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Effect of *Saccharomyces Cerevisiae* Supplementation on Growth Performance of Broiler Chickens

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Abstract
The present experiment was conducted to evaluate the effect of dietary supplementation of *Saccharomyces cerevisiae* on the growth performance of broiler chickens. A total of 120-day-old Cobb-400 broiler chicks were randomly allotted to four dietary treatments with five replications of six birds each. The treatments consisted of T_0 (control, basal diet), T_1 (basal diet + 1% yeast), T_2 (basal diet + 1.5% yeast), and T_3 (basal diet + 2% yeast). The feeding trial lasted for 42 days under uniform managemental conditions.
Results indicated that yeast supplementation significantly (P<0.05) influenced growth performance. Birds in T_2 recorded the highest final body weight (2439.96 g) and the most efficient FCR (1.90), followed by T_1 (2410.24 g, FCR 1.91). Control (T_0) and T_3 (2% yeast) showed comparatively lower performance. It was concluded that supplementation of *Saccharomyces cerevisiae* at 1.5% optimizes broiler growth and feed efficiency.

Keywords: Broiler, *Saccharomyces cerevisiae*, growth performance, feed intake, feed conversion ratio

Introduction
Poultry production is one of the most dynamic and rapidly expanding sectors of animal agriculture worldwide, playing a pivotal role in providing affordable and high-quality animal protein to meet the nutritional demands of a growing population. Broiler meat, in particular, has emerged as a preferred source of protein because of its relatively low cost, short production cycle, and wide consumer acceptance. In developing countries like India, poultry farming also contributes significantly to rural employment, income generation, and food security. In recent decades, the poultry industry has faced increasing challenges associated with intensive production systems, including disease outbreaks, environmental stressors, and fluctuating feed costs. Traditionally, antibiotic growth promoters (AGPs) were widely incorporated into poultry diets to enhance growth rate, improve feed efficiency, and reduce disease incidence. However, the routine use of antibiotics has raised global concerns due to the emergence of antimicrobial resistance, transfer of resistant genes, and potential residues in poultry products. As a result, there is growing consumer demand and regulatory pressure to reduce or eliminate AGPs from poultry production systems. This scenario has led to the search for safe and natural alternatives that can sustain or improve broiler performance while ensuring food safety and animal welfare. Among the various alternatives explored, probiotics, prebiotics, organic acids, plant extracts, and yeast-based products have attracted considerable attention. Yeast and yeast-derived products, particularly *Saccharomyces cerevisiae*, have been studied extensively for their potential as natural feed additives. Yeast cells contain high-quality proteins, essential amino acids, vitamins, minerals, mannan oligosaccharides (MOS), and β-glucans, which are known to enhance nutrient digestibility, stabilize intestinal microflora, improve immune response, and promote gut health. Additionally, yeast supplementation has been associated with reduced pathogenic bacterial load, better feed conversion efficiency, and improved carcass yield. Several experimental studies have demonstrated the positive influence of *S. cerevisiae* on broiler growth performance. Onifade *et al.* (1999) [4] reported improved weight gain and feed utilization with yeast supplementation. Santin *et al.* (2001) [6] observed enhanced immune response and nutrient absorption in broilers fed yeast culture.

Mountzouris *et al*. (2007) [3] highlighted its role in modulating gut microbial ecology, while Paryad and Mahmoudi (2008) [5] reported significant improvement in feed efficiency and growth performance with optimal inclusion levels of yeast. Nevertheless, the reported outcomes are not always consistent, as the magnitude of response varies depending on strain, dosage, diet composition, management conditions, and bird genotype. In particular, the optimum level of supplementation that yields maximum growth and feed efficiency benefits remains to be clarified.

Considering these aspects, the present investigation was undertaken to evaluate the effect of dietary supplementation of *Saccharomyces cerevisiae* at three different inclusion levels (1.0%, 1.5%, and 2.0%) on the growth performance of broiler chickens under controlled experimental conditions.

Materials and Methods

Experimental Site and Birds

The experiment was carried out at the Poultry Unit, Division of Animal Husbandry and Dairy Science, College of Agriculture, Dhule, Maharashtra. A total of 120-day-old Cobb-400 broiler chicks of uniform body weight were procured from a commercial hatchery. The chicks were wing-banded, weighed individually, and randomly allotted to four dietary treatments.

Experimental Design and Treatments

The trial was conducted using a completely randomized design (CRD) with four treatments and five replicates per treatment, each replicate comprising six birds. The treatments were as follows:

T_0: Control diet (basal diet without yeast supplementation)
T_1: Basal diet + 1.0% *Saccharomyces cerevisiae*
T_2: Basal diet + 1.5% *Saccharomyces cerevisiae*
T_3: Basal diet + 2.0% *Saccharomyces cerevisiae*

Diets were formulated according to the Bureau of Indian Standards (BIS, 1992) specifications for broilers to meet nutrient requirements during starter (0-21 days) and finisher (22-42 days) phases. Feed and water were provided ad libitum throughout the experimental period.

Management Practices

All chicks were reared under deep litter housing conditions with uniform management. Standard vaccination schedules were followed. Brooding temperature, ventilation, and lighting were maintained as per recommended practices. Mortality was recorded daily, and strict hygiene was maintained during the trial period.

Data Collection

Weekly body weight was recorded on a replicate basis to monitor growth. Feed intake was measured as the difference between feed offered and feed residue at weekly intervals. Feed conversion ratio (FCR) was calculated as the ratio of feed consumed to body weight gain.

Statistical Analysis

The experimental data were subjected to one-way analysis of variance (ANOVA) as per the procedure of Snedecor and Cochran (1994). Treatment means were compared using the Critical Difference (CD) test at a 5% probability level.

Results

The growth performance of broiler chickens as influenced by dietary supplementation of *Saccharomyces cerevisiae* was evaluated in terms of weekly body weight changes, cumulative feed intake, and feed conversion ratio. The observations are summarized in Tables 1-3 and corresponding graphical trends are depicted in Figures 1-3.

Weekly body weight changes

The effect of yeast supplementation on body weight is presented in *Table 1* and *Figure 1*. Initial body weights were comparable across treatments (44.4-44.6 g), indicating uniformity at the beginning of the trial. No significant differences were observed up to the second week. From the third week onwards, significant variation was noted, with birds in T_2 (1.5% yeast) recording consistently higher weights than the control and other supplemented groups. At the sixth week, T_2 achieved the highest body weight (2439.96 g), followed by T_1 (2410.24 g), the control (2378.85 g), and T_3 (2342.70 g). These results demonstrate that yeast supplementation at 1.5% improved growth performance in broilers.

Table 1: Effect of supplementation of *Saccharomyces cerevisiae* on body weight changes of broilers (g)

Weeks	T_0 (Control)	T_1 (1%)	T_2 (1.5%)	T_3 (2%)	SE of Mean	CD @ 5%
Birth weight	44.650	44.595	44.533	44.425	0.39	NS
First week	189.560	189.072	189.271	188.880	0.41	NS
Second week	428.836	428.348	429.057	427.106	0.33	1.00
Third week	740.178	751.124	756.756	720.626	0.27	0.82
Fourth week	1220.018	1245.462	1265.614	1200.802	0.25	0.75
Fifth week	1790.172	1820.102	1848.112	1770.300	0.08	0.25
Sixth week (Final)	2378.850	2410.240	2439.962	2342.696	0.20	0.62

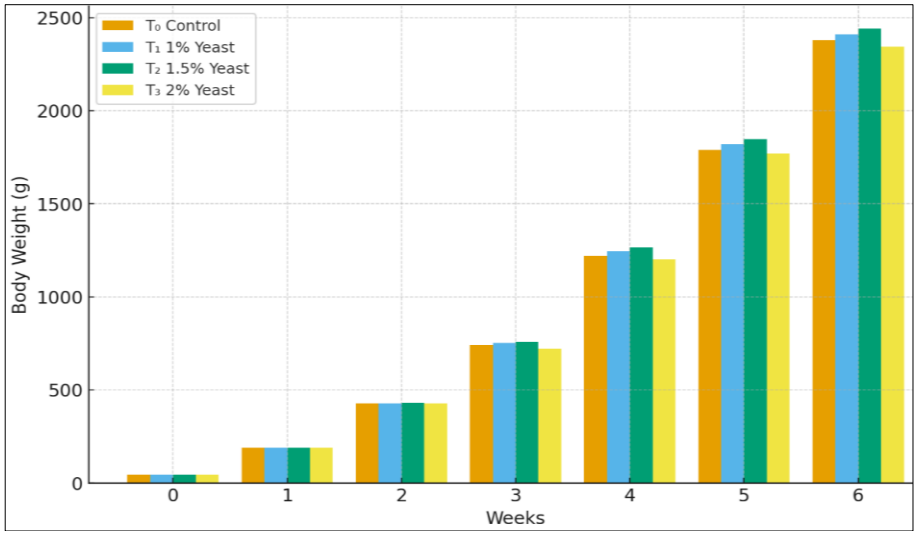

Fig 1: Weekly body weight of broilers under different treatments.

Cumulative feed intake

Cumulative feed intake across treatments is shown in *Table 2* and *Figure 2*. During the first four weeks, differences among groups were statistically non-significant. By the fifth week, significant variation was observed, with T_2 recording the highest intake (2850.21 g) and T_3 the lowest (2823.28 g). A similar trend persisted until the sixth week, where T_2 consumed 3976.30 g compared with 3926.02 g in T_3, while the control and T_1 remained intermediate. Although differences were marginal, the higher feed intake in T_2 corresponded with superior body weight gain.

Table 2: Effect of supplementation of *Saccharomyces cerevisiae* on cumulative feed intake of broilers

Weeks	T_0	T_1	T_2	T_3	SE of Mean	CD @ 5%
First	164.34	165.09	164.50	161.44	1.10	NS
Second	517.40	517.45	517.09	512.13	3.08	NS
Third	964.08	962.94	963.37	951.71	3.43	NS
Fourth	1792.81	1792.38	1795.62	1779.62	3.94	NS
Fifth	2838.69	2839.43	2850.21	2823.28	3.64	10.9
Sixth (Final)	3963.38	3964.81	3976.30	3926.02	3.62	10.86

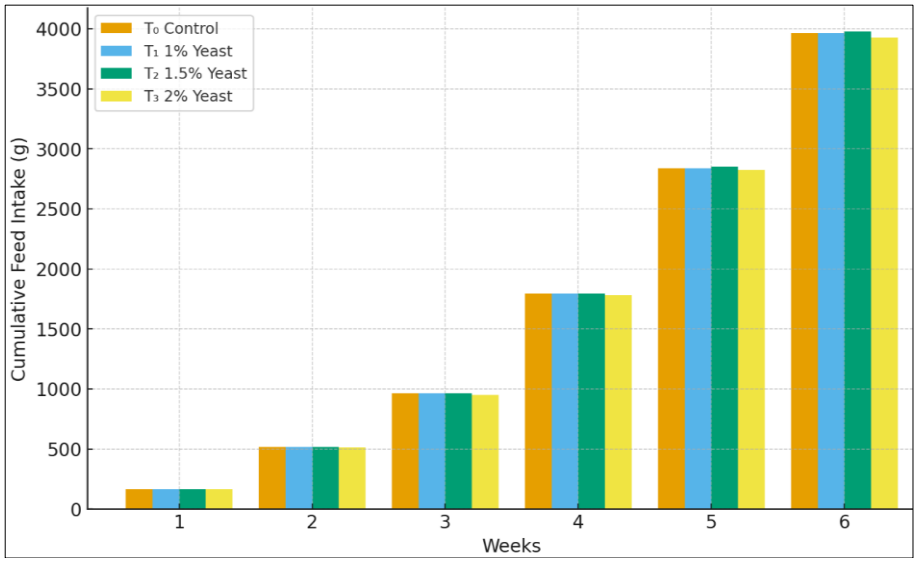

Fig 2: Weekly Cumulative Feed Intake of Broilers

Feed conversion ratio

Weekly FCR values are summarized in *Table 3* and *Figure 3*. During the initial two weeks, no significant differences were detected among treatments (1.12-1.48). From the third week onwards, T_2 exhibited superior feed efficiency, with significantly lower. FCR (1.36 at week 3 and 1.64 at week 4) compared with other treatments. By the end of the sixth week, the most efficient FCR was observed in T_2 (1.90), followed by T_1 (1.91), while the least efficient was in T_3 (1.93). These findings indicate that supplementation of *S. cerevisiae* at 1.5% optimized feed utilization in broilers.

Table 3: Effect of supplementation of *Saccharomyces cerevisiae* on feed conversion ratio of broilers

Weeks	T_0	T_1	T_2	T_3	SE of Mean	CD @ 5%
First	1.13	1.14	1.14	1.12	0.0074	NS
Second	1.48	1.47	1.47	1.47	0.0096	NS
Third	1.43	1.38	1.36	1.50	0.0055	0.016
Fourth	1.73	1.68	1.64	1.72	0.0029	0.0087
Fifth	1.83	1.82	1.81	1.83	0.0020	0.0070
Sixth (Final)	1.91	1.91	1.90	1.93	0.0010	0.0030

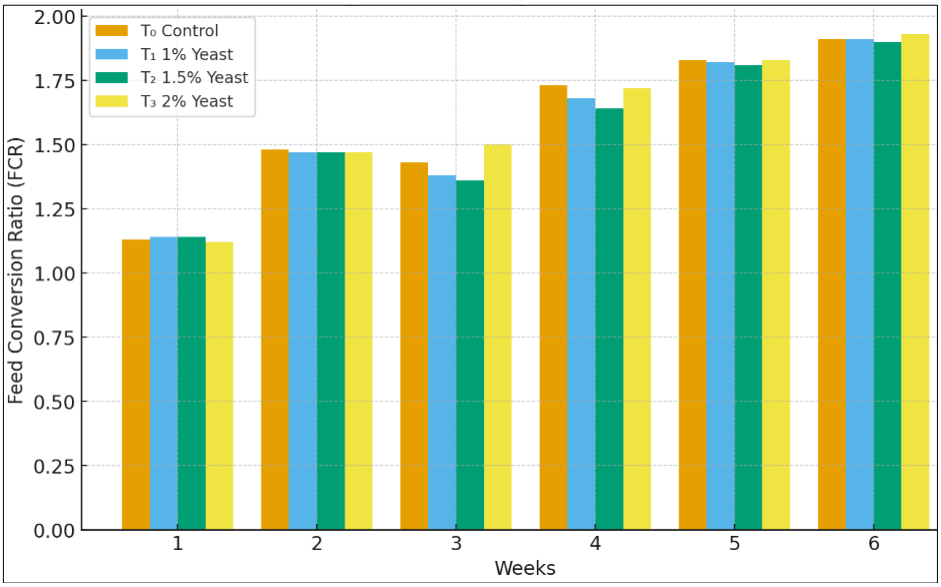

Fig 3: Weekly FCR of broilers

Discussion

The results clearly demonstrated that supplementation of *Saccharomyces cerevisiae* influenced the growth performance of broilers, with the most consistent improvements observed at the 1.5% level (T_2).

Body weight gain was significantly higher in T_2 compared to control and other treatments. Feed intake was slightly higher in T_2, though differences were mostly non-significant in early weeks. The improved feed conversion ratio in T_2 indicates that nutrients were more efficiently converted into body mass. These findings agree with earlier reports by Onifade *et al*. (1999), Santin *et al*. (2001), Paryad and Mahmoudi (2008), and Gao *et al*. (2008) [4, 5, 2], who observed similar improvements in broiler performance with yeast supplementation. In contrast, excessive supplementation at 2% (T_3) reduced performance, which supports Zhang *et al*. (2005).

Conclusion

Supplementation of *Saccharomyces cerevisiae* at 1.5% significantly improved the growth performance and feed efficiency of broilers, while higher supplementation at 2% was less effective. It is therefore recommended to include yeast at 1.5% in broiler diets to enhance productivity and sustainability.

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