



SALTOSE

New Bio-Culture & Enzyme Combination

Our *Bacillus* bacteria which are screened among 10,000 strains and special enzymes ensure the safety and health of poultry and livestock by controlling harmful bacteria (*Salmonella*, *E. coli*, *Clostridium*) and parasites (*Coccidium*, *Cryptosporidium*)

PIC-BIO INC. has been involved in research and development of remedies for not only production of antibiotic-free poultry and livestock but also enzyme products that are capable of preventing migration of zoonotic diseases as replacement of antibiotic for number of years since PIC-BIO INC. was incorporated. One of the enzyme products is “SALTOSE” by its trade name whose efficacy has been recognized by poultry and livestock industries in Japan and foreign countries.

What is SALTOSE?

SALTOSE is one of leading probiotics which contains *Bacillus* group, *Enterococcus* group and unique enzymes. SALTOSE can prevent and treat the bacterial and parasitic diseases with the characteristics of used bacteria and enzymes, and improve the productivity for poultry and livestock.

Ingredients and Characteristics

We have selected several strains of *Bacillus* group among more than ten thousand strains of *Bacillus* group which do not produce antibiotics, but produce unique enzymes which can break down the cell wall of bacteria and oocyst of some important parasites.

Bacillus strains and main enzymes

The *Bacillus* group;

1. *Bacillus licheniformis*
2. *Bacillus subtilis*
3. *Bacillus pumilus*

The main enzymes;

1. Beta-Xylanase
2. Cell Wall Lyase
3. Protease

1. Disease Control

Strong bacteriolytic effects against bacterial diseases and antiprotozoal effect against parasitic diseases through unique enzyme “Cell Wall Lyase” .

2. Improvement in Digestion

Disintegration of the cell wall of feed substances for improvement of productivity by enhancing digestion, feed conversion, and body weight gain.

3. Odor Control

Decrease of Ammonia and Hydrogen Sulfide in their excreta.

Lactic Acid Bacteria

The *Enterococcus* group;

1. *Enterococcus faecalis*
2. *Enterococcus faecium*

1. Improving ecological environment in intestines

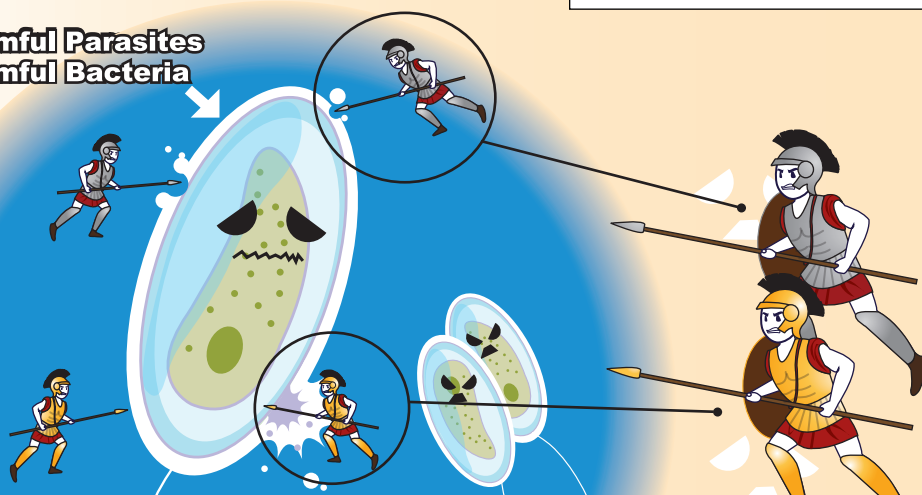
2. Enhancing multiplication and growth of bifido bacteria

3. Prevention and elimination of harmful bacteria

4. Keeping microorganisms in rumen and caecum at normal conditions

5. Enhancing appetite of animals and also enhance their growth

Harmful Parasites
Harmful Bacteria



Our own developed Enzymes
(Cell Wall Lyase etc.)

Degradation Effects on Parasite 2 - 1

< Coccidium oocyst (Poultry) >



Before SALTOSE

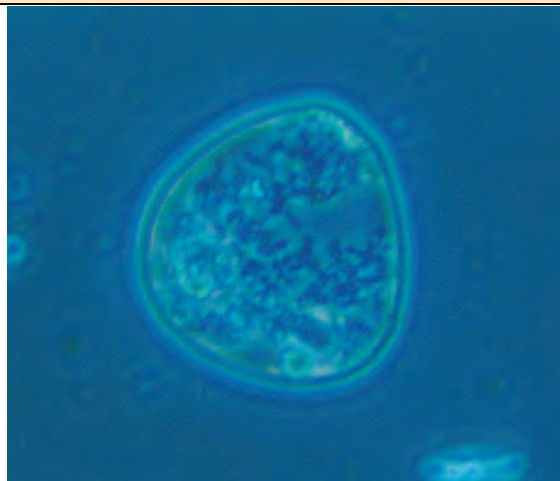
Coccidium oocyst germinated and sporocyst developed



After SALTOSE

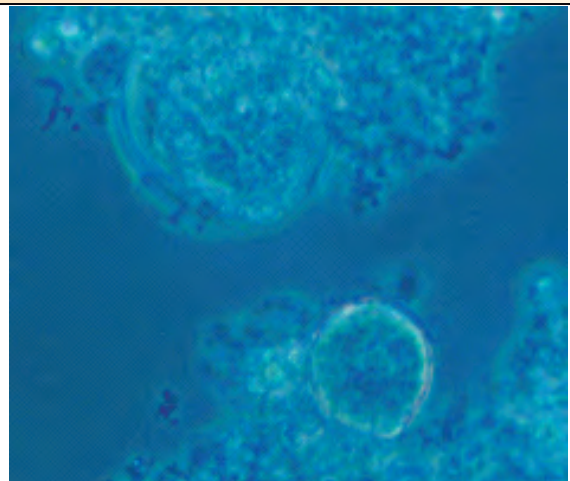
Coccidium oocyst was dissolved completely and its original shape disappeared.

< Coccidium oocyst (Cattle) >



Before SALTOSE

Coccidium oocyst germinated and sporocyst developed.



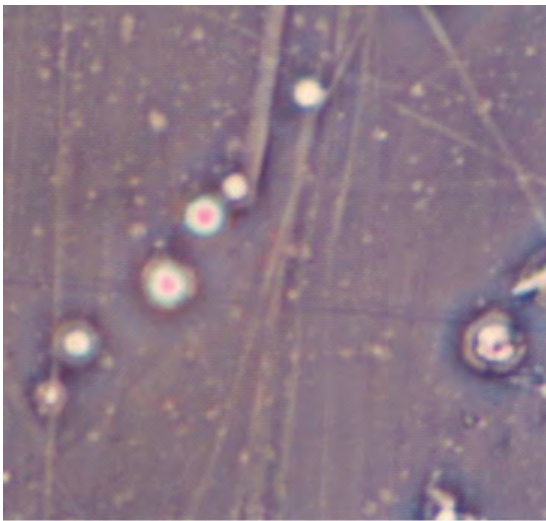
After SALTOSE

Coccidium oocyst was dissolved completely and its original shape disappeared.

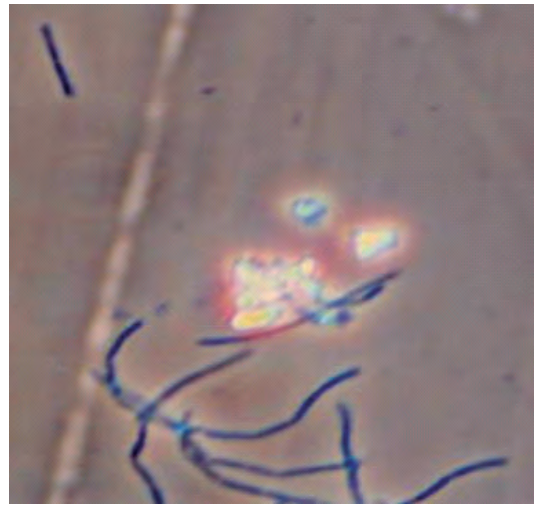
Degradation Effects on Parasite 2 - 2

< *Cryptosporidium* (Cattle) >

Prepared culture media for SALTOSE and inoculated *Cryptosporidium* for observation of degradation effects.



Before SALTOSE application



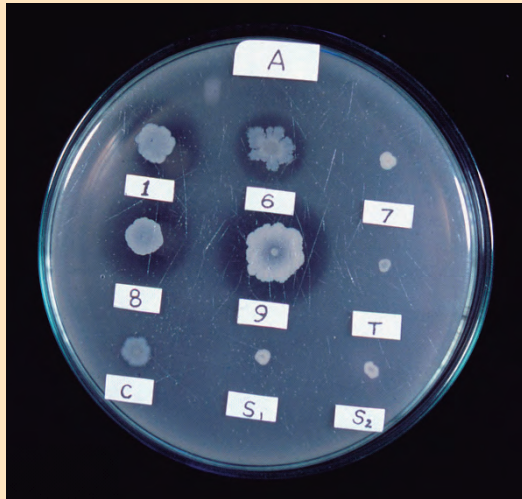
After 12 hours

* Blue stick bacteria are SALTOSE bacteria.

Finally, *Cryptosporidium* was dissolved completely and its original shape disappeared.

Inhibitory Effects on Bacteria 2 - 1

< *Salmonella* Enteritidis >



Prepared culture medium for *S. Enteritidis* and inoculated the following bacteria.

1, 6, 7, 8, 9 : SALTOSE

T : Competitor

C : Competitor

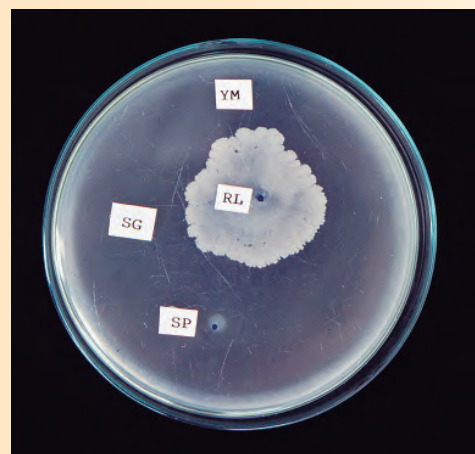
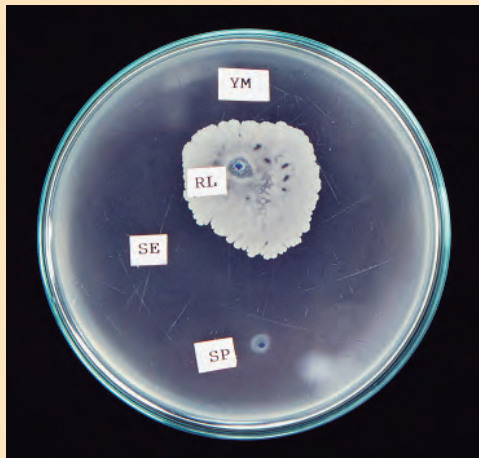
S1 : *S. Typhimurium*

S2 : *S. Gallinarum*

SALTOSE shows their antibacterial activities with the formation of inhibition ring.

< *Salmonella* Enteritidis and *Salmonella* Gallinarum >

RL bacteria were inoculated in YM-SE and YM-SG culture medium for observation of inhibition ring.



YM : Yeast and Malt

RL : SALTOSE bacteria

SE : *S. Enteritidis*

SG : *S. Gallinarum*

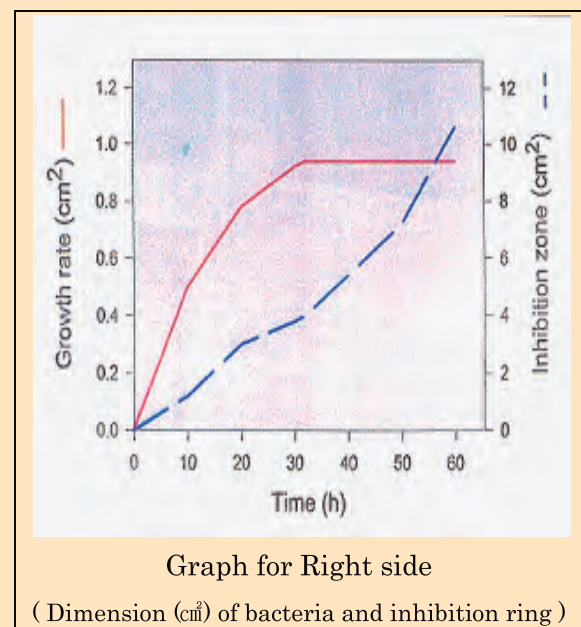
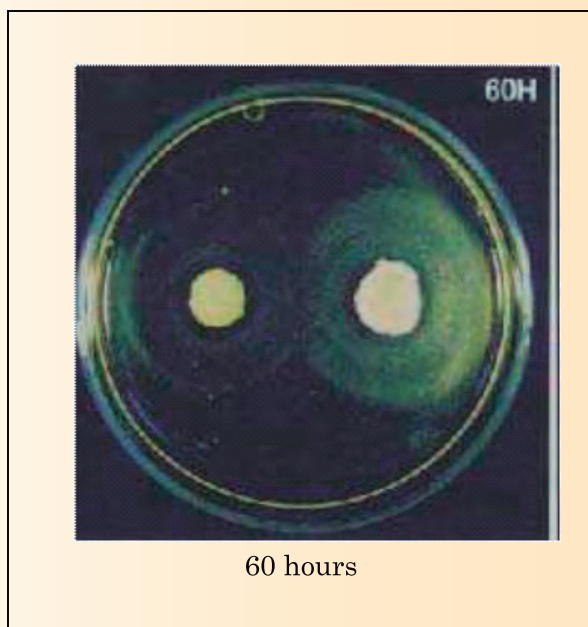
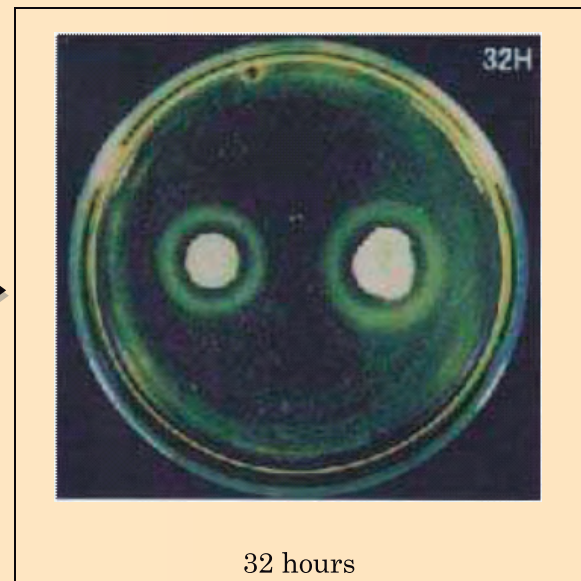
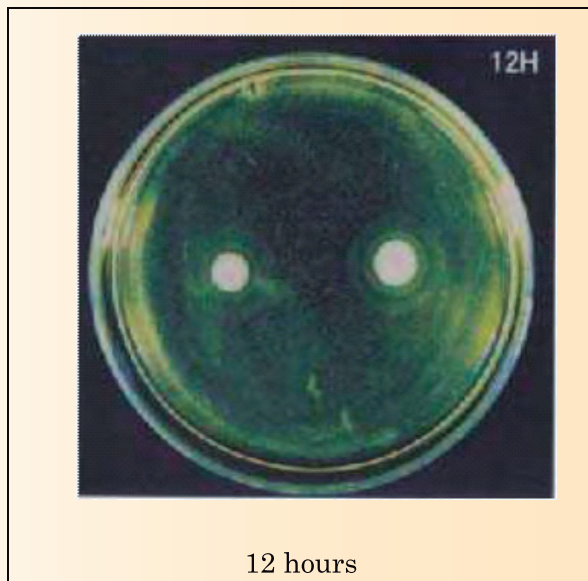
SP : other *Bacillus subtilis*

1. SALTOSE produced a large inhibition ring, which indicates strong control effect on *S. Enteritidis* and *S. Gallinarum*.
2. Other *Bacillus subtilis* indicated almost no control effect.

Inhibitory Effects on Bacteria 2-2

< Clostridium >

Prepared culture medium for *Clostridium* and inoculated *Bacillus licheniformis* of SALTOSE (Right side) and the other *Bacillus licheniformis* (Left side) bacteria for observation of growth and inhibition ring.



32 hours after the inoculation, *Bacillus licheniformis* of SALTOSE stopped their growth due to completing the absorption of nutrients from culture medium.

However, inhibition ring continued to expand, and dissolved *Clostridium*.

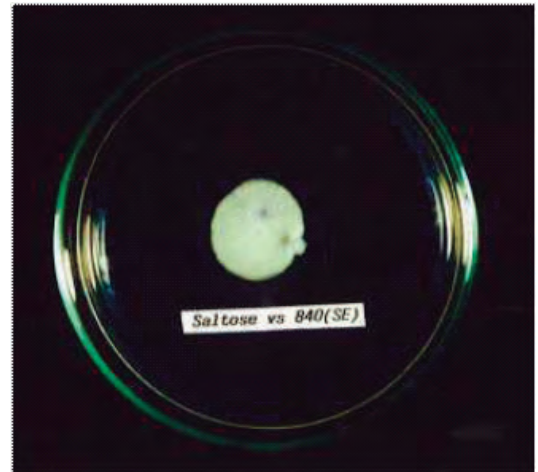
Antagonistic Effects on Bacteria 3 - 1

< *Salmonella* Enteritidis (840) and *Salmonella* Infantis (837) >



Competitor

Competitor did not absorb the inoculated *Salmonella* bacteria.



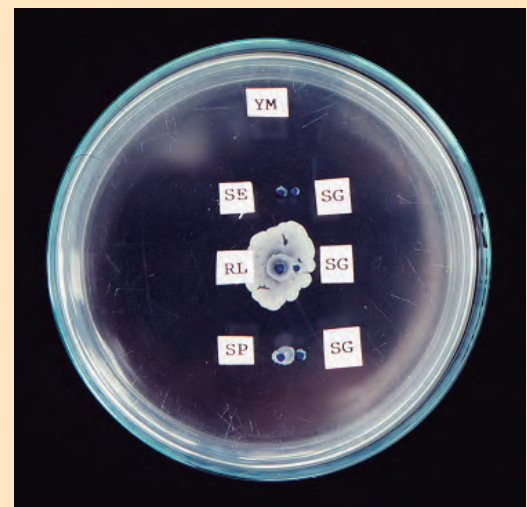
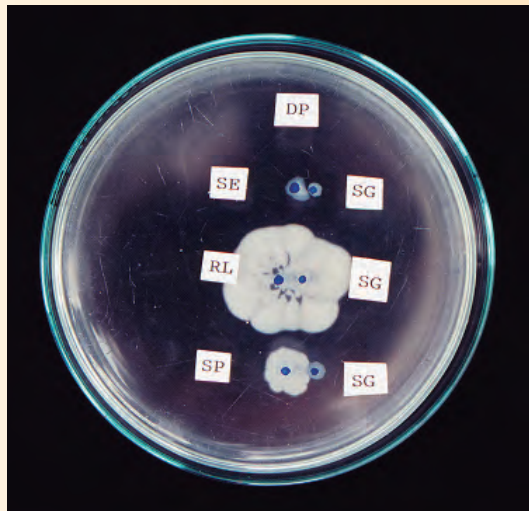
SALTOSE

SALTOSE absorbed the inoculated *Salmonella* bacteria.

Antagonistic Effects on Bacteria 3 - 2

< *Salmonella Gallinarum* >

S. Gallinarum were inoculated in DP (Left side) and YM (Right side) culture medium, and then, each bacterium was inoculated in the same point for observation of antagonistic effects.

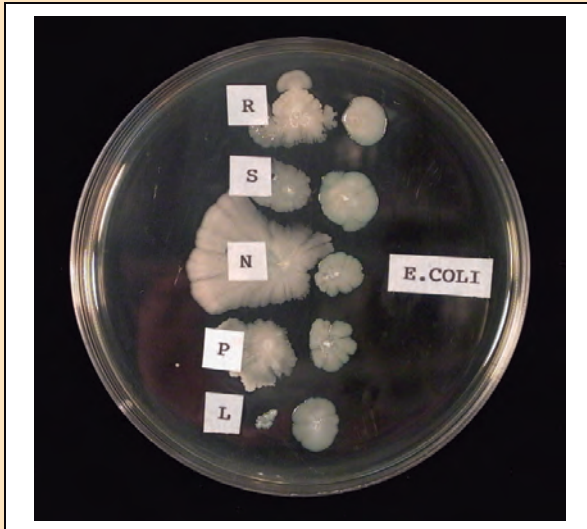


DP : Dexton and Pepton	YM : Yeast and Malt
SE : <i>S. Enteritidis</i>	SG : <i>S. Gallinarum</i>
RL : SALTOSE bacteria	
SP : Other <i>Bacillus subtilis</i>	

1. The growth power of SALTOSE bacteria is the strongest, and SALTOSE bacteria controls *S. Gallinarum* bacteria.
2. Other *Bacillus subtilis* indicated poor growth power.

Antagonistic Effects on Bacteria 3 - 3

< *E. coli* (K-88) >

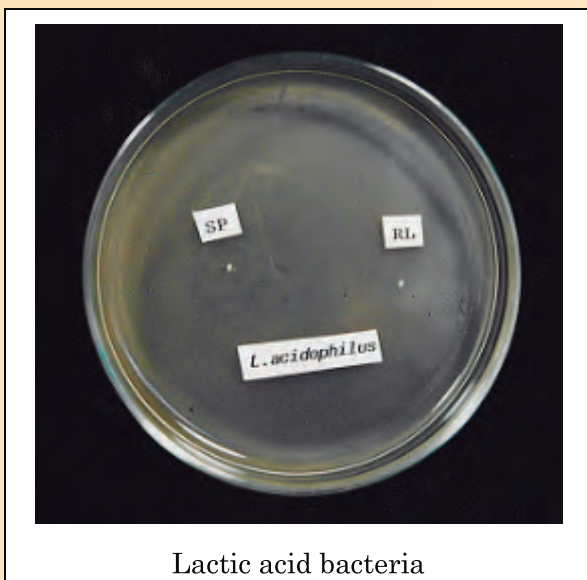


E. coli (K-88) and SALTTOSE bacteria were inoculated on the same culture medium.

It is observed that SALTTOSE shows more antibacterial activities against *E. coli*.

R :	}	SALTTOSE bacteria
S :		
N :		
P :		
L :		

< Beneficial Bacteria (Lactic acid bacteria and Bifido bacteria) >

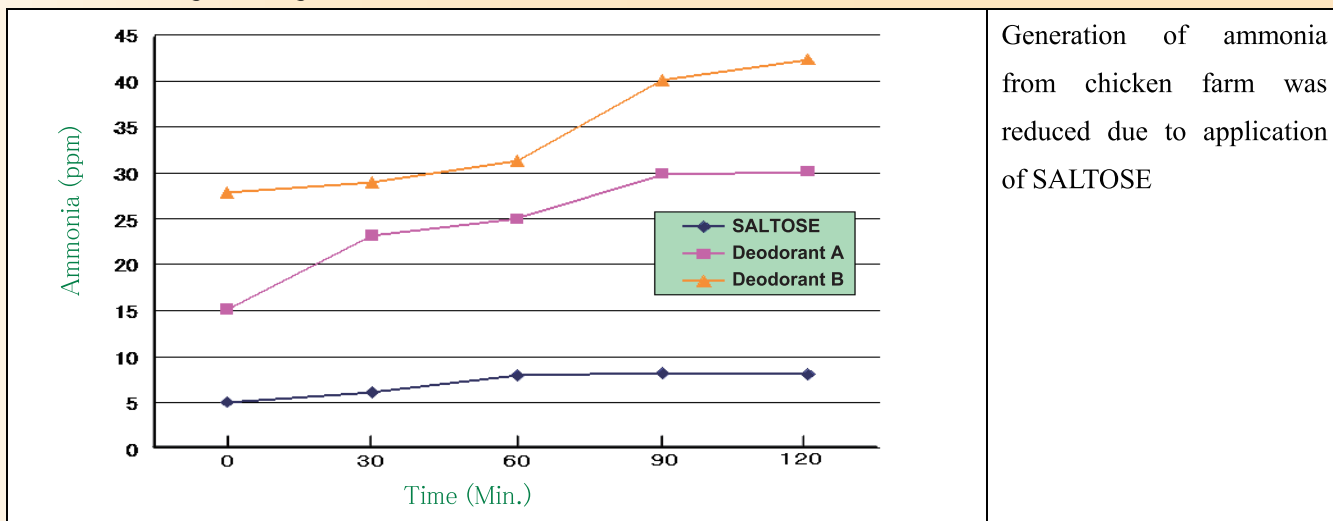


SALTTOSE did not damage the beneficial bacteria.

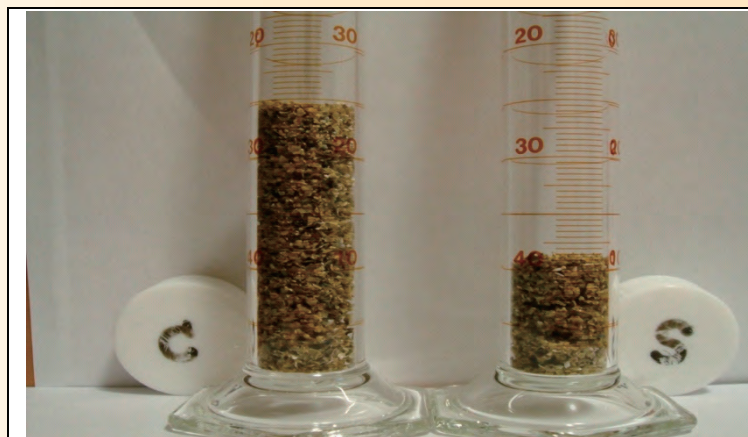
The Other Data

Testing result (Excreta of poultry)

1. <Reduction of generating ammonium odor>



2. <Comparison of digestibility>

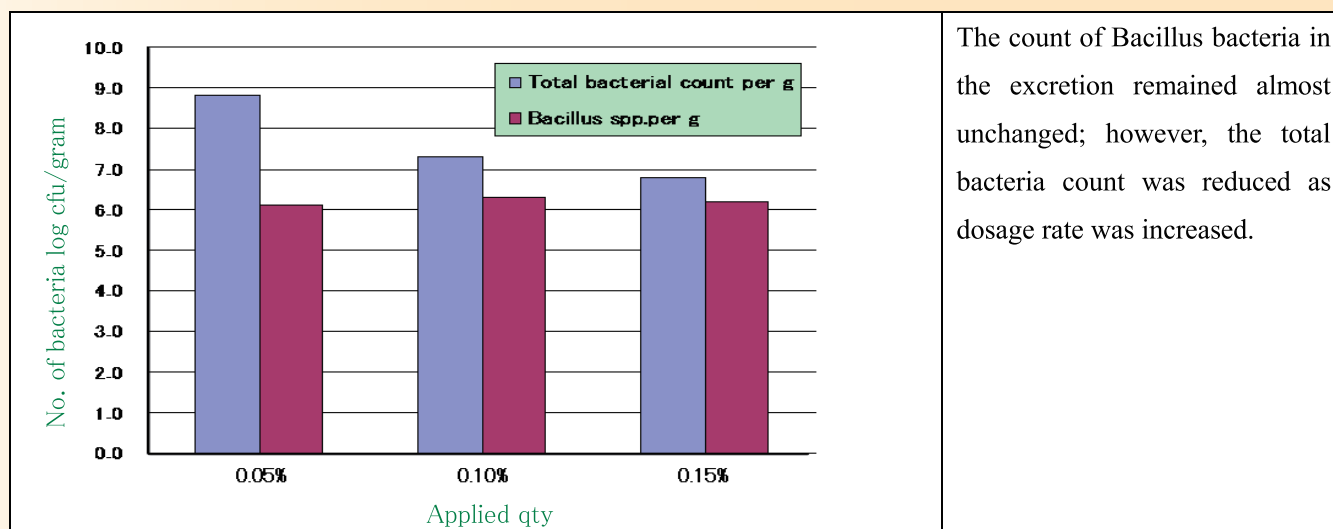


S: SALTOSSE

C: Control

Result: SALTOSSE treatment can improve the digestion, so the amount of undigested materials in the excreta becomes half as compared with the control.

3. <Bacterial count in the excretion>



Heat resistance			
Treatment Time (100°C)	Protease (pu/g)	<i>Bacillus subtilis</i> group (cfu/g) x 10 ⁸	<i>Enterococcus</i> group (cfu/g) x 10 ⁸
Control	1,377	1.80	1.30
5 min.	1,377	1.77	0.30
10 min.	1,377	1.45	0.20
15 min.	1,250	1.50	0.15

Bacillus subtilis group and enzymes have a tolerance for the temperature at least 100°C.

But, we're afraid that *Enterococcus* group doesn't have a tolerance towards heating.

[Note]

Do not use SALTUSE in expander or extruder at all due to high temperature and pressure.

Compatibility with antibiotics and coccidiostats	
Not sensitive	Sensitive
Lincomycin, Lincomycin + Spectinomycin, Terramycin, Aureomycin, Amprolium, Colistin, Framycetin, Tylosin, Neo-Terramycin, Tiamulin, Destomycin, Neomycin, Virginiamycin, Ethopabate	Enromycin, Chloramphenicol, Penicillin, Kanamycin, Carbadox

1) SALTUSE with antibiotics

Please do not use together with "sensitive" antibiotics because the effect of SALTUSE will be reduced. However, the effect of "sensitive" antibiotics will not be reduced, and the animal itself will not suffer any damages.

2) SALTUSE with coccidiostats

SALTUSE could be used with any kind of Coccidiostats.

It helps Coccidiostats to overcome *Eimeria* species' (resistance to those drugs).

Ingredients

Main Enzyme	Beta-xylanase	350 U/g minimum
	Protease	12,000 PU/g minimum
	Cell Wall Lyase	3,700 U/g minimum
<i>Bacillus</i> group	<i>Bacillus licheniformis</i>	more than 1.0×10^9 cfu/g
	<i>Bacillus subtilis</i>	
	<i>Bacillus pumilus</i>	
<i>Enterococcus</i> group	<i>Enterococcus faecalis</i>	more than 1.0×10^8 cfu/g
	<i>Enterococcus faecium</i>	

* Main ingredients in medium are Soybean Cake, Cornstarch, Magnesium Sulfate (MgSO₄), and Phosphate.

Appearance

Yellow-white powder, passing #60 mesh screen, No change in the appearance after processing into pellets.

Dosage and administration

Poultry and Livestock: 0.25-0.5kgs per 1,000kgs of feed.

Attention

Keep in dry, cool and dark place. Do not mix other microorganism.

Packing

20kgs / Bag



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