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# The Effects of *Saccharomyces cerevisiae* and Flavomycin on Broiler Growth Performance

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**Abstract:** Ninety days old commercial broilers (Ross PM-3) were used in a completely randomized design to study the effect of *Saccharomyces cerevisiae* and flavomycin on growth performance of broiler chicks. Three treatments (30 replicates) utilized were (1) control, (2) *Saccharomyces cerevisiae* and (3) flavomycin. A significant increase in gain of birds was observed in birds fed *Saccharomyces cerevisiae* group in 5 th and flavomycin group on 28 th and 35 th days ($P<0.05$). Feed consumption of broilers during the 14 days of experiment was not different among treatments. A considerable increase in feed consumption in the treated chicks was recorded in 21st and 37th days of the experiment in flavomycin group. A similar result was found on 28 th day of the experiment in control group. Birds receiving 0.2 % *Saccharomyces cerevisiae* consumed significantly much more feed during 5th week of experiment. Body weight of broilers at 37 days age were better with flavomycin, *Saccharomyces cerevisiae* and control groups respectively ($P<0.05$).

**Key words:** Probiotic, flavomicyn, broiler, performance

## Introduction

Yeasts have been fed to animals for more than a hundred years, either in the form of yeast fermented mash produced on the farm, yeast by products from breweries or distilleries, or commercial yeast products specifically produced for animal feeding. *Saccharomyces cerevisiae,* also known as ''baker yeast'' is one of the most widely commercialized species and one of the effective adsorbent which is rich in crude protein (40-45 %) and its biological value is high and it is also rich in vitamin-B complex. Several vitamins were first extracted and characterized from yeast, including biotin, niacin, pantothenic acid, and thiamin. The quality of yeast protein is excellent for a vegetable protein and it is about equivalent in quality to soybean protein. Both are rich in lysine, and are excellent supplements to cereals, whose proteins are generally low in lysine (Reed and Nagodawithana, 1991). Also antibiotics are chemical substances that are produced by such living organisms as molds, bacteria and green plants. Some antibiotics are used to inhibit the growth of microorganisms and basically, there are two groups of naturally occurring micro-organisms functioning in the digestive system. The first group is considered beneficial or non-pathogenic, and is actually made up of several hundred different kinds of friendly bacteria (Charles and Duke, 1978). Those ingredients are used for their bacteriostatic or bactericidal properties. After a European Union ruling, only two chemicals, flavomycin and avilamycin are used to speed up the growth. Growth promoters have been used extensively in animal's feed and water all over the world especially in the poultry and pig industries (Charles and Duke, 1978). Microorganisms used in animal feeds are mainly bacterial strains belonging to different and sometimes distant genera, *e.g. Lactobacillus, Enterococcus, Pediococcus* and *Bacillus,* some of which are spore-forming. Other probiotics are microscopic fungi, including *Saccharomyces* yeasts (Guillot, 1998). Some probiotic microorganisms (*Lactobacillus* and *Enterococcus*) are normal residents in digestive tract while the others (*Bacillus, Pediococcus* and *Saccharomyces*) are absent. About 90 % of the antibiotics used in agriculture are given as growth-promoting and prophylactic agents, rather than to treat the infection. Flavomycin is an antibiotic feed additive to be used exclusively as a growth stimulant, and for the improvement of the feed conversion ratio in farm animals (Esteive *et al.*, 1997). Antibiotics have also been shown to have positive effects on increased egg production, hatchability, and shell quality in poultry (Smith *et al.*, 1985). Feed additives have shown a tendency to increase feed and water intake by animals (Charles and Duke, 1978). They may also reduce the growth of organisms that produce waste products or toxins. In present experiment efforts have been made to evaluate effects of *Saccharomyces cerevisiae* and flavomycin on broiler performance.

## Materials and Methods

Ninety male broiler chickens (3 groups of 30 birds each Ross PM-3) were obtained from a commercial hatchery, individually weighed, wing-banded, and housed in heated batteries under continuous fluorescent lighting. Chicks were reared in wire cages during a period of 37 days and fed a commercial broiler diet to meet or exceed the critical nutrient requirements (NRC, 1984). Groups were randomly assigned to following treatment groups: 1) control diet - no additives; 2 ) 2 g flavomycin / kg feed, 3) 0.2 % *Saccharomyces cerevisiae* / kg feed. Approximate gross composition of *Saccharomyces cerevisiae* (bakers yeast) was given in Table 1. Feed and water were provided for *ad libitum*. Feed consumption and individual body weight were determined weekly. At 37 days of age, the study was terminated. Statistical parameters (except feed conversion ratio) were evaluated by SPSS program, (1993). All statements of significance are based on 0.05% level of probability.

Table 1: Approximate gross composition of *Saccharomyces cerevisiae* (bakers yeast)

| | |
|---|---|
| Moisture | 2-5 (%) |
| Crude Protein | 50-52 (%) |
| True Protein | 42-46 (%) |
| Nucleic Acids | 6-8 (%) |
| Minerals | 7-8 (%) |
| Lipids | 4-7 (%) |
| Carbohydrates | 30-37 (%) |

Adapted from Reed and Nagodawithana (1991).

## Results

The effects of *Saccharomyces cerevisiae* and flavomycin on broiler performance are presented in Table 2. Body weight

Table 2: Body weight, feed consumption and feed conversion ratio of broilers receiving control and additive feed for 37 days.

| Days | 7 | 14 | 21 | 28 | 37 |
|---|---|---|---|---|---|
| **Body weight gain of broilers (g)** | | | | | |
| Groups | $\bar{x}\pm S_{\bar{x}}$ | $\bar{x}\pm S_{\bar{x}}$ | $\bar{x}\pm S_{\bar{x}}$ | $\bar{x}\pm S_{\bar{x}}$ | $\bar{x}\pm S_{\bar{x}}$ |
| Control | 123.10±3.04a | 317.66±6.07a | 642.56±13.14a | 1109.43±14.80a | 1761.20±30.98a |
| *S. cerevisiae.* | 127.30±3.38a | 318.93±5.54a | 646.33±13.23a | 1150.83±20.19ab | 1861.66±40.58b |
| Flavomycin | 129.26±3.41a | 328.40±7.46a | 671.33±12.24a | 1174.93±21.26b | 1905.00±31.19b |
| **Feed consumption of broilers (g)** | | | | | |
| Groups | $\bar{x}\pm S_{\bar{x}}$ | $\bar{x}\pm S_{\bar{x}}$ | $\bar{x}\pm S_{\bar{x}}$ | $\bar{x}\pm S_{\bar{x}}$ | $\bar{x}\pm S_{\bar{x}}$ |
| Control | 114.36±2.94a | 412.23±3.25a | 912.46±4.31ab | 1803.90±9.49b | 3160.20±7.74a |
| *S. cerevisiae.* | 116.16±2.36a | 409.10±2.33a | 906.36±3.09a | 1779.66±7.39a | 3313.76±7.52b |
| Flavomycin | 115.30±2.39a | 413.83±2.49a | 918.90±2.87b | 17953±5.54ab | 3344.00±8.97b |
| **Feed Conversion of broilers (g/g)** | | | | | |
| Groups | $\bar{x}$ | $\bar{x}$ | $\bar{x}$ | $\bar{x}$ | $\bar{x}$ |
| Control | 0.929 | 1.297 | 1.420 | 1.625 | 1.794 |
| *S. cerevisiae.* | 0.912 | 1.282 | 1.402 | 1.546 | 1.780 |
| Flavomycin | 0.892 | 1.260 | 1.368 | 1.528 | 1.755 |

[a,bc] Means within the same column with different superscripts are significantly different ($P<0.05$).

gain during the first 21 days of experimental period and was not different among treatments. Body weights were lower in birds fed control diet during the experiment. A significant increase in gain was observed in birds fed *Saccharomyces cerevisiae* on 37 $^{th}$ and flavomycin on 28 $^{th}$ and 37$^{th}$ days ($P<0.05$). Feed consumption of broilers during 2 weeks of experimental period was not different among treatments. A considerable increase in feed consumption in the treated chicks was recorded in 21st and 37 $^{th}$ day of the experiment in flavomycin group. Birds receiving 0.2 % *Saccharomyces cerevisiae* consumed significantly much feed during 37 days of experiment ($P<0.05$). Body weight of broilers at 37 $^{th}$ d age were better with flavomycin, *Saccharomyces cerevisiae* and control groups respectively ($P<0.05$).

## Discussion

Oral administration of probiotics and antibiotics to broilers has been found to produce a substantial and reproducible effect on weight gain and feed conversion (Smith *et al.*, 1985). Dietary tylosin, avoparcin and mixture of lincomycin and spectinomycin are reported to produce deleterious effects whereas flavomycin did not (Chadwick and Goode, 1997). (Esteive *et al.*, 1997) has also shown the effect of flavomycin on chickens and confirmed that flavomycin has positive effects on body weight gain. This is in agreement with the results obtained with chicks receiving 2 g/kg flavomycin improved feed utilization and body weight gain. This is also in agreement with the results of Smith *et al.* (1985). In present investigation, the data demonstrated that dietary S*accharomyces cerevisiae* and flavomycin increased in feed intake and body weight of the birds. Similar results have been reported by (Çelik *et al.*, 1997). (Raju and Devegovwda, 1996), studying broilers, had reported the increase in feed intake and higher body weight. Same results have also been reported by Burket *et al.* (1977). Barrow *et al.* (1988), has reported that probiotics for chickens are designed either to replace beneficial organisms that are not present in the alimentary tract or to provide the chicken with the effects of beneficial bacteria, by similar way the microbial flora of the alimentary tract was supported by *Saccharomyces cerevisiae* and found a significant increase in gain was observed in birds at 37th day ($P<0.05$). Burket *et al.* (1977), has reported that probiotics known as friendly bacteria, have been shown to prevent the growth of unfriendly bacteria in the intestines. Denli, (2001) and Samuel, (1995), reported an increased daily feed consumption, nitrogen, and calcium retentions and decreased intestinal lengths were observed in layers, fed probiotic feed. One of the most important ways in which a probiotic organism may exert a beneficial effect on its host is to modify the metabolic processes, particularly those occurring in the gut. It seems likely that gut bacterial activities can result in metabolites capable of modulating the activity of mucosal oxidative enzymes in the light of similar effects observed on hepatic drug metabolizing enzymes (Mac Donald *et al.*, 1984). This is consistent with earlier work reporting on rats (Klubes *et al.*, 1971). In this investigation intestinal system was not checked due to lack of technical facilities. The microbial flora of the alimentary tract can have a considerable effect on the health and performance of broilers. Disturbance of the flora could lead to detrimental effects by allowing colonization by pathogens or by growth-depressing bacteria. *Saccharomyces cerevisiae* and flavomycin are the good sources to support intestinal micro ecology of broilers.

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