



**ANTIBODY RESPONSE OF BROILER CHICKENS FED DIETS CONTAINING YEAST
SINGLE CELL AS REPLACEMENT OF SOYBEAN MEAL AGAINST NEWCASTLE
DISEASE**

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ABSTRACT

A study was conducted to evaluate the effect of replacement of soya bean meal with yeast single cell protein on broiler antibody titer against Newcastle disease virus (NDV). A total of 120 chicks out of 150 chicks were selected randomly and were grouped as; YSCP-0, YSCP-5, YSCP-10 and YSCP-15 having 0, 5, 10, and 15% replacement of soybean meal with yeast single cell protein (YSCP), respectively. Each group had 3 replicates of 10 chicks each. The trial was continued for 35 days after a week of adaptation period. No significant effect was observed on antibody titre against NDV in all the groups. From outcomes of the present study it is concluded that yeast single cell protein should not be used or tried as a replacement meal for soybean meal in broiler chicks to enhance immunity against NDV.

KEYWORDS: Soybean Meal, Yeast, Single Cell Protein, Newcastle Disease Virus, Antibody Titre.

I. INTRODUCTION

Poultry industry is one of the largest industries in Pakistan with annual growth rate of 15-20%, thus having important position in the economy.^[1] Poultry is a very gainful business, due to high demand for poultry products such as meat and eggs, which contain all the essential nutrients and a good source of cheaper protein.^[2] One of the major problems is the high cost of feed. In poultry production feed cost usually ranges between 65-75% of the total production cost^[3], and this share has increased over the time.

A possible way of increasing the supply of poultry products is to reduce the cost of production through the use of cheaper and other unconventional feed ingredients in place of costly fish meal and imported soybean meal.^[4] One of the alternate and unconventional source of protein is the single cell protein (SCP), which is the dried microbial mass or total protein extracted from cultivated microbial biomass (Algae, bacteria, fungi and yeast) on various substrates. Yeast is one of best microorganism for production of single cell protein because of its high nutritional quality and can be put side by side with animal proteins.^[5] Yeasts have a balance proportion of amino acids, B-complex vitamins and also having probiotic properties therefore more suitable for poultry feed.^[6] The objective of the study was to investigate the effect of yeast SCP on the antibody titer against Newcastle disease (ND) in broilers.

II. MATERIALS AND METHODS

The research was carried out at the poultry farm Department of Poultry science, Faculty of Animal Husbandry and Veterinary Sciences, University of Agriculture Peshawar.

2.1 Experimental design

A sum of 150, day-old broiler chicks were obtained from the local market in June, 2012. Out of them 120 chicks were randomly selected and were grouped as; YSCP-0, YSCP-5, YSCP-10 and YSCP-15 having 0, 5, 10, and 15% replacement of soybean meal with yeast single cell protein (YSCP) respectively. Each group was divided into three replicates of 10 chicks each. Starter and finisher rations were prepared in mash form and formulated to meet the requirement of growing broiler chicks recommended by the.^[7] Adaptation period was from 0-7 days of age while experimental period was from 8-42 days of age.

Table. 1. Proposed layout for experiment.

Groups	Level of yeast single cell protein (%) in feed	Replicates R1 R2 R3
YSCP-0	0 (Control)	10 10 10
YSCP-5	5	10 10 10
YSCP-10	10	10 10 10
YSCP-15	15	10 10 10

YSCP=Represents yeast single cell protein; 0-15= 0 to 15% replacement of soybean meal

2.2 Antibody titer

Blood samples were taken on 14, 21, 28 and 35th day for the determination of antibody titer against Newcastle disease (ND). Hemagglutination inhibition (HI) test^[8] was used to determine the antibody titer.

2.3 Data analysis

The analyses of the recorded data were carried out through standard procedure of analysis of variance (ANOVA) in completely randomized design (CRD) and means were compared by least significant difference (LSD).^[9] The statistical package^[10] was applied to complete the data analysis. Statistical model: $Y_{ij} = \mu + \alpha_j + E_{ij}$

Where

Y_{ij} = yield or response variable subjected to i th chick and j th treatment, yield comprises weight gain, feed intake feed conversion ratio, dressing percentage, weight of visceral organs, antibody titre against ND, digestibility of DM and OM

μ = Population mean, Common to all observations.

α_j = Treatment effect. Treatment comprises replacement of 0, 5, 10 and 15% soybean meal with yeast single cell protein.

E_{ij} is normally distributed with zero mean and constant variance. δ^2 i.e $E_{ij} \sim N(0, \delta^2)$.

III. RESULTS

3.1 Antibody titer

Mean antibody titre against Newcastle disease (ND) using different levels of yeast single cell protein as a replacement of soybean meal is presented in Table 12. There was no significant ($P > 0.05$) effect among the different feeding groups at all recorded stages. Numerically antibody titer to Newcastle disease was lower in control group as compared to those fed with YSCP.

Table. 2: Effect of replacement of soybean meal with yeast single cell protein on mean antibody titer against Newcastle disease in broiler chicks.

Group	Day-14		Day-21		Day-28		Day-35	
	Mean \pm SE	P-value						
YSCP-0	4.3 \pm 0.33	0.957	4.3 \pm 0.33	0.452	2.7 \pm 0.33	0.182	3.7 \pm 0.33	0.339
YSCP-5	4.7 \pm 0.66		5.0 \pm 0.57		6.0 \pm 1.52		4.3 \pm 0.33	
YSCP-10	4.7 \pm 0.33		4.7 \pm 0.88		5.3 \pm 0.88		4.0 \pm 0	
YSCP-15	4.7 \pm 0.66		5.7 \pm 0.33		4.7 \pm 0.88		4.7 \pm 0.66	

YSCP= yeast single cell protein levels; 0-15% replacement of soybean meal

IV. DISCUSSION

4.1 Antibody titre against Newcastle disease (ND)

There was no significant effect of yeast on antibody titre against ND virus but numerical value was high for the yeast treated groups as compared to the control. Yeast cell wall contains mannan-oligosaccharide and mannan-proteins which not only improve performance of the broilers but also improve immunity.^[11] Yeast cell wall also contain 1, 3, 1-6 B-glucan that improved immunity.^[12] Oligosaccharide in yeast cell wall binds to virus and increase the efficacy of vaccines to provoke antibody response in yeast treated birds.^[13]

Some previous researchers also observed no effect on antibody response against ND virus in broiler chicks fed with diet containing yeast cells or its cell wall components^[14,15,16] at the rate of 2 to 10 g/kg of diet. Contrary to these results, yeast culture at 7.5g/kg in the diet increased antibody titre to ND virus.^[17,18] also reported similar findings that yeast mannan-oligosaccharide increases antibody titre to Newcastle disease virus. The variations in findings may be due to genomics of the birds, type of vaccines used and the physiological status of the birds.

V. CONCLUSIONS

1. Replacement of soybean meal with yeast single cell protein at the level of 15% in broiler diets showed no effect on mortality.

2. Antibody titre against Newcastle disease (ND) was not effected by replacement of soybean meal with yeast single cell protein in broiler chicks.

VI. RECOMMENDATION

Further studies are recommended to investigate the potential for replacing costive feed stuff with cheap one keeping in view the overall production and performance of birds in mind.

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