The composition of the experimental diets, was formulated to contain similar level of protein

(21%), ME (2,900 Kcal/kg), Ca (1%) and total P (0.7%) are presented in Table 1. Each ration was fed to 40 chicks, divided into 4 cages (5 males and 5 females /cage). Feed and water were given *ad libitum*, during the four weeks trial. Body weight and feed consumption were measured biweekly during the four weeks trial. The data were subjected to analysis of variance (CAMPBELL, 1967).

Table 1. Composition of experimental rations

Ingredient	0% rice bran			21% rice bran			42% rice bran		
	0%	5%	10%	0%	5%	10%	0%	5%	10%
Cassapro	0.0	5.0	10.0	0.0	5.0	10.0	0.0	5.0	10.0
Fish meal	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Corn	69.3	66.7	63.7	48.3	45.4	42.6	27.4	24.4	21.3
Soy bean meal	24.2	21.9	19.9	24.3	22.2	20.0	24.2	22.2	20.3
CaCO <sub>3</sub>	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
NaCl	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Vit.Premix	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Note: All rations contain similar crude protein (21%), ME (2,900 kcal/kg), Calcium (1%) and total Phosphorus (0.7%)

For diseases prevention, the birds were vaccinated against ND and Gumboro and medication to prevent CRD. During the first three days, prior to the treatment, the birds were given commercial broiler-starter feed.

## RESULTS AND DISCUSSION

Body weight gain of the bird given the experimental ration, is summarized in Table 2 and its feed conversion ratio (FCR) in Table 3. Although the effect of cassapro level on body weight gain was parabolic, the overall analysis showed that cassapro inclusion in the diet significantly ( $P < 0.05$ ) improved the body weight gain. The 5% inclusion rate gave better improvement (104.6%) than the 10% inclusion rate (102.7%), similar as being reported previously (KOMPIANG *et al.*, 1994). Its overall effect on FCR was also parabolic as previously reported, but it was not significant ( $P > 0.01$ ), while previously, we reported significant improvement of FCR due to cassapro inclusion. This discrepancy could be due to the difference in ration quality being used. In the previous trial, rice bran was not included in the ration.

Increasing the level of rice bran, as being reported by other workers (CRESWELL *et al.*, 1977, PILIANG *et*

*al.*, 1982, TANGENDJAJA, 1993) significantly reduced body weight gain ( $P < 0.001$ ) and FCR ( $P < 0.01$ ), indicating that rice bran contained anti-nutritional factors. Various substances have been postulated, such as silica content, fat quality (oxidative and hydrolytic rancidity), fibre content, phytic acid etc., responsible for this detrimental effect (KRATZER *et al.*, 1974).

Table 2. Body weight gain (gram) of the bird fed experimental ration after 4 weeks

	0% cassapro	5% cassapro	10% cassapro	Average
0% rice bran	881	901	893	892
21% rice bran	815	847	842	835
42% rice bran	746	809	772	776
Average	814	852	836	
Analysis of variance:				
Source of variance	DF	SS	MSS	F
Cassapro (C)	2	7,114	3,557	4.20 *
Rice bran (R)	2	59,765	29,883	35.29 ***
C * R	4	24,459	6,115	7.22 **
Error	27	22,862	847	
Total	35	114,200		

\*  $P < 0.05$ ; \*\*  $P < 0.01$ ; \*\*\*  $P < 0.001$

Table 3. Feed conversion ratio of the bird fed experimental ration, after 4 weeks

	0% cassapro	5% cassapro	10% cassapro	Average
0% rice bran	1.80	1.81	1.85	1.82
21% rice bran	1.92	1.82	2.00	1.92
42% rice bran	1.99	1.96	2.08	2.01
Average	1.90	1.87	1.98	
Analysis of variance:				
Source of variance	DF	SS	MSS	F
Cassapro (C)	2	0.0032	0.0016	0.47
Rice bran (R)	2	0.164	0.0821	23.58 **
C * R	4	0.129	0.0321	9.23 ***
Error	27	0.094	0.0035	
Total	35	0.390		

\*\*  $P < 0.01$ ; \*\*\*  $P < 0.001$

The interaction effect between the level of cassapro and rice bran was significant both on body weight gain (BWG) ( $P < 0.01$ ) and FCR ( $P < 0.001$ ), indicating that their effects are interdependent. The percentage improvement due to cassapro increased as the level of rice bran in the ration increased (Fig. 1 and 2), indicating that the birds are able to utilize rice bran better in the presence of cassapro. This observation suggests that cassapro contain some factors which are able to enhance digestibility of rice bran. Various enzymes, such as amylase, protease, cellulase and phytase, which are reported being able to be produced by *A. niger* (OGUNDERO, 1982; SANI *et al.*, 1992), could be responsible. The activity of those enzymes in cassapro should be further evaluated, to elucidate the hypothesis.

Although cassapro has a possibility to contain some factors which could improve digestibility of feedstuff, it may also contain some anti-nutritive factors, since the

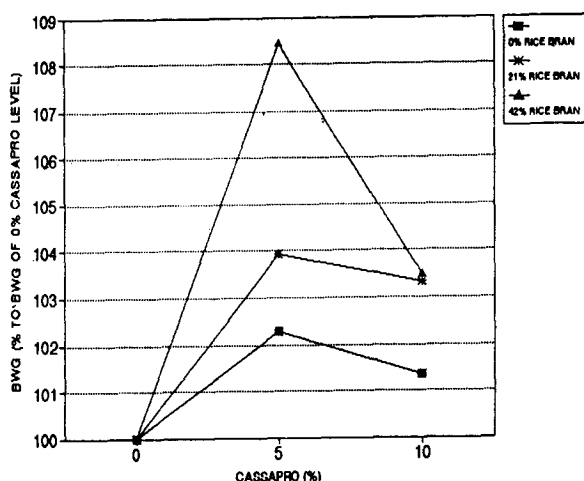


Figure 1. Effect of cassapro on BWG of birds fed various levels of rice bran

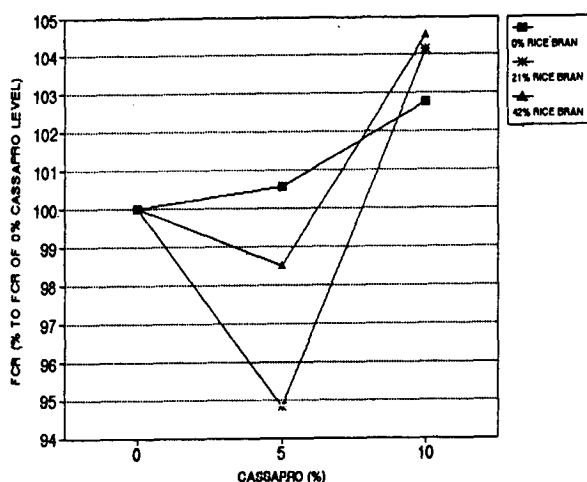


Figure 2. Effect of cassapro on FCR of birds fed various levels of rice bran

performance of the birds given 10% cassapro, although better than the control, was lower than those given only 5%. As discussed before (KOMPIANG, *et al.*, 1994) part of these factors could be cell wall and nucleic acids.

Based on the present data, enrichment of cassava by solid fermentation using *A. niger* as inoculum have a double benefit. Besides increasing its protein content, it also contains some factors, most likely digestive enzymes, which enhance the digestibility of rice bran. The possibility of this factor also enhance the digestibility of other low quality feedstuffs such as cassava waste, coffee pulp, pineapple waste, coconut cake, etc., warrant further investigation.

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