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EFFECT OF CELMANAX® LIQUID ON PERFORMANCE, IMMUNE FUNCTION, AND HEALTH OF BROILERS CHALLENGED WITH *E. Coli* O_{78}

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Introduction: Celmanax® Liquid is an enzymatically hydrolyzed yeast and yeast culture manufactured as a combined supplement. Celmanax Liquid contains complex sugars such as beta glucans, galactosamine, mannose and mannan oligosaccharide (MOS). Yeast culture and MOS containing products play an important role in improving overall intestinal well being and in modulating immune function in the animal. The ability of Celmanax to agglutinate *E. coli* and *Salmonella spp* has been shown before. In this study, the effect of Celmanax on *E. coli* challenged broiler chicks was assessed.

Objective: Effect of Celmanax Liquid supplementation on performance, immune function, and in protecting broilers challenged with *E. coli* O_{78}.

Materials and Methods: Three hundred, one-day old chicks were assigned to three replications with four treatments and 25 birds/pen/replicate.

1. Control
2. Celmanax Liquid 0.5ml/L in drinking water was given 3 days before and 3 days post vaccination with LaSota vaccine (NDV) (administered on day 20)
3. Celmanax Liquid 0.5ml/L in drinking water was given 3 days before and 3 days post vaccination with LaSota vaccine (administered on day 20) but chicks were infected with *E. coli* O_{78} 1 x 10_4 cfu/ml orally on day 21
4. Control + LaSota vaccine (day 20) + *E. coli* O_{78} 1 x 10_4 cfu/ml orally on day 21

All birds received Hitchinar vaccine on day 6 and Gumboro vaccine on day 14. The trial period was days 1-49 (body weight and feed conversion was determined at 4 and 7 weeks). Whole blood was collected from five birds in each treatment, 3 days pre-vaccination and post vaccination for heterophil function and differential leukocyte counts. Serum was collected weekly to measure NDV antibody titer. Morbidity and mortality was recorded and ten birds per treatment were sacrificed and infection in internal organs was determined. Data was analyzed statistically.

Results: Weight gain and feed conversion was significantly improved ($p<0.05$) throughout the duration of the trial in birds receiving Celmanax Liquid as shown in Fig 1. The phagocytic activity of heterophils from chicks receiving Celmanax Liquid was higher ($p<0.05$) compared to other treatments (Fig 2). The percentage of lymphocytes was higher in birds receiving Celmanax Liquid 3, 6 and 9 days post vaccination (data not shown). The NDV antibody titer was significantly higher in vaccinated chickens receiving Celmanax Liquid compared to chickens vaccinated only (Fig 3).

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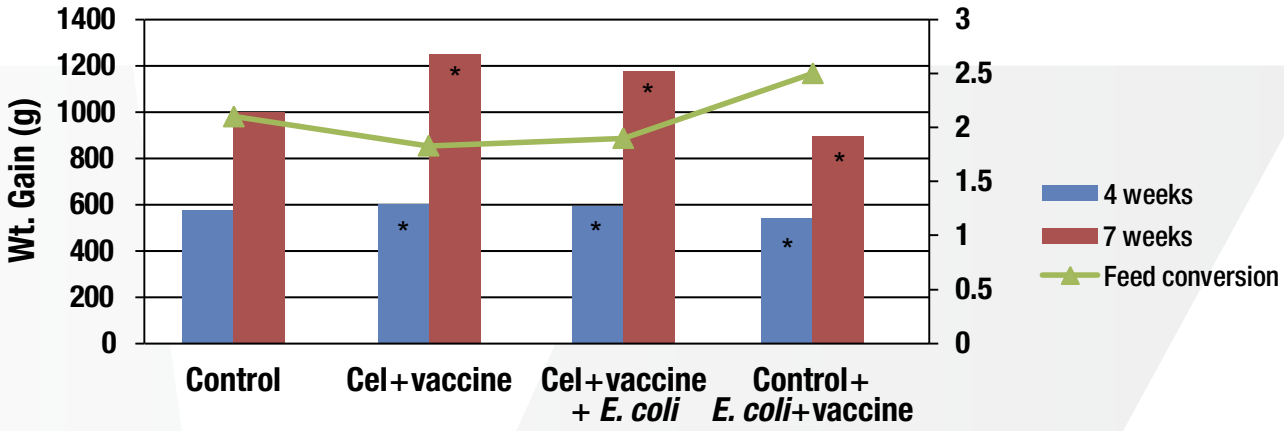
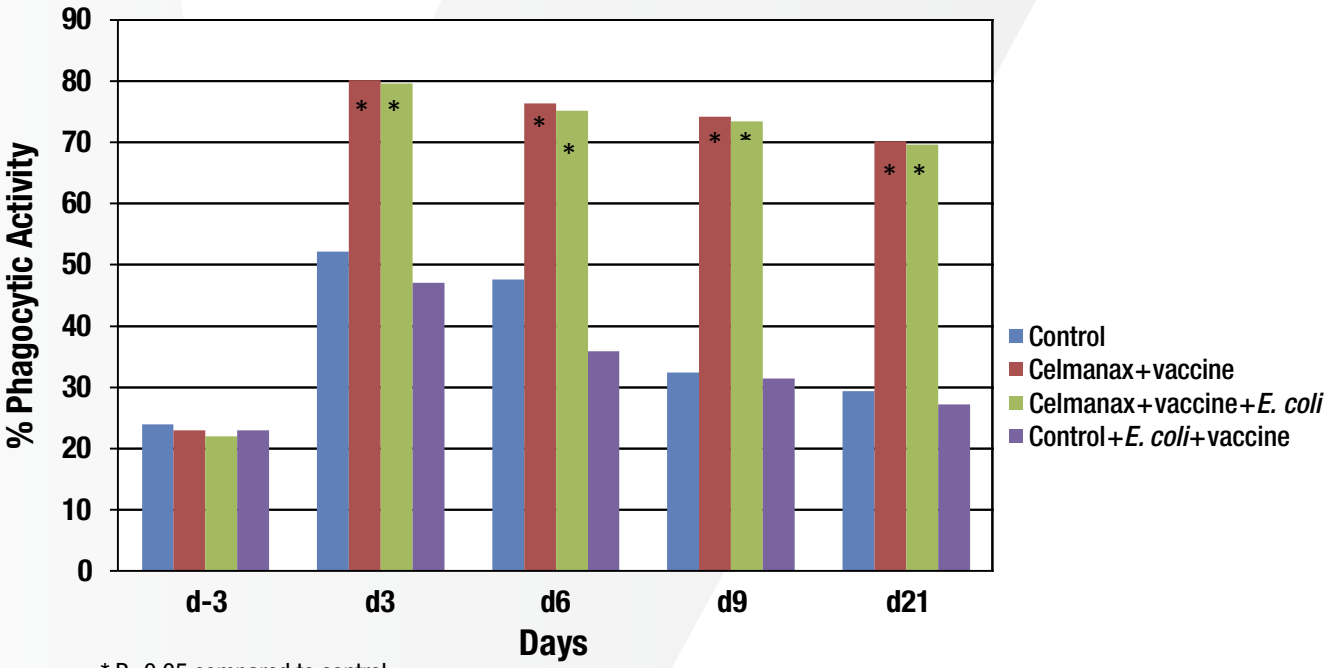
Fig 1: **Effects of Celmanax Liquid on Weight Gain and Feed Conversion**



* P <0.05 compared to control

Fig 2: **% Heterophil Phagocytic Activity Before and After Celmanax Liquid Use**



* P<0.05 compared to control

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***Fig 3*: Effect of Celmanax Liquid on NDV Titer**

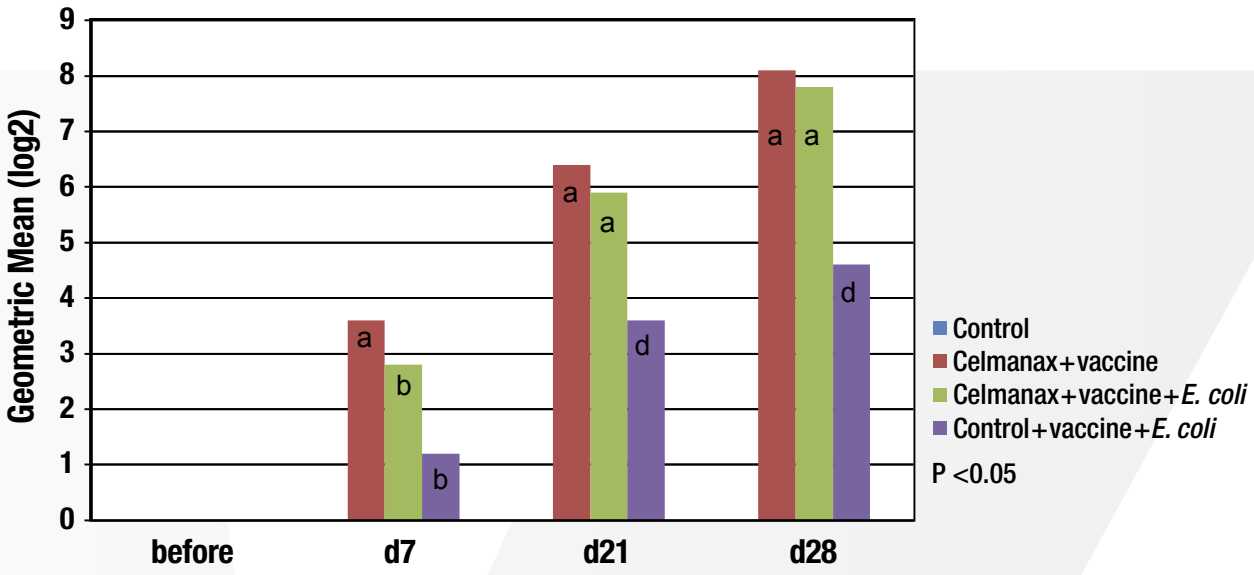

***Table1*: Re-isolation of *E. coli* from organs**

Treatment	Morbidity %	Mortality %	Liver	Spleen	Heart	Caecum
Control	0	0	0/10	2/10	2/10	4/10
Celmanax+vaccine	0	0	0/10	0/10	0/10	1/10
Celmanax+vaccine+*E. coli*	20	0	0/10	0/10	1/10	2/10
Control+*E. coli*	80	30	10/10	10/10	8/10	10/10

The morbidity and mortality data is shown in Table 1. Morbidity was observed in chicks infected with *E. coli*. However, only 20% chicks were morbid in the *E. coli* + Celmanax group compared to 80% morbidity in *E. coli* only group. No mortality was recorded in the *E. coli* + Celmanax group where as 30% mortality was recorded for the *E. coli* only group. *E. coli* was re-isolated from various internal organs in 10% of the birds from *E. coli* + Celmanax group verses from >90% birds in the *E. coli* only group.

Conclusions: Supplementation of Celmanax Liquid significantly improved performance resulting in 253 g heavier birds at the end of the trial compared to control birds. Additionally, by modulating the cellular immunity, Celmanax Liquid reduced morbidity and mortality in birds infected with *E. coli* compared to infected birds.

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