

## EFFECT OF PROBIOTIC SUPPLEMENTED DIETS ON THE PERFORMANCE OF BROILER CHICKENS DURING THE RAINY SEASON

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### ABSTRACT

This study was conducted to determine the effect of probiotic (*Saccharomyces cerevisiae*) supplemented diets on the performance of broilers chickens during the rainy season. Two hundred and fifty five broilers chickens were randomly allotted to five treatments in a complete randomize design (CRD) with three replicate per treatment, each replicate having 17 birds. *Saccharomyces cerevisiae* was included at 0%, 0.25%, 0.5%, 0.75% and 1% respectively. Feed intake was measured weekly and the birds were weighed once weekly. Data obtained from the study were subjected to Analysis of Variance and significances differences among treatment means were compared using the Duncan test. All parameters (final body weight, body weight gain, average daily gain, total feed intake, average feed intake and feed conversion ratio) measured show significance ( $P < 0.05$ ) difference. In conclusion, inclusion of baker's yeast in broilers diet improved growth performance of broiler chickens.

**Keywords:** Probiotics, broiler chickens, growth performance.

### INTRODUCTION

Probiotics is defined as "a live microbial feed supplement which beneficially affects the host animal by improving its intestinal microbial balance" (Fuller 1989). Over the last several years considerable attention has been given to the use of probiotics and other natural feed additives in poultry feed. Much of this interest has been generated because of increased public awareness and objection to the use of antibiotic as a growth promoter (Al-Homidan and Fahmy, 2007). Intestinal function is affected by diets fed to the animal and also the season of production, many kinds of natural substances such as prebiotics and probiotics have been supplemented to broilers to increase production by activating intestinal function, but there is limited information about the effect of different seasons on the performance of broilers supplemented with *Saccharomyces cerevisiae* as a probiotic in the tropics. The basis of this study was to investigate the effect of baker's yeast (*saccharomyces cerevisiae*) supplementation as probiotic in broiler chickens diet during the rainy season.

### MATERIALS AND METHODS

The study was conducted at the Skills Acquisition and Development Centre of National Agricultural Extension and Research Liaison Services, Ahmadu Bello University, Zaria. The institute is located within the Northern Guinea Savannah Zone of Nigeria at latitude 11° 09' 06" N and longitude 7° 38' 55" E, at an altitude of 706m above sea level (GPS, 2014). The area has an average annual rainfall of 1100mm, which starts from late April or early May to mid-October. The mean maximum temperature varies from 26°C to 35°C depending on the season, while the mean relative humidity during rainy season is 72% (Akpa *et al.*, 2002). Five experimental diets were formulated to meet the nutrient requirement of broilers. Diet 1 served as the control while diets 2, 3, 4, and 5 contain 0.25, 0.50, 0.75 and 1.00% *Saccharomyces cerevisiae*, respectively. The composition of the diets for starter phase is shown in Table 1 while that of finisher phase is shown in Table 2. Two hundred and fifty-five (225), 1-day-old broiler chicks of Ross white strain were used for this study. The design of the experiment was a completely randomize design. The average weight of the birds was recorded then the birds were randomly divided into five treatments of 45 chicks each. Each group was subdivided into 3

replicate pens of 15 chicks each. The birds were reared in deep litter system under strict managerial and hygienic conditions. Feed and water was provided *ad libitum* during the experimental period. The first treatment (T1) was used as the control and fed the starter and finisher basal diet; the second (T2), third (T3) fourth (T4) and fifth (T5) treatments were fed the basal diet supplemented with 0.5, 1.0, 1.5 and 2.0% of a commercial dry yeast (*Saccharomyces cerevisiae*), respectively. All diets were formulated to meet the nutrient requirements of the chicks. Vaccines against Newcastle and Gomboro diseases were given following the vaccination schedule of the study area. Anti-stress was given to the birds after each vaccination. Feed consumption and body weight of the birds were recorded weekly. Body weight gain was calculated as the difference between the final weight and the initial weight. Feed conversion was calculated as the ratio between feed intake and weight gain.

#### Statistical analysis

Data obtained from all the experiments were subjected to the analysis of variance (ANOVA) using the General Linear Model procedure of (SAS, 2001). Significant differences among treatment means were separated using the Duncan's Multiple Range Test in the SAS, version 9.0 package.

### RESULT AND DISCUSSION

Table 3 shows the effect of inclusion of *saccharomyces cerevisiae* in the diet of broilers on growth performance during the starter phase. Significant differences ( $P < 0.05$ ) were observed for all the measured parameters (final body weight, body weight gain, daily gain, total feed intake, average feed intake and feed conversion ratio) measured. T<sub>4</sub> had the best final body weight although not statistically different from T<sub>5</sub>. T<sub>5</sub> recorded the best (2.05) feed conversion ratio among the dietary treatments.

Table 4 shows the effect of inclusion of *Saccharomyces cerevisiae* in the diet of broilers on growth performance at finisher phase. The result shows significance ( $P < 0.05$ ) differences for all the measured parameters. T<sub>5</sub> had the best performance in terms of final body weight and feed conversion ratio. Birds fed the control diet consumed more feed (2675.5g) compared to other treatment groups.

The result of this study is also in line with the report by kabir *et al* (2004) who reported high weight gain in bird fed with probiotic supplemented diet. This could be as a result of the microbes present in probiotic which would secrete some enzymes (amylase, protease and lipase) which would enhance the catalytic activities of the endogenous enzymes and then help to improve the growth performance of the birds. Also the best weight observed in T<sub>5</sub> could be due to digestive tract activity whereby *Saccharomyces cerevisiae* in the gut inhibit the growth of pathogenic microbes by increasing acidity of the intestinal contents thereby providing a pathogenic free intestinal medium for proper functioning of endogenous enzymes to breakdown the energy nutrients of the experimental rations thus in turn improve body weight gain and feed conversion ratio (Altaf-Ur-Rahman, 2007).

### CONCLUSION

It is concluded from the study poultry farmers should include 1.0%/100kg of *Saccharomyces cerevisiae* in broilers diet for better growth performance.

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**Table 1 Composition of Broiler Starter Diets Containing Varying Levels of *Saccharomyces Cerevisiae* (SC) (1-4weeks).**

| Ingredients    | Treatments    |               |               |               |               |
|----------------|---------------|---------------|---------------|---------------|---------------|
|                | 1<br>SC 0.0%  | 2<br>SC 0.25% | 3<br>SC 0.50% | 4<br>SC 0.75% | 5<br>SC 1.00% |
| Maize          | 50.66         | 50.63         | 50.60         | 50.55         | 50.52         |
| Groundnut cake | 25.31         | 24.81         | 24.31         | 23.82         | 23.32         |
| Soya cake      | 12.59         | 12.59         | 12.59         | 12.59         | 12.59         |
| Palm oil       | 3.69          | 3.72          | 3.75          | 3.79          | 3.82          |
| Limestone      | 0.90          | 0.90          | 0.90          | 0.90          | 0.90          |
| Bone meal      | 2.75          | 2.75          | 2.75          | 2.75          | 2.75          |
| Common Salt    | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Premix**       | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Lysine         | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Methionine     | 0.20          | 0.20          | 0.20          | 0.20          | 0.25          |
| <b>Total</b>   | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> |

**Table 2 Composition of Broiler Finisher Diets Containing Varying Levels of *Saccharomyces Cerevisiae* (SC) (5-8 weeks).**

| Ingredients    | Treatments    |               |               |               |               |
|----------------|---------------|---------------|---------------|---------------|---------------|
|                | 1<br>SC 0.0%  | 2<br>SC 0.25% | 3<br>SC 0.50% | 4<br>SC 0.75% | 5<br>SC 1.00% |
| Maize          | 57.52         | 57.52         | 57.52         | 57.52         | 57.52         |
| Groundnut cake | 11.67         | 11.17         | 10.67         | 10.17         | 9.67          |
| Soya cake      | 20.00         | 20.00         | 20.00         | 20.00         | 20.00         |
| Palm oil       | 2.81          | 2.81          | 2.81          | 2.81          | 2.81          |
| Limestone      | 1.10          | 1.10          | 1.10          | 1.10          | 1.10          |
| Bone meal      | 2.80          | 2.80          | 2.80          | 2.80          | 2.80          |
| Common Salt    | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Premix**       | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Lysine         | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Methionine     | 0.20          | 0.20          | 0.20          | 0.20          | 0.20          |
| <b>Total</b>   | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> |

immune response in broilers. *International Journal of Poultry Science*, 3:361-364.

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**Table 1 Composition of Broiler Starter Diets Containing Varying Levels of *Saccharomyces Cerevisiae* (SC) (1-4weeks).**

| Ingredients    | Treatments    |               |               |               |               |
|----------------|---------------|---------------|---------------|---------------|---------------|
|                | 1<br>SC 0.0%  | 2<br>SC 0.25% | 3<br>SC 0.50% | 4<br>SC 0.75% | 5<br>SC 1.00% |
| Maize          | 50.66         | 50.63         | 50.60         | 50.55         | 50.52         |
| Groundnut cake | 25.31         | 24.81         | 24.31         | 23.82         | 23.32         |
| Soya cake      | 12.59         | 12.59         | 12.59         | 12.59         | 12.59         |
| Palm oil       | 3.69          | 3.72          | 3.75          | 3.79          | 3.82          |
| Limestone      | 0.90          | 0.90          | 0.90          | 0.90          | 0.90          |
| Bone meal      | 2.75          | 2.75          | 2.75          | 2.75          | 2.75          |
| Common Salt    | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Premix**       | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Lysine         | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Methionine     | 0.20          | 0.20          | 0.20          | 0.20          | 0.25          |
| <b>Total</b>   | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> |

**Table 2 Composition of Broiler Finisher Diets Containing Varying Levels of *Saccharomyces Cerevisiae* (SC) (5-8 weeks).**

| Ingredients    | Treatments    |               |               |               |               |
|----------------|---------------|---------------|---------------|---------------|---------------|
|                | 1<br>SC 0.0%  | 2<br>SC 0.25% | 3<br>SC 0.50% | 4<br>SC 0.75% | 5<br>SC 1.00% |
| Maize          | 57.52         | 57.52         | 57.52         | 57.52         | 57.52         |
| Groundnut cake | 11.67         | 11.17         | 10.67         | 10.17         | 9.67          |
| Soya cake      | 20.00         | 20.00         | 20.00         | 20.00         | 20.00         |
| Palm oil       | 2.81          | 2.81          | 2.81          | 2.81          | 2.81          |
| Limestone      | 1.10          | 1.10          | 1.10          | 1.10          | 1.10          |
| Bone meal      | 2.80          | 2.80          | 2.80          | 2.80          | 2.80          |
| Common Salt    | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Premix**       | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Lysine         | 0.30          | 0.30          | 0.30          | 0.30          | 0.30          |
| Methionine     | 0.20          | 0.20          | 0.20          | 0.20          | 0.20          |
| <b>Total</b>   | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> | <b>100.00</b> |

**Table 3 Effect of inclusion of *Saccharomyces cerevisiae* in the diet of broilers on growth performance (0-4wks)**

| Parameters               | Dietary Treatments   |                      |                      |                      |                      | SEM   |
|--------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-------|
|                          | T <sub>1</sub>       | T <sub>2</sub>       | T <sub>3</sub>       | T <sub>4</sub>       | T <sub>5</sub>       |       |
| Initial body weight (g)  | 41.18                | 41.18                | 41.18                | 41.18                | 41.18                |       |
| Final body weight (g)    | 524.51 <sup>b</sup>  | 526.47 <sup>b</sup>  | 565.68 <sup>a</sup>  | 579.41 <sup>a</sup>  | 578.43 <sup>a</sup>  | 17.85 |
| Body weight gain (g)     | 483.33 <sup>b</sup>  | 485.29 <sup>b</sup>  | 524.50 <sup>a</sup>  | 538.23 <sup>a</sup>  | 537.25 <sup>a</sup>  | 17.85 |
| Av daily gain (g)        | 28.43 <sup>b</sup>   | 28.55 <sup>b</sup>   | 30.85 <sup>a</sup>   | 31.94 <sup>a</sup>   | 31.60 <sup>a</sup>   | 1.03  |
| Total Feed Intake(g)     | 1133.74 <sup>b</sup> | 1121.35 <sup>b</sup> | 1094.68 <sup>b</sup> | 1375.29 <sup>a</sup> | 1092.14 <sup>b</sup> | 43.18 |
| Average Feed Intake(g/d) | 66.69 <sup>b</sup>   | 65.96 <sup>b</sup>   | 64.39 <sup>b</sup>   | 80.90 <sup>a</sup>   | 64.24 <sup>b</sup>   | 2.54  |
| FCR                      | 2.35 <sup>a</sup>    | 2.31 <sup>ab</sup>   | 2.10 <sup>b</sup>    | 2.58 <sup>a</sup>    | 2.05 <sup>b</sup>    | 0.12  |

<sup>abc</sup>: Means with different superscripts along same rows show significant differences (P<0.05)  
SEM: Standard Error of Means,

**Table 4 Effect of inclusion of *Saccharomyces cerevisiae* in the diet of broilers on growth performance (5-8wks)**

| Parameters               | Dietary Treatments   |                       |                       |                      |                      | SEM    |
|--------------------------|----------------------|-----------------------|-----------------------|----------------------|----------------------|--------|
|                          | T <sub>1</sub>       | T <sub>2</sub>        | T <sub>3</sub>        | T <sub>4</sub>       | T <sub>5</sub>       |        |
| Initial body weight (g)  | 579.41               | 579.41                | 579.41                | 579.41               | 579.41               |        |
| Final body weight (g)    | 1545.10 <sup>c</sup> | 1701.96 <sup>bc</sup> | 1662.74 <sup>bc</sup> | 1721.57 <sup>b</sup> | 1788.24 <sup>a</sup> | 30.66  |
| Body weight gain (g)     | 995.09 <sup>c</sup>  | 1151.96 <sup>b</sup>  | 1112.73 <sup>b</sup>  | 1171.57 <sup>b</sup> | 1238.23 <sup>a</sup> | 30.66  |
| Av daily gain (g)        | 58.54 <sup>c</sup>   | 67.76 <sup>b</sup>    | 65.46 <sup>b</sup>    | 68.92 <sup>b</sup>   | 72.84 <sup>a</sup>   | 1.80   |
| Total Feed Intake(g)     | 2675.5 <sup>a</sup>  | 2423.5 <sup>ab</sup>  | 2425.5 <sup>ab</sup>  | 2240.2 <sup>b</sup>  | 2133.3 <sup>b</sup>  | 132.17 |
| Average Feed Intake(g/d) | 157.38 <sup>a</sup>  | 142.56 <sup>ab</sup>  | 142.68 <sup>ab</sup>  | 131.78 <sup>b</sup>  | 125.49 <sup>b</sup>  | 7.78   |
| FCR                      | 2.68 <sup>a</sup>    | 2.10 <sup>bc</sup>    | 2.19 <sup>b</sup>     | 1.91 <sup>c</sup>    | 1.72 <sup>c</sup>    | 0.11   |

<sup>abc</sup>: Means with different superscripts along same rows show significant differences (P<0.05)  
SEM: Standard Error of Means