EFFICACY OF PROBIOTICS (BACTOSAC-P) ADDITIONS IMPROVES PERFORMANCES IN FATTENING PIGS AND CARCASS CHARACTERISTICS

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Abstract – Three hundred and sixty crossbred pigs were used to investigate the efficacy of supplementation probiotic (Bactosac-P) as growth promoters on performance, carcass characteristics and meat quality of fattening pigs. Bactosac-P was included two levels (0.05 and 0.10%) in grower pigs (60 kg BW) diets for the whole period of 54 days of feeding. Supplementation with two levels (0.05 and 0.10%) of Bactosac-P in fattening pigs showed a remarkable effect of growth promoters and improvement in total body weight gain, daily weight gain, uniformity of body weight at termination and better feed efficiency (feed conversion ratio, FCR) and also showed better (P>0.05) in carcass quality; Longissimus muscle area (LMA) and percentage of muscling (MUS) were increase and tenth rib fat (TRF) thickness was decreased. Dressing percentage were increased by Bactosac-P addition for 95 and 100 kg slaughter weigh. Addition of at the level of 0.10% showed the high response on growth performance, feed efficiency and showed the Carcass Characteristics when compared with 0.05% Bactosac-P group and control no added group.

Key Words – Fattening pigs, Probiotics, Performance and Carcass quality.

I. INTRODUCTION

According to the Food and Agriculture Organization of the United Nations and the World Health Organization [1]. Probiotics are live microorganisms that confer a health benefit to the host when administered in adequate amounts. In particular, strains belonging to *Bifidobacterium* and *Lactobacillus*, which are the predominant and subdominant groups of the gastrointestinal microbiota, respectively, are the most widely used probiotic bacteria [2]. Mode of action and benefits for using probiotics have been documented as a new class of feed additives useful for animal performance and health. Probiotics can act not only as growth promoters and feed savers, but also as nutritional bioregulator useful to animal production. These effects have been found in pigs as well as in poultry, calves and rabbit [3,4,5,7,8]. The reported that administrated Toyocerin (*Bacillus Toyoi* or Paciflor in sow feeds from 2 to 3 weeks before farrowing to weaning, were able to decrease significantly mortality of suckling piglets [9]. These effects have been also reported supplementation of Toyocerin in both gestating and lactating sow and creep feeds significantly improved the reproductive performance in sows and the prevention of diarrhea and mortality in suckling piglets [10]. The results indicated that Toyocerin could satisfactory replace antibiotics in creep feed. Another mechanism of action effect of probiotics is serve to reinforce the non-specific immunity system of animals if continuous usage. Using yeast have been documented in several important ways for probiotics, immunological properties of the inner layer of yeast cell wall [11] mycotoxin adsorbing properties [12,13,14] cholesterol lowering properties [15] and improvement of functional properties such as solubility, fat binding capacity, emulsion capacity and foaming capacity of yeast extracts [16]. The use of yeast in pig diets results in improvement of appetite, palatability, digestibility of feedstuffs and feed efficiency in pigs from weaning to slaughter house [17,18,19]. The objective of present study was to evaluate probiotics (Bactosac-P, K.M.P. Biotech Co, Ltd. Thailand) the mixture of *Lactobacillus acidophilus* and *plantarum*, *Pediococcus pentosaceus*, *Streptococcus faecium*,

Bacillus subtilis and *lichenifermis* and yeast (*Sacchalomyces cerevisiae*) in nursery and fattening pigs diets.

II. MATERIALS AND METHODS

The experiment was conducted in a well manage commercial farm (Reuang Siri Farm) in MahaSarakham Province, Thailand. A total of 360 crossbred pigs [Duroc x (Yorkshire x Landrace)] with average BW 60 kg (92 days of age) were divided into three treatments with 4 replications of 30 pigs each (2 replications for males and 2 replications for females). All pigs were allotted to treatment on the basis of gender, body weight and genetic background. All pigs were house in an evaporation regulated pens throughout the study (54 days period). All pigs were given *ad libitum* access to feed and water. One nine-hole feeders and two nipple water were available per pen. Feed intake and mortality of diarrhea are recorded every day until termination. Pigs uniformity was accounted as percentage units that fell into two times of standard deviation based on average live weight at period. The three treatments consisted of the control diet for treatment 1 and the control diet supplemented with probiotics Bactosac-P two levels (0.50 and 1.00 kg/t) for treatment 2 and 3 levels and deduction antibiotic 20% from the control diets. The diets were fed in mash form and water was allowed *ad libitum*. Body weights were weighed at initial, feed intake and mortality were also recorded. At the termination of the test as pigs in each pen attained 100 kg BW, one pigs from each pen were fasted for 12 hours and slaughtered at the provincial abattoir for carcass evaluation. Backfat and loin muscle area were measured between the 10^{th} and 11^{th} ribs. Backfat was measured by metal probing at a point approximately 7.5 cm from the backbone, perpendicular to skin. Loin muscle area was determined by the dot grid method. Values were adjusted to a common weight of 104.5 kg using the formulas recommended by the National Swine Improvement Federation [20]. Color scores of loin eye muscle area were also determined. Percentage of muscling or lean percentage was calculated using the formula in Procedures to Evaluation Market Hogs [21]. Carcass measurements were taken 4 hours after slaughter using direct measurement on hot carcasses. Carcass length was obtained on the unribbed side; length was measured from the anterior edge of the first rib to the anterior edge of the aitch bone.

Statistical analysis

Data from this experimental were subjected to analysis of variance using the General Linear Model (GLM) procedure of SAS system [22] Duncan's Multiple Range Test [23] was used to determine treatment differences. Dressing percentage was analyzed by using mean replicate final body weight as a covariate. All statements of significance were based on the probability level of 0.05.

III. RESULTS AND DISCUSSION

The results of the experiment for the whole period of supplementation Bactosac-P on growth performance responses are shown in Table 1. Supplementation Bactosac-P at 0.05 and 0.10% throughout finisher period showed an increased in final body weight, in ADG with 0.80 and 2.53% improvement, significant improved feed efficiency ($P<0.05$) of 6.39 and 8.75%. However, decreased FCR resulted in an increase in net profits return per head with economic benefits return of 75.68 and 100.04 Baht per head over the control. Addition of 0.05 and 0.10% Bactosac-P also showed improvement in uniformity of body weight at termination with improvement 1.90 and 3.10%.

Carcass quality: Supplementation of Bactosac-P 0.05 and 0.10% in fattening pigs on carcass quality (Table 2) showed an increased ($P<0.05$) in carcass weight but not statistical different ($P>0.05$) in dressing percentage and carcass length and loin eye area (Longissimus muscle area, LMA) and percentage of muscling or lean percentage (LP). Backfat thickness in the 10^{th} rib fat (TRF) decreased by Bactosac-P. Color scores of loin eye area meat showed better red colored but were not significant ($P>0.05$) when compared with the control unsupplementation Bactosac-P group.

IV. CONCLUSION

The results from this study clearly demonstrated that supplementation of Bactosac-P with two levels (0.05 and 0.10%) in fattening pig diets (for 54 days elicits flavorable biological responses in feed efficiency, carcass weight and also cheaper in feed cost per head with higher economic benefits return over the control unsupplementation Bactosac-P group. Addition Bactosac-P at the level of 0.10% showed improves on growth performance, carcass characteristics and highest economic benefits return in fattening pigs.

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Table 1 Effects of addition Bactosac-P to the diets on the performance in finisher period (54 days)

Parameter	Control	Bactosac-P		Pooled SEM
		0.05%	0.10%	
	T1	T2	T3	
Finisher period, 54d Trial:				
Initial no. of pigs	117	118	119	
Final no. of pigs	117	118	119	
Survival rate	100.00	100.00	100.00	
Initial weight, kg	60.00	61.89	62.71	4.94
Final weight, kg	100.60	102.85	104.38	2.82
Av. Body weight gain, kg	40.61	40.96	41.66	2.95
Improvement, %		+0.86	+2.59	
Av. Daily gain (ADG), g	752	758	771	54.51
Improvement, %		+0.80	+2.53	
Av. Daily feed intake, g	2,292	2,167	2,151	162.17
Improvement, %		-5.45	-6.15	
Feed conversion ratio (FCR)	3.053[a]	2.858[b]	2.786[b]	0.09
Improvement, %		+6.39	+8.75	
Feed cost/kg BWG, Baht	39.90	38.32	38.31	1.25
Uniformity body weight, %	85.82	87.46	88.48	1.65
Improvement, %		+1.91	+3.10	
Av. Net profit/head, Baht*	1,427.69	1,503.37	1,527.73	126.30
Economic benefits return/head, baht		+75.68	+100.04	

[a,b] Means within row with no common superscript differ significant (*P<0.05*)
* Av. Net profit/head calculated from [(Average overall body weight gain x Sale price of pigs (75 Baht/kg)) - (Feed cost/kg/BWG x Weight gain)]

Table 2 Effects of Bactosac-P supplementation in fattening pig diets on carcass characteristics.

Parameter	Control	Bactosac-P		Pooled SEM
		0.05%	0.10%	
	T1	T2	T3	
Live weight, kg	100.00	102.75	104.40	2.855
Carcass weight, kg	72.50[b]	74.30[ab]	75.90[a]	1.801
Dressing percentage, %	73.36	75.79	75.63	3.461
Carcass length, cm	82.50	84.25	85.00	2.303
Tenth rib fat depth, cm	23.25	22.25	20.25	3.023
Loin eye area, cm^2	41.39	43.42	45.13	3.159
Percentage of muscling, %	53.15	55.26	56.58	2.967
Color score**	1.588	1.603	1.599	0.090

[a,b] Means within row with no common superscript differ significant (*P<0.05*)
* Direct carcass measurement on 4 pigs (2 females and 2 males) per treatment
** Color score: 1.0 = normal red +, 1.5 = normal red ++, 2.0 = normal red +++