

## Utilization of A Probiotic "Starbio" in Broiler Diet With Different Levels of Crude Fibre

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**ABSTRACT:** Previous study showed that a probiotic "starbio" were more effective to improve the productivity and feed efficiency broilers if the protein content of the diet was reduced 2 % as compared with broiler commercial ration. This may be due to ability of the microbe itself in probiotic "starbio" to synthesize protein and other nutrients. The aim of this study was to investigate the effect of probiotic in diet with different levels of crude fibre on the broiler performance. One hundred and eighty day old broiler chickens were used in this study up to six weeks of experiment. The Treatments were factorial of levels of crude fibre in diets (4.5, 6 and 8%) and levels of probiotic "starbio" (0 and 0.25%)

with five replication of six birds. The ration were formulated iso-nitrogenously and iso-caloricly (19 % CP, 3000 kcal ME/kg of starter diets and 17 % CP, 3100 kcal ME/kg of finisher diets). The data obtained were subjected to analysis of variance based on 3 x 2 factorial Completely Randomized Design. Differences between treatment means were examined using the Least Significant Difference (LSD) test. Results of this study showed that the addition of probiotic in the diet with 6 % crude fibre content gave the highest (1814 gram/head) body weight gain and the best (1,77) feed conversion ratio ( $P < 0.05$ ) compared with other diets.

Key Words : Broiler, Nutrition, Crude Fibre, Probiotic

### Introduction

Microbe starter or "starbio" : is a probiotic, the biotechnology product. The microbe is a small colony culture in the cattle's rumen made of the mixture of land, grass root and spoiled leaves or branches. The colony has some specific microbes which have different functions such as fat digestible (i.e. *Cellulomonas Clostridium thermocellulosa*), lignolytic digestible (i.e. *Agaricus, Coprinus*) and proteolytic digestible (i.e. *Klebsiella, Azospirillum brasiliensis*), (Suharto and Winantuningsih, 1993). A probiotic "starbio" is produced in Indonesia made of natural materials which are easily to find out.

The advantages and function of probiotic "starbio" is improve the digestibility of ration or feedstuff and to increase the efficiency of absorption to achieve optimum production. Beside that a probiotic "starbio" could be reducing an ammonia odor from manure. (Suharto et al., 1993 and Desmayati et al. 1993). A study of Suharto et al. (1993) showed that probiotic "starbio" increase the growth rate of cattle fed with low nutrient ration

(rice straw mixed with probiotic "starbio"). Previous study (Desmayati et al. (1993) showed that probiotic "starbio" were more effective in improving the productivity and feed efficiency on broilers if the protein content of the diets was reduced 2 % as compared with broiler commercial ration (21% crude protein, 3000 kcal ME/kg and 4% crude fibre).

The aim of this study was to investigate the effect of probiotic in diets with different levels of crude fibre on the broiler performance.

### Materials and Methods

In this experiment, 180 day old broiler chickens strain Arbor Acres CP-707 from PT. Charoen Pokphand Indonesia were used. These chickens were allocated at random to seven treatments. Each treatment was divided into five groups of six birds. The birds were housed wire-floored brooder cages 30 x 40 x 60 cm, each cage provided feedtrough and watertrough with running water.

The treatments were factorial of levels of crude fibre in diets (4.5, 6 and 8 %) and levels of probiotic "starbio" (0 and 0.25 %). Each treatment

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was divided into five groups of six birds. The treatment diets were following as :

- T 1 : 4.5 % crude fibre without "starbio" added.
- T 2 : 4.5 % crude fibre added "starbio" 0,25 %.
- T 3 : 6.0 % crude fibre without "starbio" added.
- T 4 : 6.0 % crude fibre added "starbio" 0.25 %.
- T 5 : 8.0 % crude fibre without "starbio" added.
- T 6 : 8.0 % crude fibre added "starbio" 0.25 %.

Composition of diets fed is presented in Table 1 (starter diets) and Table 2 (finisher diets). A change to finisher diets was made at 28 days of age. The ration were formulated iso-nitrogenously and iso-caloricly (19 % crude protein, 3000 kcal ME/kg of starter diets and 17 % crude protein, 3100 kcal ME/kg of finisher diets) using a linear programming technique (programme mixit-2<sup>+</sup> Software from Cooperative League of the USA).

Vaccination programme of Newcastle Disease and Infectious Bursal Disease to preventive the poultry diseases was treated according to recommended schedule from medicine factory.

Performance of the chickens was measured to 42 days of age after addapted during 3 days after hatching with a broiler commercial diets. Feed and water were provided ad libitum. Measurements were made of body weight gain, feed consumption by weekly and feed conversion ratio, mortality during experimental proceed and economic analysis (Income Over Feed and Chick Cost). Data from the feeding trials were subjected to analysis of variance based on Completely Randomized Design and significant differences between treatment means were examined using the Least Significant Difference (LSD) test (Steel and Torrie, 1986).

Table 1. The composition of experimental starter diets.

Ingredient	Treatment Diet					
	1	2	3	4	5	6
	----- % -----					
Broiler commercial starter diets (BR1-511)	83.64	83.64	73.14	73.14	70.41	70.41
Rice bran (CF.12 %)	13.19	13.19	19.34	19.34	20.97	20.97
Rice hull meal (CF.39%)	-	-	1.08	1.08	1.08	1.08
Fish meal (CP.65 %)	-	-	2.05	2.05	3.22	3.22
Palm oil	3.17	3.17	4.39	4.39	4.32	4.32
Probiotic "starbio"	-	0.25	-	0.25	-	0.25
<b>T o t a l</b>	<b>100.00</b>	<b>100.25</b>	<b>100.00</b>	<b>100.25</b>	<b>100.00</b>	<b>100.25</b>

CF:Crude Fibre , CP:Crude Protein

Calculated analysis :

Crude protein (%)	19	19	19	19	19	19
Energy (kcal ME/kg)	3000	3000	3000	3000	3000	3000
Crude fibre (%)	4.5	4.5	6.0	6.0	8.0	8.0
Calcium (%)	1.1	1.1	1.0	1.0	1.0	1.0
Phosphorus total (%)	0.7	0.7	0.8	0.8	0.8	0.8
Lysine (%)	1.0	1.0	1.0	1.0	1.0	1.0
Methionine (%)	0.4	0.4	0.4	0.4	0.4	0.4



Table 2. The composition of experimental finisher diets

Ingredient	Treatment Diet					
	1	2	3	4	5	6
	----- % -----					
Broiler commercial finisher diets (BR2-512)	80.48	80.48	78.80	78.80	62.96	62.96
Rice bran (CF.12 %)	15.74	15.74	15.26	15.26	18.78	18.78
Rice hull meal (CF.39%)	-	-	1.09	1.09	6.77	6.77
Fish meal (CP.65 %)	-	-	0.51	0.51	4.16	4.16
Palm oil	3.78	3.78	4.34	4.34	7.32	7.32
Probiotic "starbio"	-	0.25	-	0.25	-	0.25
Total	100.00	100.25	100.00	100.25	100.00	100.25

CF:Crude Fibre , CP:Crude Protein

#### Calculated analysis :

Crude protein (%)	17	17	17	17	17	17
Energy (kcal ME/kg)	3100	3100	3100	3100	3100	3100
Crude fibre (%)	4.5	4.5	6.0	6.0	8.0	8.0
Calcium (%)	0.8	0.8	0.8	0.8	0.8	0.8
Phosphorus						
total (%)	0.8	0.8	0.8	0.8	0.8	0.8
Lysine (%)	1.3	1.3	1.2	1.2	1.1	1.1
Methionine (%)	0.5	0.5	0.5	0.5	0.5	0.5

## Results and Discussion

### Body weight

Utilization of probiotic "starbio" in broiler diet with different levels of crude fibre on weight gain at six weeks of age showed in Table 3. The results show that the addition of probiotic "starbio" 0.25% in the diet with 6% crude fibre content gave the highest ( $P < 0.05$ ) of weight gain (Figure 2) and increase the growth rate of broiler chickens (Figure 1) compared with other diets. The diet T5 with 8% crude fibre content without addition of probiotic "starbio" was lower of weight gain than treatment T1, T2 and T3 ( $P < 0.05$ ) but not significant differences ( $P > 0.05$ ) with treatment T6 (diet with 8% crude fibre content addition of probiotic

"starbio" 0.25%) of diet the same protein and energy contents as diet T5.

The suspected crude fibre as a limiting factor for broiler ration, and the broiler chickens it might be couldn't digested effectively the ration with high level of crude fibre (8%) and the supplementation of probiotic "starbio" at 0.25% in diets was not enough to digest the crude fibre or other nutrients. According to Standard Quality of Broiler Ration from Animal Husbandry Agency (1992) that maximum of crude fibre content in broiler commercial diets is 4.5% at 21% crude fibre.

A previous study of Desmayati *et al.* (1993), showed the supplementaton of 0.25% probiotic "starbio" in broiler ration with the protein content was reduced 2% as broiler commercial ration (21%)

and 5% crude fibre content has no significant differences of weight gain tahn broiler commercial ration as six weeks of age.

*Feed consumption and feed conversion*

The average feed consumption and feed conversion ratio of broiler chickens in this experiment is presented in Table 3. Table 3 shows that levels of crude fibre by 8% in broiler ration for 6 weeks gives no significant effect the feed consumption either addition probiotic "starbio" (Figure 2).

A study of Wiluto et al (1992) that the feed consumption of broiler chickens increased with the increase of crude fibre level in diet (5%, 8% and 11% crude fibre), Diet with 11% crude fibre content was higher feed consumption compared 5% and 8% crude fibre but there were no significant differences ( $P>0.05$ ) between the two treatments at 5% and 8% crude fibre. The results is in agrement with Wiluto et al (1992) if the crude fibre content of the diet up to 8%.

The Table 3. also shows that there is significant differences between three levels of crude fibre content on feed conversion ratio. The level of 6% crude fibre in diet resulted a better ( $P<0.05$ ) feed

conversion than other crude fibre content. Supple-mentation 0.25% probiotic "starbio" had no effects on feed consumption and feed conversion ratio at the different levels of crude fibre.

Broiler chickens fed a 6% crude fibre and probiotic supplementation in diet has the best feed conversion ratio compared with other diets. The advantage of relationship between probiotic supplementation and crude fibre level in the ration that the probiotic more effective in improving weight gain and feed efficiency of broiler at 6% crude fibre content in ration.

*Economic analysis*

The average Income Over Feed and Chick Cost (IOF&CC) of broiler chickens is presented in Table 4. Income Over Feed and Chick Cost was calculated by (live body weight x price/kg) minus (total feed intake per head during 6 weeks x price/kg) minus (price doc/head).

The results shows that the treatment T4 (6% crude fibre addition probiotic "starbio") gave the higher Income Over Feed and Chick Cost compared with other treatments , and the lower is treatment T5, T6 but there were no different among the three treatments diet (T1, T2 and T3).

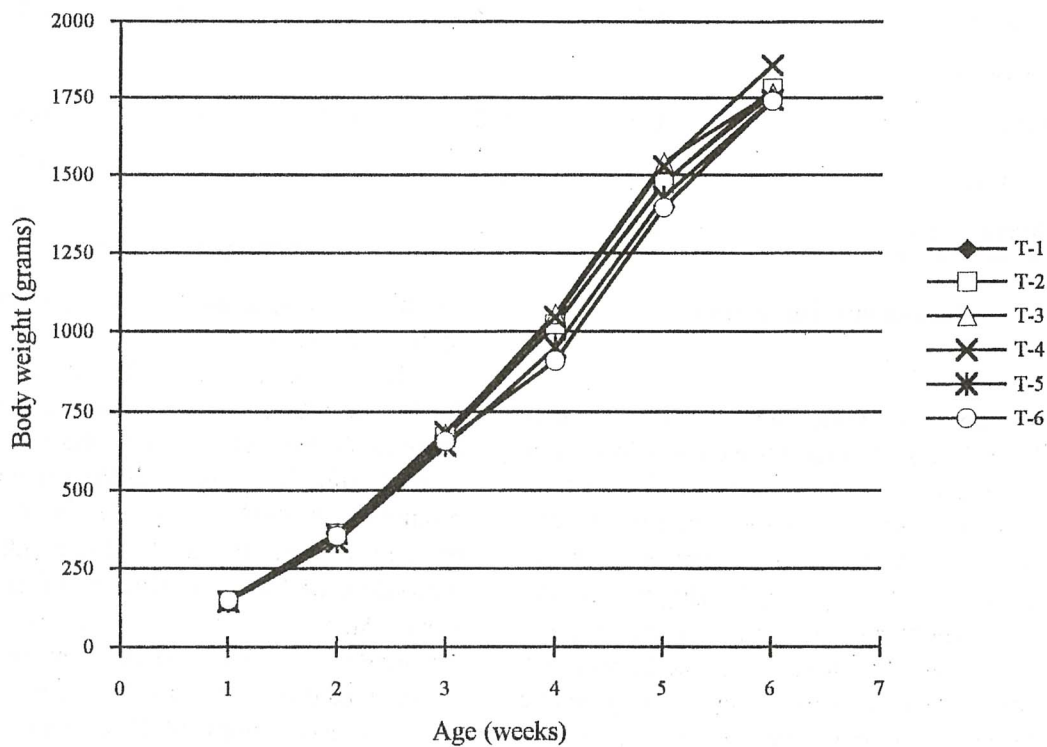
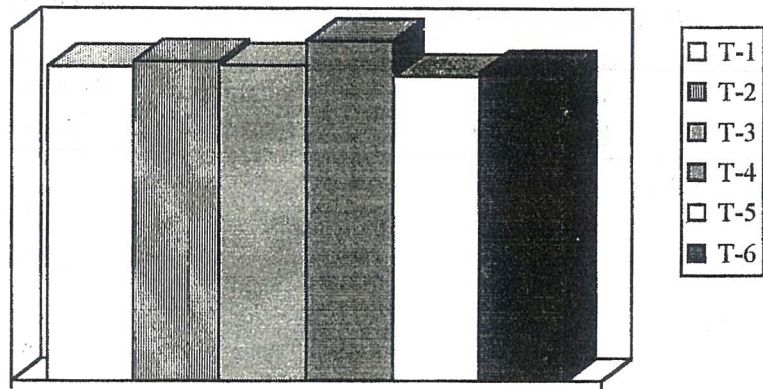
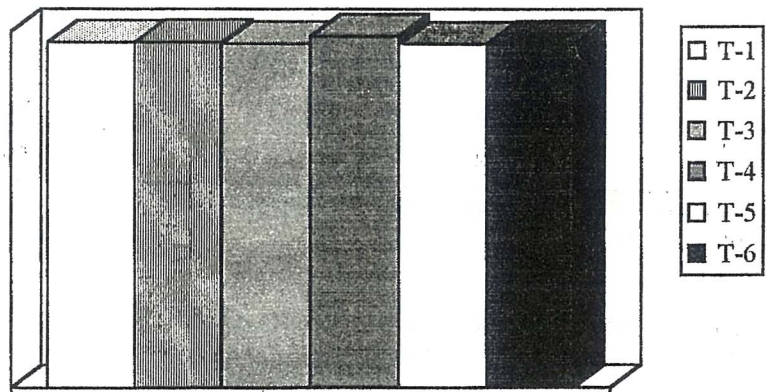


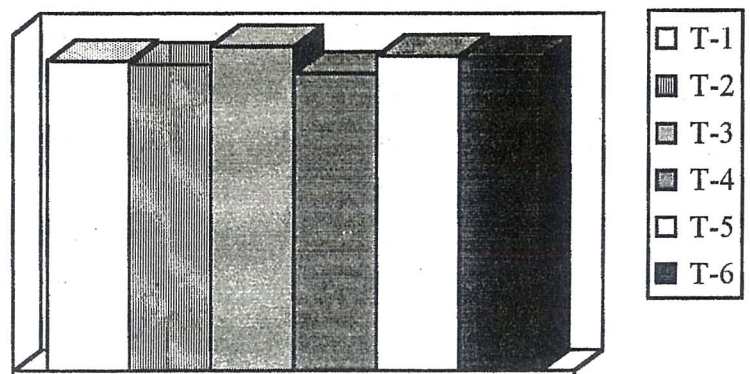
Figure 1. The effect of probiotic "Starbio" with different levels of crude fiber on body weight up to six weeks of age.



Weight gain (gram/head)



Feed Consumption



Food Conversion

Figure 2. The effect of probiotic "starbio" with different levels of crude fibre on weight gain, feed consumption and feed conversion at six weeks of age.



Table 3. Performance of broiler chicken in the experimental diets<sup>1</sup>

Treatments	Weight gain (gram/head)	Feed consumption (gram/head)	Feed/gain(FCR) <sup>2</sup> (gram/gram)	Mortality (%)
Levels of Probiotic "Starbio".				
0 %	1709.4 <sup>b</sup>	3157.6 <sup>a</sup>	1.85 <sup>a</sup>	
0.25%	1749.8 <sup>a</sup>	3180.2 <sup>a</sup>	1.82 <sup>a</sup>	
Levels of Crude Fibre.				
4.5%	1728.4 <sup>a</sup>	3167.0 <sup>a</sup>	1.83 <sup>ab</sup>	
6.0%	1768.6 <sup>b</sup>	3185.5 <sup>a</sup>	1.80 <sup>b</sup>	
8.0%	1791.9 <sup>a</sup>	3154.3 <sup>a</sup>	1.87 <sup>a</sup>	
Level probiotic x Crude Fibre.				
T 1.	1719.4 <sup>ab</sup>	3165.1 <sup>a</sup>	1.842 <sup>b</sup>	0
T 2.	1737.4 <sup>b</sup>	3168.9 <sup>a</sup>	1.825 <sup>b</sup>	6.67
T 3.	1723.3 <sup>ab</sup>	3156.7 <sup>a</sup>	1.833 <sup>b</sup>	0
T 4.	1813.9 <sup>c</sup>	3214.2 <sup>a</sup>	1.773 <sup>a</sup>	0
T 5.	1685.6 <sup>a</sup>	3151.2 <sup>a</sup>	1.874 <sup>b</sup>	0
T 6.	1698.1 <sup>ab</sup>	3157.4 <sup>a</sup>	1.859 <sup>b</sup>	3.33

<sup>1</sup>Value in the same column with a common superscript letter are not different ( $P>0.05$ ).

<sup>2</sup>FCR : Feed Conversion Ratio.

Table 4. Income over feed and chick cost (IOF&amp;CC) of broiler chickens in the experimental diets

Diet	Diet		Live weight (Rp/kg)	Body weight (kg/head)	Feed Consumption (kg/head)	DOC (Rp/head)	IOF&CC (Rp/head)
	S	F					
	(Rp/kg)						
T.1	692	655	2900	1.76	2242	960	1902
T.2	702	665	2900	1.78	2271	960	1929
T.3	684	660	2900	1.77	2227	960	1946
T.4	694	670	2900	1.86	2260	960	2180
T.5	684	668	2900	1.75	2273	960	1842
T.6	694	678	2900	1.74	2283	960	1807

S = Starter diets

F = Finisher Diets

DOC = Day Old Chicks

### Conclusion

The addition of a probiotic "starbio" in the diets with 6 % crude fibre content gave the highest body weight gain and the best feed conversion ratio compared with other diets.

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