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# Supplementation of synbiotic in diets of Thai native chicken: the effect on its production performance, intestinal histomorphology and carcass quality

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**Abstract** This syudy focused on the effect of synbiotic supplementation in Thai native chicken diets, on production efficiency and morphology in the intestines of chickens where Jerusalem artichoke (*Helianthus tuberosus* L.) and BACTOSAC-P® were used as synbiotic sources, respectively. The results showed that final weight, ADG, and FCR were statistically different. (P<0.05) with values of 2,422.35, 2,497.40, 2,585.70 and 2,599.12, (g); 25.45, 26.25, 27.25, and 27.44, (g/day); 2.98, 2.92, 2.74, and 2.86 respectively. While, the values of villous height, cryptal depth, lactic acid bacteria and $NH_3$ production were not statistically different. Carcass quality studies showed that the total internal organ was significantly reduced. (P<0.05) with values of 11.78 10.32 10.26 and 10.18 (%), respectively. However with, meat quality,it was found that the lightness (L*value) was significantly reduced (P<0.05) with values of 50.51, 48.81, 48.90, and 49.61, respectively and the reflectance of redness (a*) was significantly increased (P<0.05) with values of 1.57, 1.92, 1.96, and 1.81 respectively. Overall, the synbiotic supplementation from Jerusalem artichoke and BACTOSAC-P® can increase growth parameters of Thai native black-tailed chickens, including weight gain, final weight, ADG and FCR. Increased villi height from synbiotic. feed supplementation suggests increased efficiency of nutrient absorption and improved chickens'helalth.

**Keywords:** Thai Native chicken, Synbiotic, Intestinal histomorphology, Productive performance and Carcass quality

## Introduction

The current use of antibiotics in animal feed is regulated because it is harmful to consumers. It has found to be used illegally in some areas in

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Thailand, resulting in the need to accelerate the search for alternatives to help reduce the problem of antibiotic use. It is cheaper to replace antibiotics with other safer substances, such as prebiotics, which are found in many plants many tubers contain inulin which is classified as a substance in the group of high amounts of prebiotics and plays a role similar to antibiotic substances but is rather safe. The harm in the digestive tract could then be reduced (Pralomkarn *et al*., 2011; Raksasiri, 2016). The use of prebiotics is therefore a good solution both in terms of safety and effectiveness. There are many plants such as quince (Helianthus tuberosus), head or rootstock of ginger, turmeric, sago palm that contain prebiotics, especially inulin, which contains. fructooligosaccharide (FOS), Bifidobacteria, and Lactobacilli in the intestinal tract reduce harmful bacteria such as *Clostridium* and *Escherichia coli* (Younes *et al*., 1995; Kaur and Gupta, 2002). The use of dough from Kays and Nottingham (2007) which includes (FOS) found to potentially a good source of prebiotics. In the previous research by Raksasiri *et al*. (2018). Tuberous plants such as sunflower jasmine, white turmeric and sago palm were used to increase the level of immunity in animal feed through improving the animal's immune system, growth efficiency and carcass quality.

Prebiotics are an essential part of maintaining overall gastrointestinal health through stimulation of bacterial growth, inhibition of pathogens, and nourishment of probiotics. Inulin is considered to be an extremely important prebiotic by development of microscopic organisms, acidophilus, bifidus and faecium, and by providing the digestive system with FOS. whereas inulin is a complex sugar particle that has a beneficial effect on nutrient fixation. Inulin is a naturally occurring polysaccharide comprises fructose joined by a beta 2, 1 glycosidic bond containing little measures of glucose (1 unit of glucose and 60 fructose units). Inulin is a capacity polysaccharide comprising of a chain of fructose particles. It is neither processed nor ingested in small digestive system however it is selectively and immediately ages by microscopic organisms in further components of wholesome tract animating multiplication of lactobacillus, mainly bifidobacterium inulin, which is most commonly used as powder. which gives better results when used in animals, conveyance, stockpiling and utilization. The most utilized technique to get this type of inulin is the drying of fluid concentrate by splash drying, which requires a plethora of vitality (Dobre *et al*., 2008). Bifidogenic activity component depends on particular aging of fructans by Bifidobacteria synthesing beta-fructosidasis, protein disintegrating beta 2,1 glycosidic bonds in inulin and oligofructosis. Change of bacterial microflora in digestive system, comprised in dismaying number of unsafe microscopic organisms is optically canvassed as a consequence of bifidogenic impact. Their multiplication is repressed by Bifidobacteria that engender short-chain unsaturated fats (SCFAs) and lower pH of digestive system chyme the same to achieve uncongenial conditions for pathogens. In the inclusion of Bifidobacteria which are bacteria that resist pathogens and found in the intestinal epithelium responsible for supplementation and redistribution of antimicrobial compounds, (bacteriocins and hydrogen peroxide) in species whose multiplication is feared by a different entrain of Bifidobacteria It has a common place among others, *Escherichia coli*, *Salmonella*, *Shigella*, *Campylobacter jejuni*, and *Clostridium* perfirgens. Amid bacterial aging of fructans short-chain unsaturated fats are delivered, particularly acidic, propionic, lactic and butyric corrosive (Gibson and Roberfroid, 1995). These acids show advantageous impact on digestion system, sustain intestinal cells, lower pH of intestinal chyme and extend intestinal villuses and in addition increment number of epithelial cells in particular villus (Babara, 2011), and in the event that utilization of prebiotic with probiotic (or synbiotic), The synbiotic will allow prebiotics and probiotics will allow probiotics to grow more, resulting in more probiotics being found in the gut. (Tapingkae, 2014). This could result in advantages to the host through the availability of the live microorganism. The combination of a prebiotic and probiotic in one product has been shown to confer benefits beyond those of either and it may be the combination of synbiotics that beneficially affected the host by improving its the survival. Therefore, this research aimed to has study the usage of synbiotic in increasing for increase the production performance, carcass quality, particularly Thai native chickens.

## Material and methods

### *Animal and treatments*

There were 320 black-tailed indigenous chickens bred at 10 days after incubation and were assigned into a complete randomized design (CRD) with 4 replicates (25 chickens per replicate), allocated to 4 dietary treatments the control diet (T1), adding symbiotic at; 0.025% (T2), 0.050% (T3) and 0.075 % of DM.

### *Sample collection and analysis*

Animal husbandry for experiments underwent a vaccination protocol that includes Mareks disease, Gumboro disease, bronchitis disease and Newcastle disease during growth period: bronchitis and newcastle disease vaccination on the 7th day while Gumboro disease on the 14th day. Feeding the broiler starter (1-72 days) with 19-20% protein and energy of 2,850 kcal/k, then continued feeding at 74-180 days with 16-17% protein and energy of 2,770 kcal/kg as recommended by the NRC (1994); full time feed and water (*Ad libitum*) and lighting of the chicken house for 23 hours (0600h-0500h+1).

The use of powdered prebiotics (from Jerusalem artichoke) for experimentation and the microorganisms necessary for the gastrointestinal tract. (BACTOSAC-P®; *Lactobacillus acidophilus*, *Lactobacillus plantarum, Pediococcus pentosaceus, Streptococcus faecium, Sacchalomyces cervisiae, Bacillus subtilis and Bacillus lichenifermis*) were used at ratio of 1:9 (w/w) at the sources of prebiotic and probiotic, respectively. Powdered synbiotic supplementation in the broiler feed was added over at 180 days old of testing, weekly Chicken weights were recorded weekly for growth rate days. parameters such as initial weight, (Day 1), feed intake and incrwase weight (weekly), and final weight, average daily gain (ADG) and feed conversion ratios (FCR).(Day 180)were all recorded as well. The daily amount of chicken feed was recorded, gut collection and intestinal morphology were measured at 72 days of age. There was a test for two types of bacteria in the gastrointestinal tract: lactic acid bacteria and *Escherichia coli* as well as measuring the level of ammonia in the gut following the method of Daneshmand *et al*. (2011). Random sampling of feed in the second phase of the trial is to analyze the chemical composition by AOAC (1995), The 180 day old chickens were fasted for 6 hours with 12 chickens per coop treatment. To check the quality of the carcass (Jaturasitha, 2010), carcass and cutting percentage and random tender loin for pH examination pH, cooking loss and drip loss, (Devine, 1999), chemical elements (protein, fat and moisture) (AOAC, 1995) shear force (Van Oeckel *et al*., 1999) and color of meat (Lightness (L*), Redness (a*) and Yellowness (b*) (Jaturasitha, 2010).

### *Statistical analysis*

The collected data were analyzed for variance (ANOVA) and compared the differences between the experimental groups using Duncan's new multiple range test (DMRT) from R version 3.3.1.

## Results

The study found that supplementation with higher levels of synbiotics in native chicken diet resulted in a statistically significant increase in final weight,

weight gain, and average daily increase (ADG) ($P<0.05$) which is equal to 2422.35, 2497.40, 2585.70 and 2,599.12 (g); 2,290.60, 2,363.34, 2,453.20 and 2470.00 (g) and 25.45, 26.25, 27.25 and 27.44 (g/day),that brought about resulted in significant reductions in feed conversion rate (FCR) values ($P<0.01$) which is equal to 2.98, 2.92, 2.74 and 2.86 in T1, T2, T3 and T4 respectively. When analyzing trends, it was found that the trend on the final weight, increase weight, ADG and FCR at higher levels of synbiotic supplementation, continued to increase, but there was no difference in total feed intake and average daily feed intake (ADFI) (Table 1). The study of small intestine histomorphology showed that higher symbiotic supplementation resulted in a statistically significant increase in villous height ($P<0.05$), which is equal to 874.32, 895.46, 901.12 and 903.60 (μm) in T1, T2, T3 and T4 respectively as trend consistently improved when trend analysis was performed. While, cryptal depth and villous: cryptal depth (V:C) were not statistically different, and no difference was found but statistically different for lactic acid bacteria, *Escherichia coli* and $NH_3$ production in Ileum (Table 2). After the end of the trial, the quality of indigenous chicken carcasses showed a statistically significant decrease in total internal organs ($P<0.05$) with higher levels of synbiotic supplementation, which is equal to 11.78, 10.32, 10.26 and 10.18 (%) in T1, T2, T3 and T4 respectively, there was a trend that continued to decline when analyzing trend analysis, but no differences were found in other studies. (Table 3). Meanwhile, in terms of the native chicken meat quality, when the synbiotic supplementation level was increased, the lightness (L*) was significantly lower. ($P<0.05$) and there was an uneven decrease in trend when measuring trend analysis, which is equal to 50.51, 48.81, 48.90 and 49.61 in T1, T2, T3 and T4 respectively, There was also statistically significant increase in redness (a*) ($P<0.01$) with higher levels of synbiotic supplementation, which is equal to 1.57, 1.92, 1.96 and 1.81 in T1, T2, T3 and T4 respectively, but no statistical difference was found in shear force and water holding capacity (drip loos, cooking loss) (Table 4).

## Discussion

It was found that at the end of the trial in the production efficiency of Thai native chickens, higher levels of synbiotic supplementation resulted in a statistically significant increase in final weight, increase weight, average daily increase (ADG) in total feed intake. As a result, the feed conversion rate (FCR) was significantly lower. It was shown that synbiotic supplementation in the diet resulted in higher yields in Thai native chickens. However, the results showed that at the supplementation levels of 0.050% and 0.075%, there were no differences in the productivity of Thai native chickens. However, the use of prebiotics derived from Jerusalem artichoke and curcuma white at 0.050 % of DM resulted in better growth rates of broilers (Raksasiri *et al.,* 2015). This corresponded to the report of Raksasiri *et al*. (2018) on the effect of supplementation of synbiotic (Jerusalem artichoke with BACTOSAC-P®) in broiler diets on production performance, intestinal histomorphology and carcass quality, which was found that synbiotic supplementation at 0.050% and 0.075% of DM significantly improved ADG, FCR and feed intake compared to the diet ($P<0.05$).A Jerusalem artichoke, it contains inulin and fructooligosaccharide (FOS) that has prebiotic properties, which are essential food for probiotics in the digestive tract. Thus, it increases the population of beneficial bacteria. and results in helping the immune system, the efficiency of nutrient absorption is higher (Kaur and Gupta, 2002). Previous studies have shown that the use of synbiotic has a beneficial effect on the production performance of other animals, such as in turkey poults (Audrey *et al.,* 2020) and goat's kids, in this study, synbiotic supplementation at 0.03 % of DM and 0.04 % of DM resulted in improved final weight, increase weight, ADG and FCR. (Raksasiri *et al.*, 2019; Raksasiri *et al.,* 2020).

However, there are a number of other plants where prebiotic compounds have been found that can be used in poultry feed that could also result in better production efficiency such as asparagus, white sago, and garlic, etc. (Nopparatmaitree *et al*., 2014; Raksasiri *et al.,* 2015).

The study effect of synbiotic supplementation in diets of Thai native chicken diets on small intestine histomorphology, lactic acid bacteria and $NH_3$ production in ileum, villous height was found to increase with higher levels of synbiotic supplementation. It was shown that synbiotics can help the small intestine increase its nutrient binding capacity, this will continue to affect the growth of Thai native chickens as well as their health. The possible mechanisms of action for synbiotics suggested the stimulation of antimicrobial substances by competition for adhesion to epithelial cells, and stimulated the host's immune. The results of the study were found to be consistent with Raksasiri *et al*. (2018) who reported thatdietary supplementation of 0.05% of DM synbiotic significantly ($P < 0.05$) increased the villus height. A morphological data study of (Ghasemi and Taherpour, 2013) found that broilers fed with synbiotics or prebiotics had jejunal villus heights at 28 days of age.

Additionally, Baski and Al-Sardary (2015) reported to villus recordings than any other experimental group statistically significant in broilers fed synbiotic 2.5 g/kg. However, Synbiotic (prebiotics +probiotic) are an essential part of maintaining overall gastrointestinal health through stimulation of bacterial growth, inhibition of pathogens, and nourishment of probiotics. Inulin is considered to be an extremely important prebiotic by development of microscopic organisms, acidophilus, bifidus and faecium, and by providing the digestive system with fruto-oligosaccharides (FOS) (Raksasiri, 2016). The capability of inulin supplementation expands sustenance for benefical microorganisms in the body. This builds the number and action of these organisms in the gut. Controlling the number of pathogenic microorganisms by competing to bind to the surface of the vili and optimize the intestinal microbial balance within the appropriate, and pathogens will be excreted from the intestines (Ross, 1999; Baurhoo *et al.*, 2007). Moreover, there were no distinctive differences in a fecal score, fecal pH and fecal bacterial populaces (*Escherichia coli*, lactic corrosive microbes and aggregate microorganisms). Kara *et al*. (2012) examined impacts of inulin supplementation on fecal qualities and soundness of neonatal, milk-fed Saanen kids fecal scores were comparative with the data gathered in the present study. Hill *et al*. (2008), examined impacts of encouraging FOS and MOS in dairy calves and found an unreasonable measure of maturation of fructans by colonic microorganisms that can prompt expanded gas development, stomach issues and free defecation. Nevertheless, Flickinger *et al.* (2003) noticed degradation of inulin as it was faster at pH 6.0 than at unbiased pH by rumen inoculums from sheep kept up on sole search diets. The eating routine of calves supplemented with oligofructose brought about diminished populace of fecal *Escherichia coli* and all out anaerobic microflora while Bifidobacteria populace showed expanding patterns (Bunce *et al*., 1995).

**Table 1.** Effects of synbiotic supplementation in diets of Thai native chicken diets on growth performance

| Parameter | Level of synbiotic supplementation in Thai native chickens diets (%of DM) | | | | SEM | P-value | Trend Analysis |
|---|---|---|---|---|---|---|---|
| | 0 % (n=25) | 0.025% (n=25) | 0.050% (n=25) | 0.075% (n=25) | | | |
| Initial weight (g) | 131.75±6.61 | 134.06±4.75 | 132.50±4.09 | 129.12±4.13 | 5.01 | ns | NS |
| Final weight (g) | 2,422.35$^{b}$±68.41 | 2,497.40$^{ab}$±41.80 | 2,585.70$^{a}$±107.94 | 2,599.12$^{a}$±75.01 | 76.98 | * | L |
| Increase weight (g) | 2,290.60$^{b}$ ±66.86 | 2,363.34$^{ab}$±38.27 | 2,453.20$^{a}$ ±106.34 | 2,470.00$^{a}$±73.90 | 75.34 | * | L |
| Total feed intake (g) | 6,826.11±362.16 | 6,897.79±143.17 | 6,730.81±277.75 | 7,056.08±115.72 | 233.14 | ns | NS |
| ADG (g/day) | 25.45$^{b}$±0.74 | 26.25$^{ab}$±0.42 | 27.25$^{ab}$±1.18 | 27.44$^{a}$±0.81 | 0.83 | * | L |
| ADFI (g/day) | 75.84±3.62 | 76.64±1.59 | 74.78±3.08 | 78.40±1.28 | 2.59 | ns | NS |
| FCR | 2.98$^{A}$±0.13 | 2.92$^{AB}$±0.07 | 2.74$^{B}$±0.06 | 2.86A$^{B}$±0.11 | 0.101 | ** | L |

n = number of broilers, $^{a,b}$ Means in row with different superscripts letter are significant differences (P<0.05), $^{A,B}$ Mean with symbol with in same row differ significantly (P<0.01), ns = non-significant (p>0.05), * = significant and SEM = Standard error of mean

**Table 2.** Effects of synbiotic supplementation in diets of Thai native chicken diets on small intestine histomorphology, lactic acid bacteria and $NH_3$ production in Ileum

| Parameter | Level of synbiotic supplementation in Thai native chickens diets | | | | SEM | P-value | Trend Analysis |
|---|---|---|---|---|---|---|---|
| | 0 % (n=25) | 0.025% (n=25) | 0.050% (n=25) | 0.075% (n=25) | | | |
| Villous height (μm) | 874.32$^{b}$±73.70 | 895.46$^{ab}$±40.99 | 901.12$^{a}$±45.57 | 903.60$^{a}$±27.89 | 49.92 | * | L |
| Cryptal depth (μm) | 158.84±17.48 | 160.28±5.59 | 167.16±12.82 | 167.27±17.56 | 14.22 | ns | NS |
| V:C | 5.52±0.44 | 5.59±0.39 | 5.40±0.24 | 5.45±0.36 | 0.45 | ns | NS |
| Lactic acid bacteria (MPN/g) | 8.51±0.51 | 8.45±0.35 | 7.95±0.14 | 8.01±0.37 | 0.375 | ns | NS |
| *Escherichia coli* (MPN/g) | 3.38±0.11 | 2.96±0.23 | 2.55±0.18 | 2.54±0.21 | 0.42 | ns | NS |
| $NH_3$ production | 1.31±0.64 | 1.19±0.41 | 0.87±0.04 | 1.23±0.15 | 0.339 | ns | NS |

n = number of broilers, $^{a,b}$ Means in row with different superscripts letter are significant differences (P<0.05), ns = non-significant (p>0.05), * = significant and SEM = Standard error of mean

**Table 3.** Effects of synbiotic supplementation in diets of Thai native chicken diets on carcass and cutting percentage

| **Parameter** (%) | **Level of synbiotic supplementation in Thai native chickens diets** 0 % (n=25) | 0.025% (n=25) | 0.050% (n=25) | 0.075% (n=25) | **SEM** | **P-value** | **Trend Analysis** |
|---|---|---|---|---|---|---|---|
| Carcass percentage | 86.94±2.16 | 89.69±1.98 | 89.17±3.24 | 8776±2.81 | 0.46 | ns | NS |
| Dressing percentage | 80.83±1.86 | 83.39±1.82 | 82.18±2.84 | 80.75±3.05 | 0.55 | ns | NS |
| Chill dressing percentage | 79.22±1.83 | 81.72±1.78 | 80.54±2.78 | 79.14±2.99 | 0.49 | ns | NS |
| Boneless breast | 24.25±3.19 | 24.87±1.44 | 24.98±0.66 | 24.70±4.58 | 0.65 | ns | NS |
| Fillet | 5.13±0.55 | 5.14±0.30 | 5.17±0.56 | 5.14±0.38 | 0.10 | ns | NS |
| Thigh | 17.91±1.10 | 18.07±1.33 | 18.23±0.73 | 17.91±0.75 | 0.22 | ns | NS |
| Drumstick | 12.90±0.91 | 13.05±0.82 | 13.113±0.50 | 12.99±0.89 | 0.17 | ns | NS |
| Skeletal bone | 23.21±1.37 | 22.22±0.79 | 22.06±1.01 | 22.06±2.06 | 0.31 | ns | NS |
| Total internal organ | $11.78^{a}$±1.15 | $10.32^{ab}$±0.70 | $10.26^{b}$±0.88 | $10.18^{b}$±0.37 | 0.18 | * | L |
| Liver | 2.60±0.14 | 2.61±0.12 | 2.6±0.08 | 2.62±0.04 | 0.02 | ns | NS |
| Gizzard | 2.57±0.38 | 2.55±0.28 | 2.53±0.08 | 2.53±0.08 | 0.05 | ns | NS |
| Heart | 0.77±0.14 | 0.77±0.08 | 0.72±0.03 | 0.75±0.01 | 0.02 | ns | NS |
| Visceral fat | 2.37±0.79 | 1.92±0.43 | 1.96±0.27 | 1.98±0.42 | 0.11 | ns | NS |

n = number of broilers, [a,b] Means in row with different superscripts letter are significant differences (P<0.05), ns = non-significant (p>0.05), * = significant and SEM = Standard error of mean

**Table 4.** Effects of synbiotic supplementation in diets of Thai native chicken diets on meat quality

| Parameter | Level of synbiotic supplementation in Thai native chickens diets | | | | SEM | P-value | Trend Analysis |
|---|---|---|---|---|---|---|---|
| | 0 % (n=25) | 0.025% (n=25) | 0.050% (n=25) | 0.075% (n=25) | | | |
| Shear force (kg) | 2.81±0.18 | 2.80±0.16 | 2.81±0.09 | 2.78±0.26 | 0.04 | ns | NS |
| Water holding capacity | | | | | | | |
| -Dip loss (%) | | | | | | | |
| -1 day | 2.22±0.08 | 1.57±0.69 | 1.60±0.92 | 1.76±0.45 | 0.14 | ns | NS |
| -2 day | 3.65±1.42 | 2.25±1.53 | 3.99±0.66 | 3.90±0.84 | 0.26 | ns | NS |
| -3 day | 6.09±1.45 | 4.02±1.46 | 6.145± | 5.47±1.83 | 0.34 | ns | NS |
| -4 day | 8.52±1.44 | 5.27±1.96 | 7.96±1.28 | 7.63±1.28 | 0.41 | ns | NS |
| -5 day | 10.33±1.18 | 7.05±22.13 | 9.39±1.45 | 9.38±3.04 | 0.41 | ns | NS |
| -Cooking loss (%) | 28.55±2.74 | 26.04±1.92 | 26.26±2.67 | 26.36±1.35 | 0.50 | ns | NS |
| Color | | | | | | | |
| L* (lightness) | $50.51^{a}$±0.52 | $48.81^{b}$±1.13 | $48.90^{ab}$±1.07 | $49.61^{ab}$±0.68 | 0.19 | * | Q |
| a* (redness) | $1.57^{B}$±0.28 | $1.92^{A}$±0.01 | $1.96^{A}$±0.13 | $1.81^{AB}$±0.07 | 0.04 | * | Q |
| b* (yellowness) | 4.16±2.04 | 3.48±0.62 | 3.81±1.04 | 3.80±0.45 | 0.27 | ns | NS |

n = number of broilers, [a,b] Means in row with different superscripts letter are significant differences (P<0.05), ns = non-significant (p>0.05), * = significant and SEM = Standard error of mean

This may be credited for the beneficial effects that occur after the use of prebiotics. Joining of oligofructose in the milk replacer of calves brought about enhanced body weight picks up, feed transformation productivity with diminishment in the occurrence of the runs and firmer dung (Mul, 1997). Resulting in the use of animal feed affect the growth process movement has increased (Awad *et al.*, 2008). Meanwhile, the inclusion of microscopic organisms on the index (caecum) found to have lower of levels ammonia (0.673 mg/l) at day 25 and disease of *Escherichia coli* (1.3 x$10^4$) in the digestive system. Awad *et al.* (2008) similarly cited that a supplementing a level of 0.05 percent. Of prebiotic showed a declining pattern of *Escherichia coli* microscopic organisms. The declining presence of microorganisms on the intestinal tract and blood, such as Clostridium and *Escherichia coli*, could also diminish any possible cancer-causing agents. However, hepatic lipid synthesis has a direct effect on the reduction of blood lipids and cholesterol (Kaur and Gupta, 2002; Raksasiri, 2016). Swanson and Fahey (2002) reported that a key part of *Bifidobacteria* and *Lactobacilli* have chemicals that disintegrate proteins bunch azoreductase nitroductas, and nitrate reductase and protein in the form β-glucuronides lower will cause toxicity. However, previous research has found that supplementation of prebiotics and probiotics in feed results in improved phagocyte (%PA) activity, a good indicator of animal health. in terms of protection from harmful microorganisms that can cause diseases in the digestive tract. (Raksasiri *et.al.*, 2019; Raksasiri *et al*, 2020). An important non-specific immunity ofprotecting the host against pathogens is monocyte cell lines. The monocytes or monophage cells perform phagocytosis on invading microorganisms. (Aderem and Underhill, 1999). The gastrointestinal tract is natural habitat of commensal probiotics, assiting in poison neutralisation and pathogen prevention. The prebiotics in synbiotic supplementation enhance survival of the gastrointestinal probiotics, boosting the immunity of host animals. (Boirivant and Strober, 2007; Vandenplas *et al*., 2013; Hozan, 2016).

Regarding the study of carcass quality and meat quality it was found that higher levels of synbiotic supplementation resulted in an increase in the meat of Thai native chickens with a higher lightness (L*) and higher red to green pigment (redness; a*) accumulation of synbiotic supplementation has also showed to affect muscle metabolism. This has been consistent with research by Raksasiri *et al.*, (2015), prebiotic supplementation obtained from Jerusalem artichoke and curcuma white at 0.050 % of DM resulted in higher redness; (a*) values. The more movement in the animal's body through working muscles, the more it stimulates the metabolic processes within the muscles This results in the accumulation of myogrobin or hemogrobin in the muscles (Raksasiri, 2020).

It concluded that the impact of synbiotics in Thai native chicken's feed resulted in particularly efficient production. Synbiotics at 0.050% and 0.075% of DM shown to increase the final weight, increase weight, ADG and FCR, beneficial to the digestive system of Thai native chickens. The height of the villus was higher as a result of an increase in the number of beneficial microorganisms. This gave more space to the small intestine to absorb nutrients. In addition, future researches on the use of synbiotics in livestock should consider immunization and conservation of livestock products with focus on common gastrointestinal diseases.

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