

## SUMMARY REPORT

# Effects of VTNest on Intestinal Health and Growth performance of Luong Phuong Broilers

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### 1. Introduction

7200 one-day old Luong Phuong broilers were selected and randomly divided into 4 groups with 15 replicates in each group and 120 individuals in each replicate. All the groups are provided with the same basal diet. 0.01% enradin was added in group A, 0.05%, 0.1% and 0.2% glyceryl tributyrates were added into group B to D instead of enradin.

### 2. Material and method

Luong Phuong broilers were provided by Binh Minh Group in Vietnam, enradin was purchased in local market, glyceryl tributyrates (VTNest) was provided by Guangdong VTR Bio-Tech Co., Ltd.

**Table: 1 Test grouping**

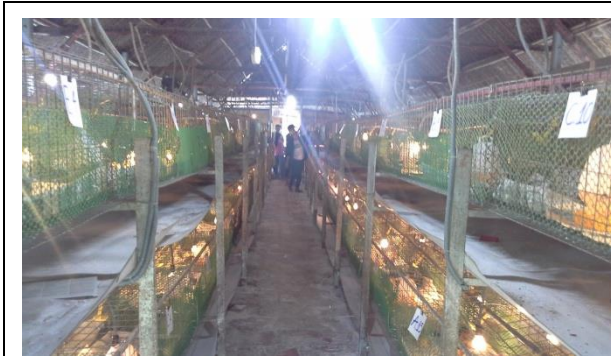
<b>Group</b>	<b>Repetition(cage)</b>	<b>Broiler amount (feather)</b>	<b>Treatment</b>
A	15	120	0.01% Enradin 80 (Antibiotic) (Control group)
B	15	120	0.05% VTNEST
C	15	120	0.1% VTNEST
D	15	120	0.2% VTNEST



**At the beginning of the test**



**Columning (8 feathers)**



**Broiler house (inside)**



**Broiler house (outside)**

**Table 2. Basal diet formula**

<b>Raw Material</b>	<b>day:0-28</b>	<b>day:29-60</b>
Corn	62.59	65.35
Soybean meal 46	31.47	29.09
Limestone	3.12	2.96
Soybean oil	1.07	1.02
NaHCO <sub>3</sub>	0.31	0.31
Premix (minerals + vitamin)	0.25	0.25
Salt	0.25	0.25
DL-methionin 99%	0.24	0.21
L-Lysin-HCl 98.5%	0.21	0.06
Cholin Chloride 60	0.15	0.15
Mycofix Secure	0.10	0.10
Ecobiol (probiotic)	0.10	0.10
Creamino	0.06	0.06
NSP enzyme	0.05	0.05
Feedox	0.02	0.02
Phytase	0.01	0.01

**Table 3.The nutritional value**

<b>Nutrition</b>	<b>Unit</b>	<b>day:0-28</b>	<b>day:29-60</b>
Dry matter	%	87.33	87.26
Crude protein	%	20.00	19.00
Crude fat	%	4.00	4.00
Crude fiber	%	3.23	3.15
Total mineral	%	6.04	5.77
ME	Kcal/kg	3078	3100
Lysin	%	1.30	1.10
Methionin	%	0.60	0.56
Cystine	%	1.80	1.80
Met+Cys	%	1.12	1.07
Threonin	%	0.83	0.80
Tryptophan	%	0.41	0.39
Isoleucin	%	0.91	0.87
Valin	%	1.03	0.99
Leucin	%	1.85	1.80
Arginin	%	1.37	1.30
Glutamic	%	3.56	3.41
Ca	%	1.20	1.14
P	%	0.70	0.70
Na	%	0.17	0.17
Cl	%	0.20	0.20
K	%	0.77	0.73
Acid Linoleic	%	1.65	1.66

### 3. Result

We can see that there is no significant difference in average weight gain and final body between enradin group and VTNest group. If enradin is deleted in the formula and VTNest is not sufficient (0.05%), the growth performance is decreased. While use sufficient VTNest (0.1%) to replace 0.01% enradin, growth performance is increased. Table 4, table 5.

There is no significant difference in FCR between enradin group and VTNest groups during the whole period, while with the addition of VTNest, FCR is decreased. Table 6.

On 28<sup>th</sup> day, *bacillus* and *lactobacillus* count in VTNest groups are lower than enradin group, the difference is not significant. On 60<sup>th</sup>, compare to enradin group, *lactobacillus* is significant higher in VTNest groups. *Bacillus* in 0.1% and 0.2% VTNest group is higher than that in enradin group. *Clostridium perfringens* count is lower in VTNest groups when compare to enradin group. Table 8, table 9.

Villus height and crypt depth are also detected on 60<sup>th</sup> day in different groups. Villus height is increased in 0.1% and 0.2% VTNest groups compare to enradin group, while crypt depth is increased in VTNest groups. The differences are not significant. Table 10

Carcass ration, thigh meat ratio, chicken breast ration are increased in 0.1% and 0.2% VTNest group compare to enradin group. Abdominal fat rate is increased in all VTNest groups. The differences are not significant. Table 11.

**Table 4. Average weight (g/feather)**

<b>Group</b>	<b>0 - day old</b>	<b>28-day old</b>	<b>60-day old</b>
<b>A</b>	38.17	370.37	1279.07
<b>B</b>	37.96	367.00	1231.91
<b>C</b>	38.25	367.21	1323.56
<b>D</b>	38.08	367.60	1279.07
<i>P</i>	<b>0.522</b>	<b>0.996</b>	<b>0.122</b>

**Table 5. Daily weight gain (g / feather / day)**

<b>Group</b>	<b>day: 0-28</b>	<b>day: 29-60</b>	<b>day: 0-60</b>
<b>A</b>	11.86	28.37	20.67
<b>B</b>	11.75	26.96	19.86
<b>C</b>	11.75	29.85	21.40
<b>D</b>	11.77	28.31	20.59
<i>P</i>	<b>0.996</b>	<b>0.066</b>	<b>0.114</b>

**Table 6.FCR (kg/kg)**

<b>Group</b>	<b>day: 0-28</b>	<b>day: 29-60</b>	<b>day: 0-60</b>
<b>A</b>	2.86	2.87	2.87
<b>B</b>	2.49	2.85	2.74
<b>C</b>	2.51	2.76	2.69
<b>D</b>	2.66	2.82	2.78
<i>P</i>	<b>0.083</b>	<b>0.592</b>	<b>0.116</b>

**Table 7. Survival rate (%)**

<b>Group</b>	<b>day: 0-28</b>	<b>day: 29-60</b>
<b>A</b>	82.50	91.84
<b>B</b>	92.50	94.50
<b>C</b>	95.83	95.61
<b>D</b>	92.50	93.40

**Table 8. Intestinal microorganisms on 28th day (log<sub>10</sub>CFU/g)**

Group	Bacillus (n=4)	Lactobacillus (n=4)	Clostridium perfringens (n=4)
A	7.99	6.62	0
B	7.87	6.24	0
C	7.00	6.25	0
D	7.56	6.24	0
<i>P</i>	<b>0.265</b>	<b>0.224</b>	

**Table 9 Intestinal microorganisms on 60<sup>th</sup> day (log<sub>10</sub> CFU/g)**

Group	Bacillus (n=4)	Lactobacillus (n=4)	Clostridium perfringens (n=4)
A	7.31	6.47 <sup>b</sup>	0.50
B	7.00	7.91 <sup>a</sup>	0.48
C	7.95	7.38 <sup>a</sup>	0.39
D	7.87	7.42 <sup>a</sup>	0.00
<i>P</i>	<b>0.096</b>	<b>0.003</b>	<b>0.832</b>

**Table 10 Intestinal villus, crypt and pH value on 60<sup>th</sup> day**

Group	Villus height (µm) (n=4)	Crypt depth (µm) (n=4)	Villus height/crypt depth (n=4)	pH (n=4)
A	1751.00	243.50	7.32	4.45
B	1674.75	240.50	7.06	4.69
C	1818.00	314.25	5.87	4.64
D	1844.50	312.50	5.95	4.74
<i>P</i>	<b>0.908</b>	<b>0.216</b>	<b>0.714</b>	<b>0.413</b>

**Table 11. Meat (%)**

Group	Carcass ratio (n=8)	Thigh meat ratio (n=8)	Chicken breast ratio (n=8)	Abdominal fat rate (n=8)
A	60.01	19.47	14.62	0.84
B	59.05	19.04	14.06	0.91
C	60.16	19.82	14.84	0.82
D	60.37	19.61	15.60	1.03
<i>P</i>	<b>0.927</b>	<b>0.955</b>	<b>0.323</b>	<b>0.928</b>

## 4. Discussion

Small intestine is supposed to be the largest immune organ and digest organ. The health of small intestine is very important for animal. The active ingredient in glyceryl tributyrate (VTNest) is butyric acid, which is the main source of energy of enterocyte in small intestine. Butyric acid enhance enterocyte in small intestine to grow and update rapidly, and provide energy to repair enterocyte once it's injured. What's more, butyric acid provides a acid micro-environment and adjust pH value in small intestine tract, thus to adjust the count of microorganism in small intestine.

Normally, there is a dynamic balance of intestinal flora in animal gastrointestinal tract, and it helps animal to keep healthy. Once the breeding environment is invaded by harmful bacteria, the balance will be broken, and disease followed. Antibiotics is used to kill or inhibit all the microorganisms in small intestine tract, thus to keep animal to be healthy. The problem of antibiotics is drug resistance and superbacteria. Antibiotics is also supposed to transfer to the next food chain, which is human.

Glyceryl tributyrate is combined by glycerin and butyric acid, the covalent bond between glycerin and butyric acid is very stable before it meets endogenous lipase in small intestine. The chemical characteristics of glyceryl tributyrate guarantees butyric acid to reach small intestine efficiently.

Final body weight and average body weight gain in 0.1% VTNest group is increased compares to enradin group. FCR is decreased and villus height is increased in all the three VTNest groups. It means growth performance is increased in VTNest groups. We guess the action principle is like the following: glyceryl tributyrate is broken into glycerin and butyric acid when it meets lipase in small intestine tract. Butyric acid is rapidly degraded and provide energy to enterocyte to enhance its growth, thus increase the absorb size in small intestine, and the utilization efficiency is increased, which leads to the increasement of growth performance.

The result also found that in the 0.05% VTNest group the growth performance is not as good as enradin group, we guess 0.05% VTNest is not sufficient to replace 0.1% enradin under this environment.

*Bacillus* and *Lactobacillus* prefer acid environment, while *Clostridium perfringens* prefers neutral environment, so *Bacillus* count is increased and *Lactobacillus* count is increased



significantly when glyceryl tributyrates is added, while *Clostridium perfringens* count is decreased at the mean time.

## **5. Conclusion**

It is can be seen in the result, 0.1% VTNest in the diet of Luong Phuong is able to replace 0.01% enradin without affection of growth performance and intestinal health