

# PerMicro BS



Bacillus Subtilis PFK1401  
Fast Growing  
Short Generation Time  
Strong Resistance

# PerMicro BS

PerMicro BS is the micro-ecology preparation that has the characteristics of high cost performance, fast growing, short generation time and strong resistance, produced by Hunan Perfly Biotech Co., Ltd.

## Composition //

This product contains *Bacillus subtilis* and other special microbes, the main content of each type is as follows:

Table 1. The Type of PerMicro BS

Product Type	Effective Spore Content (cfu/g)
PerMicro BS I	$5 \times 10^9$
PerMicro BS II	$2 \times 10^{10}$

## Intestinal Health and Biological Oxygen Consumption //

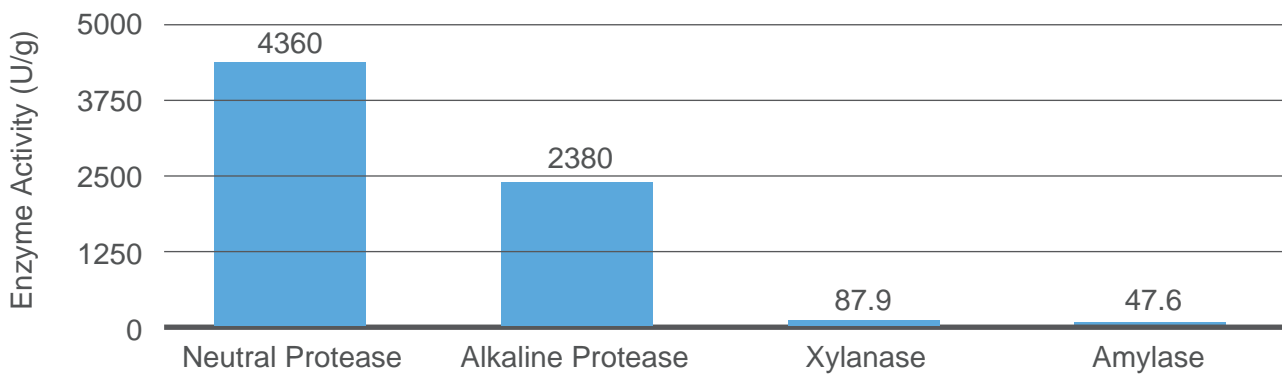
The intestinal tract is the main place where animal digestion and absorption, more than 80% nutrients are absorbed in intestinal tract; intestinal tract is the largest animal immune organ; it is the main habitat of intestinal microflora that include both anaerobic beneficial bacteria, such as *Lactobacillus*, *Bifidobacterium* and aerobic harmful bacteria, such as *Escherichia coli*, *Staphylococcus aureus*, etc. In the process of animal eating and breathing, a part of oxygen will enter into the intestine tract. Oxygen can improve redox potential in the intestine to inhibit the growth of intestinal beneficial bacteria. *Bacillus subtilis* is a strictly aerobic bacterium that can propagate quickly in the presence of oxygen. Rapid propagation of *Bacillus subtilis* in the animal gut can consume the intestinal oxygen to reduce intestinal redox potential and to provide the anaerobic growth environment for intestinal beneficial bacteria, which promotes the growth of beneficial bacteria. So the key factor that affects the ability of *Bacillus subtilis* to consume oxygen is whether they have advantages of quick germination, rapid growth and rapid propagation in the intestinal tract.

## Action Mechanism //

### 1. PerMicro BS can produce amylase and other enzymes

PerMicro BS produces protease, amylase and other enzymes, which is conducive to digestion and absorption of nutrient in the gut.

Figure 1. The Analysis of Metabolites of PerMicro BS



### 2. PerMicro BS has a strong ability to consume oxygen

PerMicro BS germinates in the intestinal tract and effectively consumes oxygen in the chyme to form the anaerobic environment with low redox potential, which inhibits the growth of harmful bacteria and promotes the proliferation of beneficial bacteria in the intestine.

### 3. PerMicro BS has direct bacteriostatic ability

During the growth, PerMicro BS can produce the bacteriocin that effectively inhibits the growth of harmful bacteria.

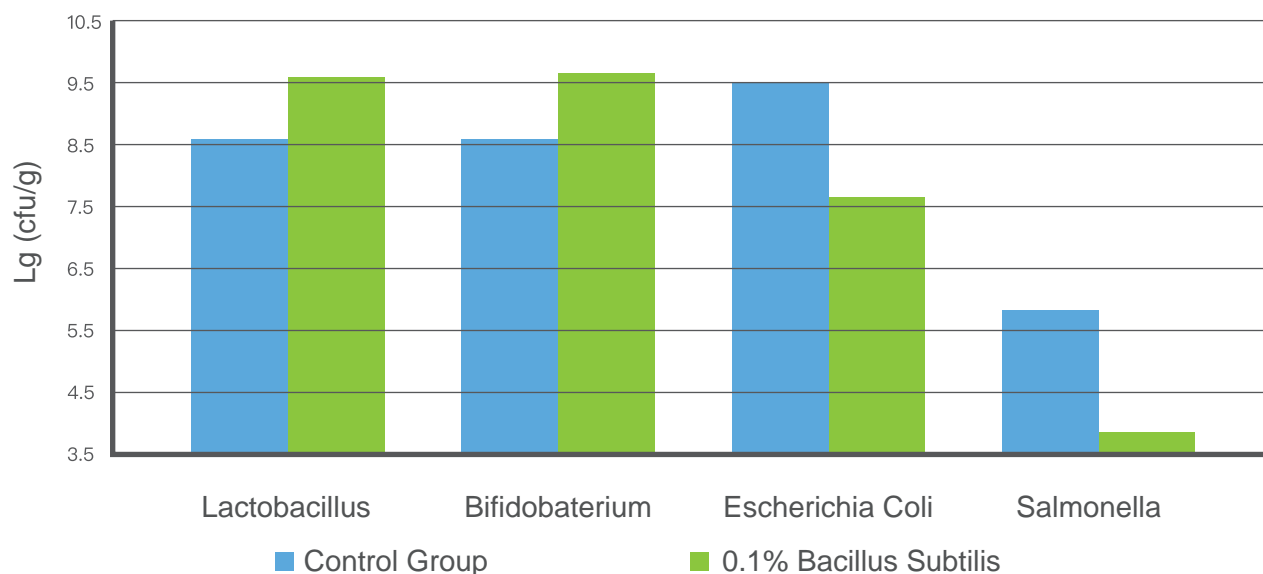
Table 2. Bacteriostatic Effect of PerMicro BS

Common Pathogenic Bacteria	The Diameter of Inhibition Zone (mm)	Common Pathogenic Bacteria	The Diameter of Inhibition Zone (mm)
Salmonella Typhi	25.12	Chicken Escherichia Coli	16.50
Salmonella Enteritidis	10.92	Pig Escherichia Coli	12.40
Salmonella Typhimurium	11.57	Shigella Flexneri	26.97
Staphylococcus Aureus	13.80	Streptococcus	15.30

## 4. PerMicro BS can improve animal intestinal micro-ecology

PerMicro BS can obviously improve the piglets' micro-ecology environment to reduce the number of harmful bacteria and to increase the number of beneficial bacteria.

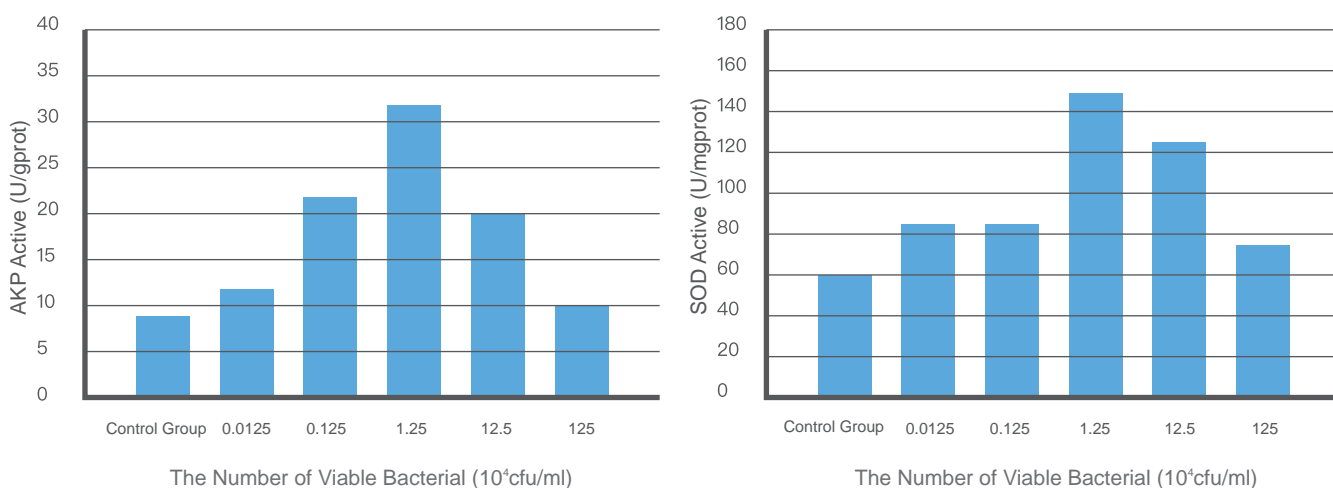
Figure 2. The Effect of PerMicro BS on the Number of Micro-organism in Broilers Intestinal Tract



## 5. PerMicro BS can improve immunity

PerMicro BS enhances the immunity of vannamei,  $10^4$  cfu/ml Bacillus subtilis can significantly improve the vannamei alkaline phosphatase (AKP), superoxide dismutase (SOD) and other enzyme activities in the aquatic water.

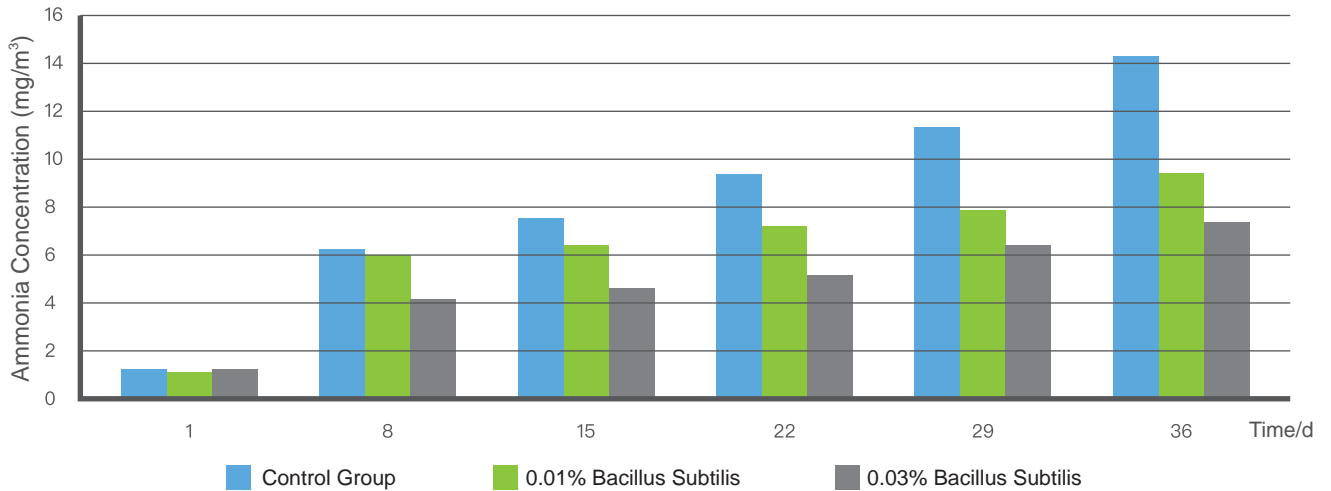
Figure 3. The Effect of Different Amount of PerMicro BS on Immunity of Vannamei



## 6. PerMicro BS can reduce ammonia concentration

The ammonia concentration in the farm can be reduced obviously, and the environment of the farm can be improved.

Figure 4. The Effect of PerMicro BS on Ammonia Concentration in Pigsty



### Characteristics //

PerMicro BS is a kind of probiotic product developed from *Bacillus subtilis* that have the characteristics of fast germination, fast growth, rapid propagation and strong resistance in the intestinal tract.

#### 1. Quick growth and propagation

Compared with the other *Bacillus subtilis*, PerMicro BS has the characteristics of fast growth (Figure 5.) and short generation time (Figure 6.)

Figure 5. The Contrast of Growth Rate between PerMicro BS and Other *Bacillus Subtilis*

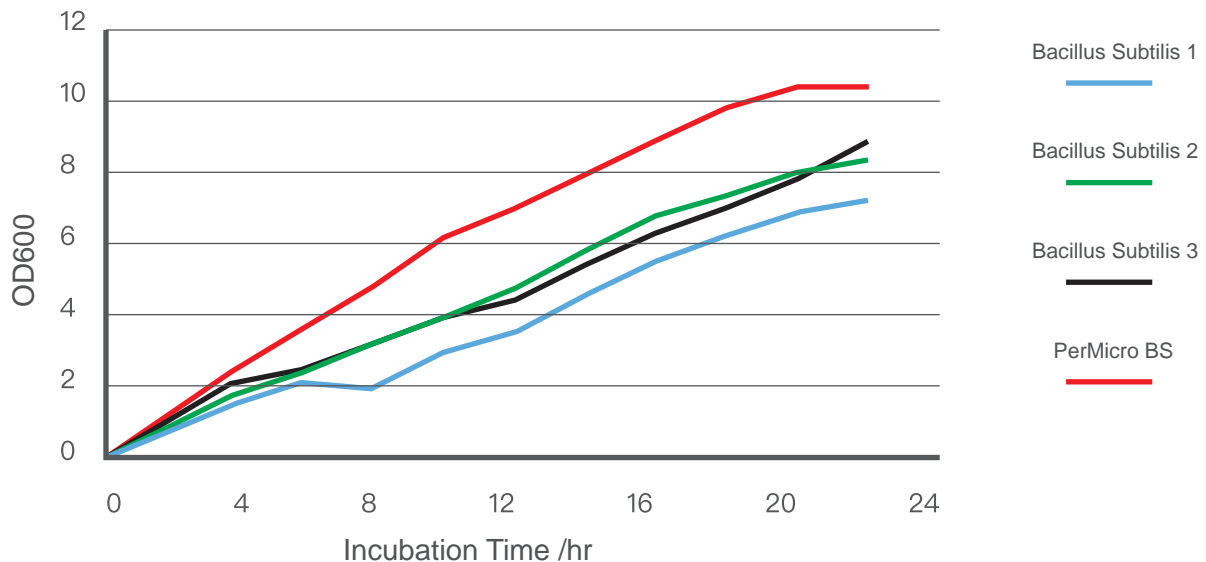
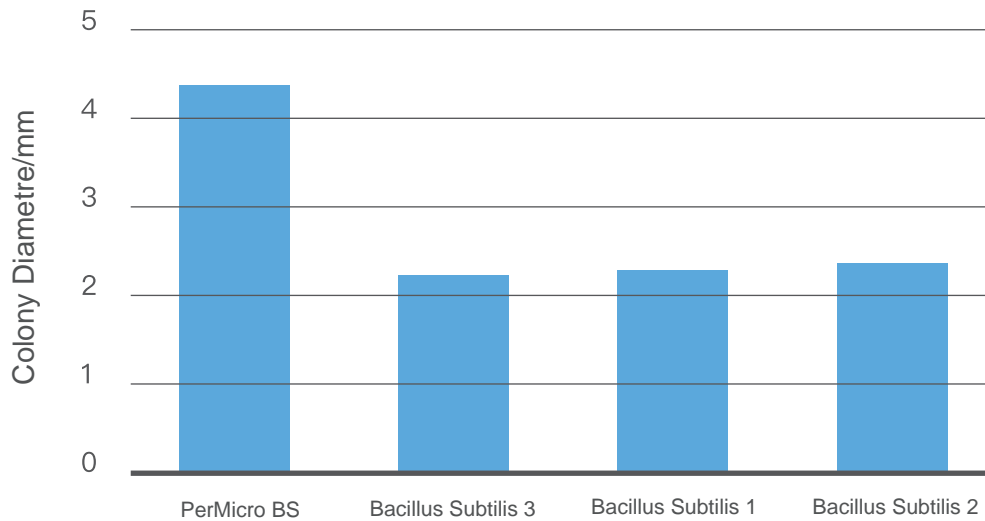


Figure 6. The Contrast of Colony Diameter between PerMicro BS and Other Bacillus Subtilis after 12 Hours' Incubation



## 2. Strong resistance

① PerMicro BS can be resistant to commonly used antibiotics

PerMicro BS has the higher resistant concentration to commonly used antibiotics in feed and its resistant concentration to common antibiotics is far more than the add amount stipulated by the Ministry of Agriculture.

Table 3. The Ability to Resist Antibiotics

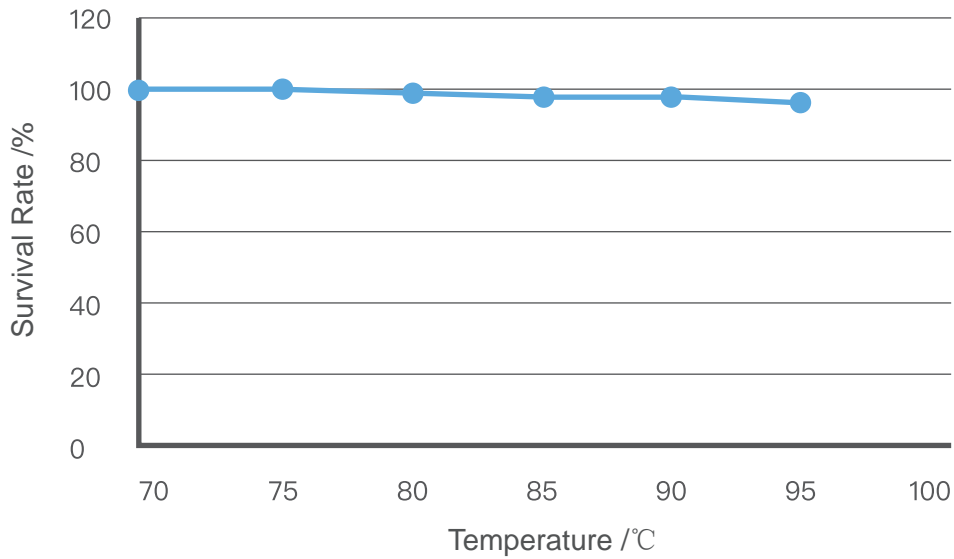
Unit: µg/ml

Antibiotics	Maximum Tolerance	Antibiotics	Maximum Tolerance
Kitasamycin	>256	Olaquinox	>256
Terramycin	>256	Colistin	>256
Aureomycin	>256	Quinocetone	>256
Salinomycin	256	Stafac	>256
Flavomycin	>256	Enduracidin	>256
Bacitracin Zinc	>256		

② PerMicro BS has the ability to resist the high temperature

PerMicro BS has a strong ability to resist the high temperature, it has been treated for 5min at 95°C, the survival rate is still more than 90%.

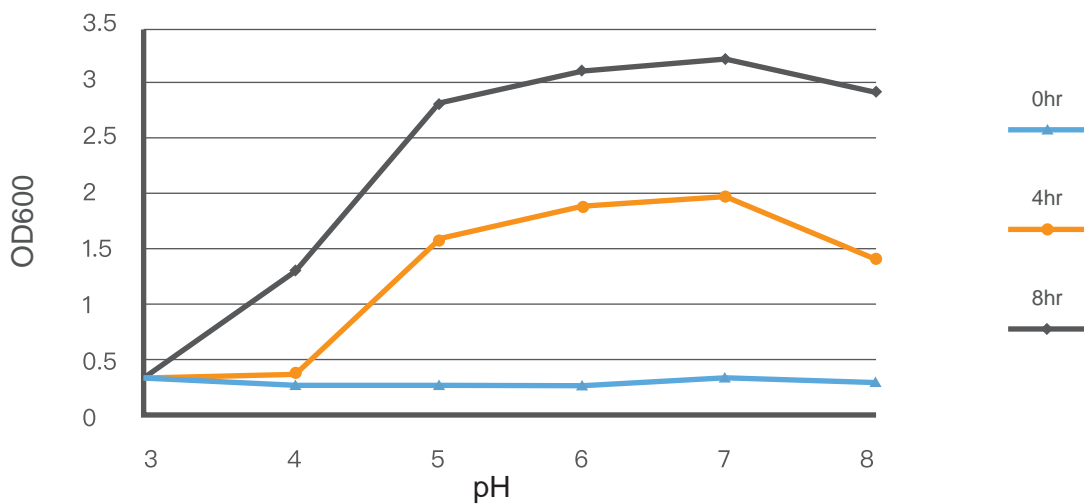
Figure 7. The Effect of Different Temperature Treatments on Survival Rate of PerMicro BS



③ PerMicro BS has the ability to resist the gastric acid

PerMicro BS has the ability to resist the acid environment of pH 4 - 8 and it can normally grow in acid environment.

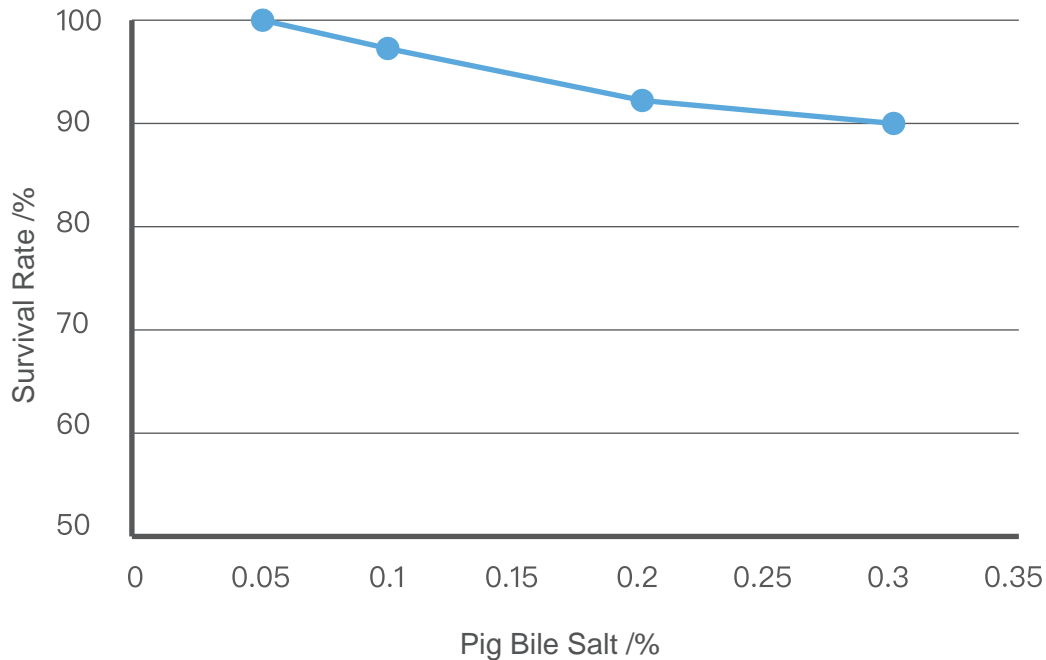
Figure 8. The Effect of Different pH Value on Growth Performance of PerMicro BS



④ PerMicro BS has the ability to resist pig bile salt

PerMicro BS has the ability to resist pig bile salt with the high concentration, the survival rate of *Bacillus subtilis* can still reach more than 90% when the pig bile salt concentration is 0.3%.

Figure 9. The Effect of Different Pig Bile Salt Concentration on Survival Rate of PerMicro BS



## Efficacy //

1. The growth and propagation speed is fast; the generation time is short.
2. PerMicro BS produces subtilin and the other bacteriocins. They effectively play the roles of inhibiting the growth of harmful bacteria, maintaining intestinal health, and reducing the dosage of antibiotics.
3. PerMicro BS rapidly germinates and effectively consumes intestinal oxygen to form the anaerobic environment with the low redox potential.
4. PerMicro BS can produce amylase, protease and so on. They are beneficial to the digestion and absorption of nutrient.
5. PerMicro BS cleans the intestinal tract and reduces the blood ammonia to reduce the odor of feces and to improve the feeding environment.



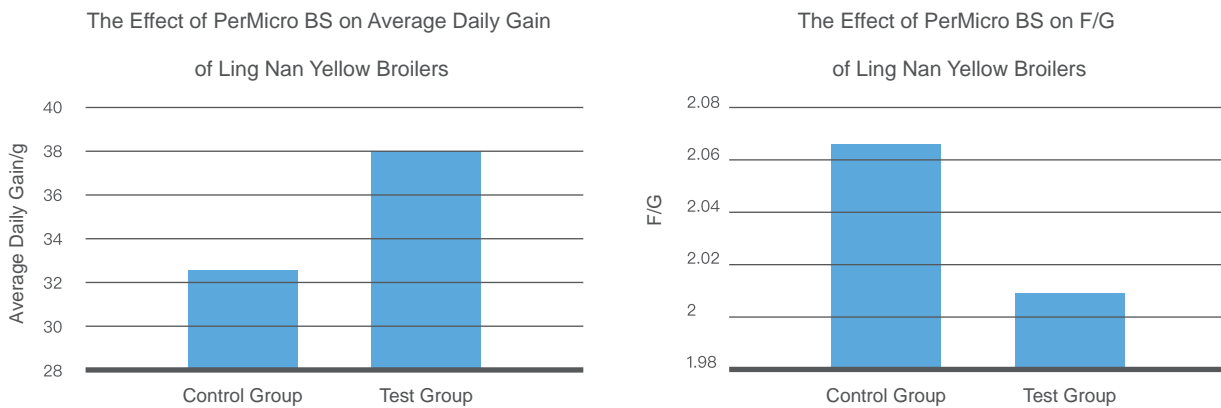
## Trial Effect //

### 1. Poultry Feed

1-day-old Ling Nan yellow broilers (the total number is 1200) were divided into 2 groups randomly, each group had 3 replicates, each replicate was 200 broilers, control group is fed with basal diet, and 100g/T PerMicro BS II is added in the test group, the test period was 50 days.

#### ① PerMicro BS can improve production performance

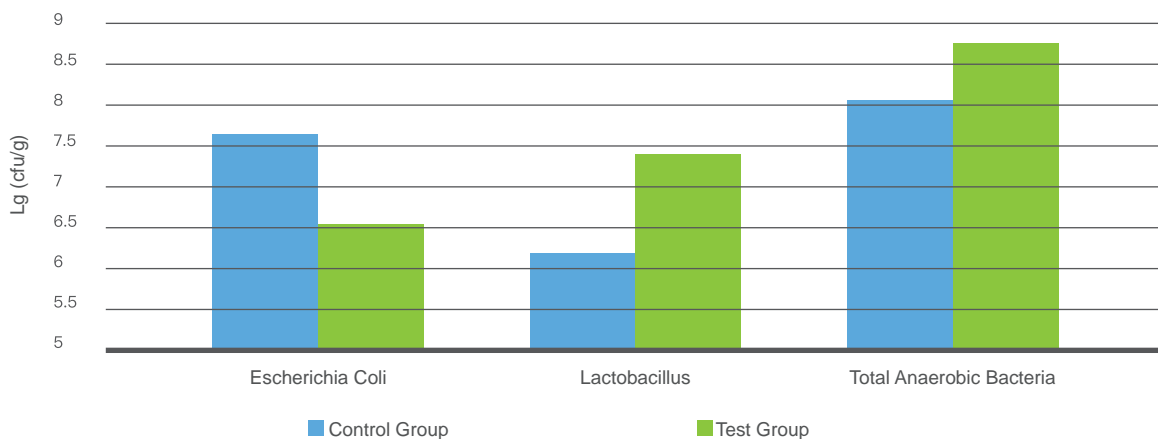
Figure 10. The Effect of PerMicro BS II on Production Performance of Ling Nan Yellow Broilers



#### ② PerMicro BS can improve micro-organism in the intestinal tract

PerMicro BS II can significantly reduce the number of intestinal Escherichia coli and increase the number of lactobacillus for maintaining animal intestinal health.

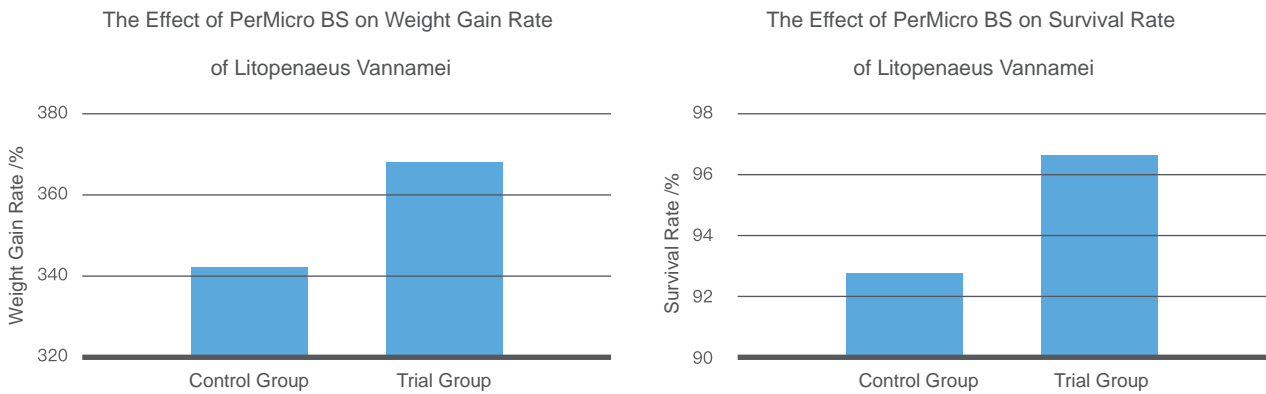
Figure 11. The Effect of PerMicro BS II on Micro-organism of Ling Nan Broilers in Cecum



## 2. Aquatic Feed

300g/T PerMicro BS II is added in *litopenaeus vannamei* feed, it can increase the weight gain rate and survival rate of *litopenaeus vannamei*.

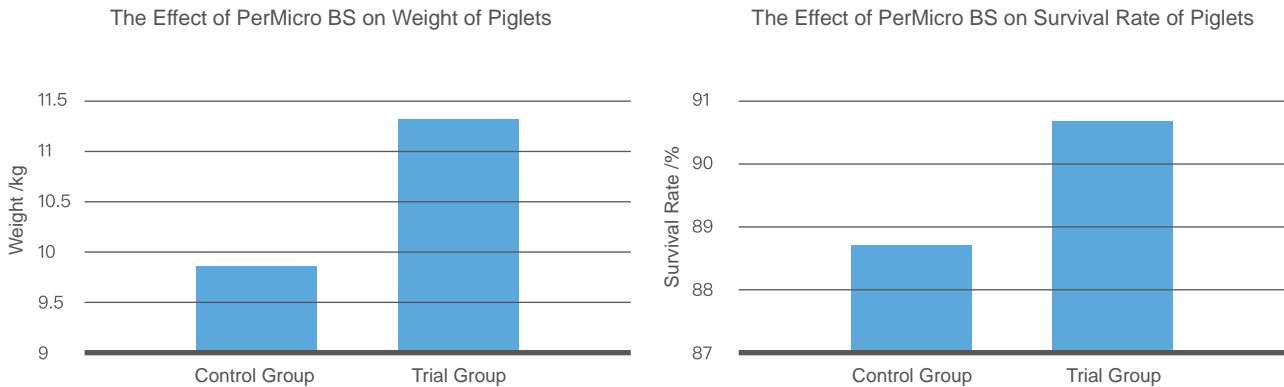
Figure 12. The Effect of PerMicro BS II on Growth Performance of *Litopenaeus Vannamei*



## 3. Pig Feed

300g/T PerMicro BS II is added in the creep feed of the piglets, it can effectively improve the weaning weight and survival rate.

Figure 13. The Effect of PerMicro BS II on Production Performance of Piglets



## Species //

This product is suitable for livestock, poultry, aquatic and other domesticated animals.

## **Usage&Dosage //**

It is recommended to add this product in compound feed, concentrated feeds, and premixes are in proportion to add this product after conversion.

Table 4. The Additive Amount of PerMicro BS in Complete Feed of Livestock and Aquatic

Species	PerMicro BS I (g/T)	PerMicro BS II (g/T)
Meat Poultry	300~1000	100~300
Laying Poultry	200~800	80~200
Breeding Poultry	400~1000	100~500
Aquatic	500~1500	200~800
Swine	300~1000	100~500

NOTE: In order to ensure uniformity in the feed, the use of this product need to be premixed firstly, and then gradually added to the follow-up feed.

This product is used as soon as possible after unpacking, the remaining parts need to tie up and keep in dark place.

## **Packaging&Storage //**

This product is packaged in a bag or barrel, the net weight of product is 25kg, and details see the package label.

Keep away from heat, moisture and direct sunlight, not with toxic and harmful substances mixed.

Under the condition of original package, the shelf life is 12 months.



## HUNAN PERFLY BIOTECH CO., LTD.



No.1038 Zhongqing Road, Jinxia Economic Development Zone,  
Kaifu District, Changsha, Hunan, P. R. China



+86-731-84699028/84699058/84699158



+86-731-84699030



<http://www.perfly-bio.com>

