

## Food Safety, Control of Necrotic Enteritis & Growth Promotion



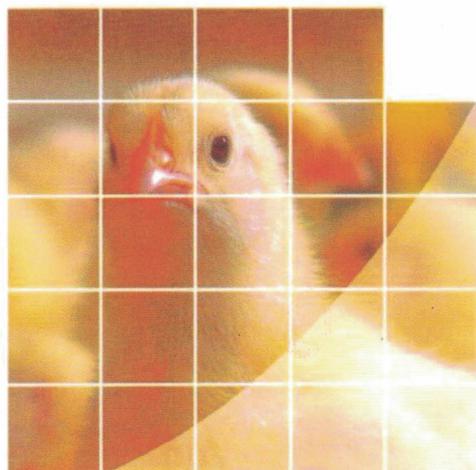
European Pharmacopeia Quality

### INTRODUCTION

A healthy gut is vital for the optimum performance of poultry. The microbial balance of the gut and maintenance of pH is of utmost importance in maintaining gut health. Intensive rearing of poultry inflicts considerable metabolic stress altering the gut environment creating an imbalance in the gut microflora favoring the pathogens to invade the intestinal cells and cause infection.

Microflora plays a vital role in the health and performance of chicken through its effect on gut microbiology, nutrition and immune response along with altering pathogenesis of enteric disease. pH is a very important factor in gut health maintenance. Variation in pH of the gut influences the microbial flora.

FlavoCombi® is a combination of flavophospholipol and *Bacillus licheniformis* which works dynamically to enhance the overall performance as well as to combat the devastating disease necrotic enteritis. It proves to be wonderful in protecting the birds' gut against various harmful bacteria by colonizing LAPBs (Lactic Acid Producing Bacteria) and thereby improving the growth, FCR and laying performance of the birds.



## FLAVOPHOSPHOLIPOL

Flavophospholipol (Flavomycin<sup>®</sup>) is developed exclusively as a feed additive for poultry and animals. The active ingredient, flavophospholipol, is the only member of the antibiotic class of phosphoglycolipids specific to livestock. Flavomycin<sup>®</sup> is fermented from a strain of bacteria *Streptomyces bambusicola*.

### MODE OF ACTION

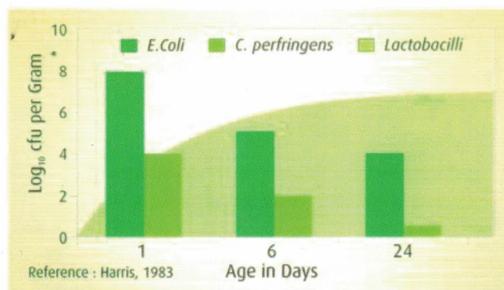
Flavomycin<sup>®</sup> inhibits the reproduction of harmful bacteria by interfering in the biosynthesis of murein, the structural substance of bacterial cell walls; this causes the bacterial cells to burst. The unique feature of Flavomycin<sup>®</sup> is that it does not kill the helpful microflora of gut. Due to this property, Flavomycin<sup>®</sup> is considered as **Microflora Manager**.

Spectrum of activity				
Protective organisms	Flavomycin	Virginiamycin	Bacitracin	Lincomycin
<i>Lactobacillus</i>	spares	kills	kills	kills
<i>Bifidobacterium</i>	spares	kills	spares	spares
<i>Strep. faecium</i>	spares	kills	kills	kills

**Microflora manager** : Flavomycin<sup>®</sup> can spare and stimulate the beneficial Gram positive bacteria, thus contributing for establishing the population of "good" bacteria in the birds digestive system. These beneficial bacteria lower the pH and produce lactic acid and volatile fatty acid. Flavomycin<sup>®</sup> helps the development of natural protective microflora in the birds gut.

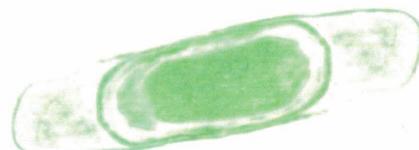
**Sparing effect on beneficial bacteria:** The "sparing" effect of Flavomycin<sup>®</sup> on lactic acid producing bacteria (LAPB) is maximum. Therefore, Flavomycin<sup>®</sup> creates gut environment very helpful to probiotic bacteria which other antibiotics are not capable to do.

**Competitive exclusion:** LAPB inhibit pathogenic bacteria like *Salmonella spp.*, *C. perfringens*, *E. coli*, *S. aureus* by competitive exclusion.



## BACILLUS LICHENIFORMIS

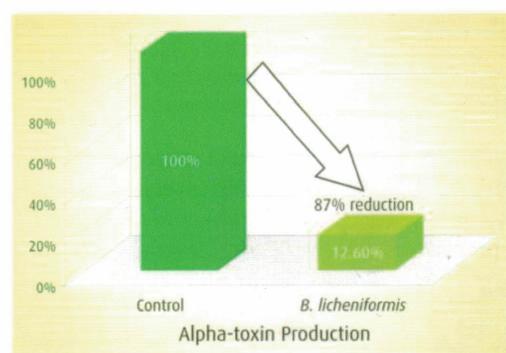
*Bacillus licheniformis* is a naturally occurring strain of *Bacillus* group of bacteria which is specially selected for monogastric animals due to wide range of health benefits. *Bacillus licheniformis*, can be administered orally by feed or in drinking water. It improves performance at sub-clinical necrotic enteritis conditions and reduce lesion score and intestinal necrosis. *Bacillus licheniformis* is a gram positive, spore forming rod shaped bacterium.



*Bacillus licheniformis* endospore

*B. licheniformis* is extremely heat stable and can withstand pelletization very well without losing any activity due to its capability to form the endospores.

Necrotic enteritis is the most common and financially devastating bacterial disease in modern broiler flocks. The intestinal necrosis characteristic of necrotic enteritis is caused by the potent toxin produced by the bacteria *C. perfringens*. The acute form of the disease leads to increased mortality in the broiler flocks. In the sub-clinical form, damage to the intestinal mucosa caused by *C. perfringens* leads to decreased digestion and nutrient absorption resulting in reduced weight gain and impaired feed utilization.



In numerous scientific studies and documented trials, *Bacillus licheniformis* has demonstrated the ability to reduce the proliferation of *C. perfringens* and decrease the level of toxin produced in the small intestine of the chicken.

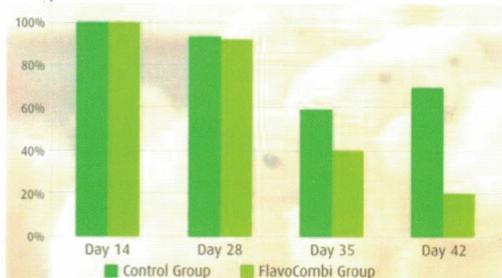
## FlavoCombi®

FlavoCombi® is a combination of flavophospholipol (Flavomycin®) and *Bacillus licheniformis*, which work synergistically for improving the gut health of poultry by increasing LAPBs concentration due to Flavophospholipols and by reducing the ill effects of pathogens especially *Clostridium perfringens*. Both Flavomycin and *B. licheniformis* are complement to each other and stable in premix as well as in finished feed.

### FOOD SAFETY BENEFITS

Food borne pathogens like *Salmonella* and *Clostridium* can be a serious challenge to human health. FlavoCombi® can be greatly effective in reducing the shedding and infection rates of harmful intestinal bacteria.

Broiler shedding *Salmonella enteritidis* on the sampling day :

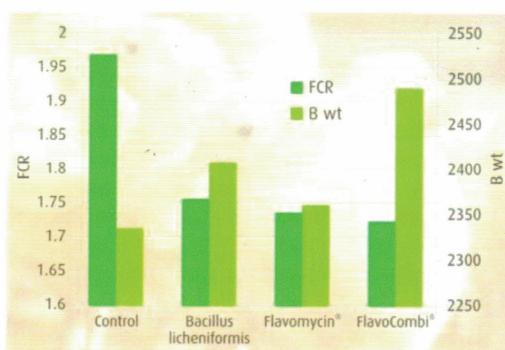


### ANTIBIOTIC RESISTANCE

The issue of antibiotics resistance had led worldwide investigations considering its impact on both animal and human health. Continuous research in the area of Flavophospholipol has revealed that FlavoCombi® has the potential to reduce antibiotic resistance, which develops due to plasmid transmission among pathogenic microbes.

### GROWTH PERFORMANCE

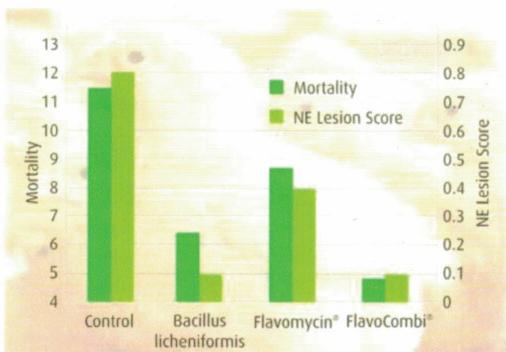
FlavoCombi® has shown significant improvement as compared to any other antibiotic or single strain probiotics in poultry. The major reason for such performance is due to increased LAPBs significantly due to Flavophospholipols and effect on pathogenic microbes especially on *Clostridium spp.*



### CONTROL OF NECROTIC ENTERITIS

*Clostridium perfringens* induced necrotic enteritis and related subclinical diseases have become economically significant problems for the broiler industry. *Clostridium spp* secretes a toxin named Alpha-toxin which is considered to be major cause of creating devastating problem in gastrointestinal tract of poultry named as necrotic enteritis.

FlavoCombi® is able to inhibit the growth of *Clostridium* as well as reduce the secretion of Alpha-toxin of *Clostridium spp*. The increased LAPBs are also very helpful in controlling the problem by reducing the pH of the gut, thereby inhibiting the growth of *Clostridium spp*.



### IMMUNO-STIMULATING EFFECT

The use of FlavoCombi® leads to stimulation of the immune function. Through Lactobacilli and under the influence of Lysozyme contained in the saliva, Muramyl dipeptide is released from the Lactobacilli cell wall which in turn triggers a series of reactions that boosts the immune system and increases the host resistance to extra and intra-cellular pathogens. It is also well documented and proven that increased concentration of LAPB and lower gut pH makes the host much more resistant to gut related and systemic infections due to better GALT (Gut associated lymphoid tissue) growth.

# FlavoCombi®

FlavoCombi® is added to the feed of agricultural livestock for growth promotion, control of necrotic enteritis. This unique combination adds nutritional efficiency and food safety benefits.

## THE BENEFITS

- Increased weight gain in broilers
- Higher egg yield in layers/breeders
- No withdrawal period
- Best results of bio-availability of nutrient in feed
- Lower mortality due to competitive exclusion of pathogens
- Reduction in water content of droppings
- Reduction in salmonella shedding
- Excellent against necrotic enteritis
- Compatible with all feed additives/ medicines
- Helps producers meet their HACCP food safety requirements.
- Daily weight gain is improved by 3-12%.
- Feed efficiency is improved by 3-8%
- No antibiotic resistance in animals and humans.
- FlavoCombi® can be the best solution in the market today preventing problems with subclinical NE and other bacterial diseases in poultry.
- Using this product leads to lower mortality in broiler flocks, broiler breeders and laying hens.

## COMPOSITION

Flavophospholipol: 50 mg/gm

Bacillus licheniformis:  $1.6 \times 10^{10}$  CFU/gm

## INDICATIONS

Improvement of weight gain and feed conversion efficiency in broilers, breeders, laying hens, turkeys, rabbits, fish and shrimps.

## OPERATOR WARNINGS

Avoid direct contact with the skin.

## STORAGE

Store in cool dry place. Protect from direct sunlight. Keep out of reach of children.

## RECOMMENDED DOSAGE

100 gm per ton of finished feed. Feed continuously. OR AS RECOMMENDED BY NUTRITIONIST.

## WITHDRAWL PERIOD

'0' days in chickens.

## PACKAGING

FlavoCombi is available in 25 kg bags.



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