COMPARATIVE EFFICACY OF VARIOUS GROWTH PROMOTERS ON PERFORMANCE OF BROILER CHICKEN

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Modern chicken face tremendous performance pressure which sometimes leads to mortality due to metabolic, locomotor, gut related disorders due to faster growth rate & higher breast meat yield consequent to improvements in genetics, nutrition, management, disease prevention, etc. Substantial reduction in mean age of liquidation makes the challenge of maintaining gut health paramount among all.

The digestive, absorptive and secretory ability of the gut is solely dependent on its integrity and microbiome. Several stressors like coccidiosis, litter management, clostridium, other pathogenic bacteria & viruses, mycotoxin, nutritional and managemental errors affect gut functionality.

Necrotic Enteritis (NE)

Clinical NE is associated with severe losses due to heavy mortality and concerns the farmer more, whereas the subclinical form is responsible for substantial losses on FCR and is being ignored generally which was very much evident during intestinal lesion scoring in broilers performed by our team, pan India.

Losses due to NE are estimated to cost the poultry industry $2 billion annually worldwide. Causative organism of NE is *Clostridium perfringens* Type A & C which is a gram positive, spore forming, anaerobic bacteria.

This bacterium produces different toxins like α, β & ξ but the most important culprit is NetB toxin, an exotoxin, which may lead to systemic circulation of this bacterium to end up with cholangiohepatitis.

NetB toxin damages intestinal cells and causes leakage of plasma from enterocytes; further they produce perfrin, inhibit the proliferation of harmless Clostridia and increase the proliferation of pathogenic bacteria leading to dysbacteriosis resulting in heavy mortality, mostly during 2 - 5 weeks of age.

The clinical infection is characterized by sudden onset, high mortality, and necrosis of the mucous membrane of the small intestine and mortality may reach up to ~ 1% per day.

Fig: 1 Turkish Towel appearance in Necrotic Enteritis

Birds with NE are depressed, reluctant to move and have ruffled feathers. They are usually diarrhoeic, may be anorexic and dehydrated. The course is often per-acute, with death in 1–2 hours. Mortality rates may be as high as 50%, but virulence varies with the infecting strains.

Some strains cause cholangiohepatitis in broilers, as *Clostridium spp.*, a strictly gut pathogen, gets into the circulation due to breach in the gut barrier function.

Modern broilers are genetically selected for continuous eating and they continue eating during clinical & subclinical NE challenges, thus leading to a shift in the microbiota and subsequently dysbacteriosis. Deep seated intestinal damage destroys the lamina propria leading to destruction of immune cells in the Peyer's patches and makes the bird incompetent immunologically.

Solution

Different solutions exist for the control of clinical as well as subclinical NE like antibiotics, synbiotics, probiotics, essential oils, bacteriophages, antimicrobial peptides, etc.

Solutions like synbiotics, antimicrobial peptides, probiotics, essential oils show excellent promise as they provide efficient control of clinical & subclinical NE with additional benefits like replenishment of microflora and better immunocompetence.

In this study we have compared the efficacy of 3 different growth promoters on the performance parameters in commercial broilers.

BAMBERCIN PLUS - Novel & Potent Tribiotic

A unique and novel combination of Bambermycin / Flavophospholipol (exclusively for veterinary use) and adequate CFUs of *Bacillus subtilis* and *B. licheniformis*, fortified with Curcumin in a compatible base for improving performance and productivity in poultry.

Bambermycin / Flavophospholipol

Class: Phosphoglycolipids
Spectrum: Primarily acts against gram positive pathogens like Clostridium and Staphylococci, but spares beneficial microflora, like Lactobacillus & Bifidobacterium and hence improves microflora balance.

Probiotics

B. subtilis & *B. licheniformis* are generally regarded as safe (GRAS) and inhibit pathogenic bacteria, regulate gut microbiota, help in immuno-modulation are highly stable during feed processing.

Curcumin

Curcumin is well known for its safe & natural phytobiotic action. It has a wide range of biological properties such as anti-oxidant, anti-bacterial, anti-viral, anti-fungal and anti-inflammatory activities. It helps in the stimulation of bile secretion and bile flow, thereby maintaining liver health.

NAGRONEX ESF - Phytobiotic Growth Promoter

It is a synergistic combination of essential oils (oregano, clove, cinnamon & eucalyptus) with short chain fatty acids (SCFA). It has anti-bacterial, anti-viral, anti-fungal, anti-coccidial and anti-oxidant properties that promote performance and productivity.

Growth Promotion Effect

NAGRONEX ESF improves intestinal histomorphometry parameters like villus height / crypt depth ratio, which leads to a wider surface area for better absorption of nutrients, electrolytes and thus combats villus atrophy & promotes intestinal integrity.

Antimicrobial Effect

It has both direct and indirect anti-microbial effects due to the synergistic interactions of its various active components. Phenols directly act by altering the cell wall of some bacteria and fungi resulting in water imbalance and cell death. It indirectly helps by ensuring quicker renewal of enterocytes, which creates a hostile environment to bacterial and coccidial development.

Objective of the Study

To evaluate the effects of dietary supplementation of different gut acting growth promoters (Nagronex ESF and Bambercin Plus) on performance of male broiler chickens against Bacitracin Methylene Disalicylate.

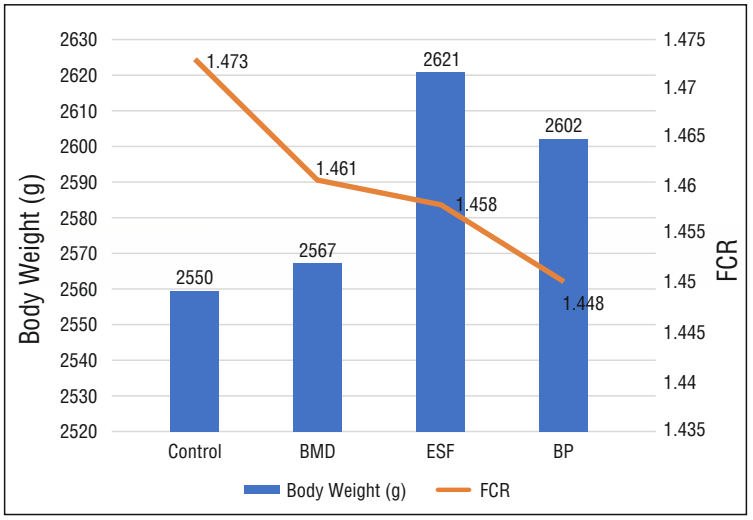
Materials and Methods

Dietary treatments and experimental diets

Group	Trial
Control	No Antibiotic / Probiotic
BMD	Control + 500 g Avibac MD (BMD 10%)
ESF	Control + 100 g Nagronex ESF
BP	Control + 250 g Bambercin Plus

General Bird Husbandry

Flock	:	410 one-day old male broiler chicks
Period	:	1 to 35 days
Diet Form		
Days 1 to 21	:	Crumbles
Day 22 onwards	:	Pellets
Diet Type		
Starter	:	Days 1-14
Grower	:	Days 15-28
Finisher	:	Days 29 to 35
Drinking Water	:	Ad libitum
Litter Material	:	Wood shavings and paddy straw
Vaccination	:	As per recommended schedule.
Placement	:	10 replicates & 10 chicks in a pen measuring (1.2 m x 1.2 m)



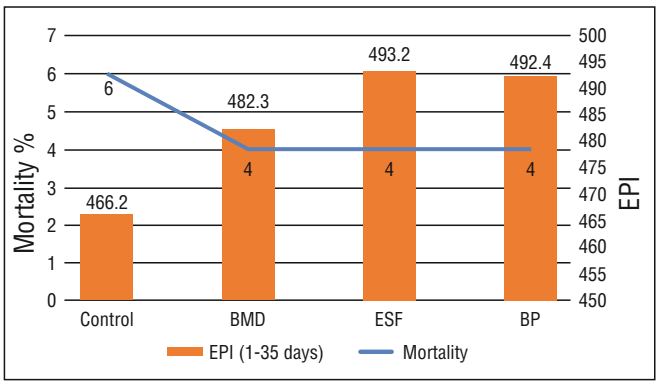
Graph 1: Body Weight & FCR

Results

BW: At the time of harvest at 35 d of age, birds supplemented with Nagronex ESF had almost 55 g more BW as compared with that in the BMD supplemented group. Similarly, the birds supplemented with Bambercin Plus had 35 g more BW than that of the BMD supplemented group.

ADG: During 29 - 35 d of age, ADG in the Nagronex ESF & Bambercin Plus supplemented groups was comparatively higher than that in the NC & BMD supplemented groups, resulting in marginally better ADG in the Nagronex ESF & Bambercin Plus supplemented groups as compared to the NC & BMD supplemented groups during 1-35 d.

FCR: FCR during 1-14 d was found to be higher in the BMD supplemented group (P = 0.032) as compared with the other dietary treatments. However, this ought to be an artefact since such difference was not followed during the subsequent periods of measurements during which FCR was found to be similar across the groups. The birds supplemented with Bambercin Plus had marginally (by 2.5 points) better FCR as compared with the Control group.



Graph 2: EPI & Mortality %

EPI: Numerically EPI was marginally better in the Nagronex ESF and Bambercin Plus supplemented groups as compared with the Control group.

Discussion and Conclusion

It was concluded from the present investigation that supplementation of **Nagronex ESF** and **Bambercin Plus** numerically improved body weight, FCR and performance of the birds.

The reason behind better performance of **Bambercin Plus** against BMD may be better control of Clostridium, sparing effect on the microbiome and additional replenishment of microflora in the gut.

Nagronex ESF performance is an outcome of different modes of action of the phytogenics like anti-microbial, anti-inflammatory, endogenous enzyme secretion, immunomdulatory, anti-oxidant, proliferation of microbiome and maintaining gut pH at optimum level.

The data had a trend which suggested that with these supplements, it may be possible to get better FCR and productivity index as compared with the conventional antibiotic growth promoters like BMD.

References are available on request.