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Study on the Effects of *Saccharomysec cerevisiae SC47* on Visceral and Immune Organs of Broiler Chickens

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Abstract: Yeast are fungi and Eucaryotic micro-organisms. Among yeasts, *Saccharomysec cerevisiae* is not only industrially important, but also nutritionally important as a probiotic for animals. A study was conducted to determine the effects of *Saccharomysec cerevisiae* SC47 on broiler visceral and immune organs. Four hundred one day old male Ross 308 broilers were completely randomized design to 5 treatments, with 4 replicate, 20 birds per each. The experimental diets fed at three different breeding periods (starter, grower and finisher) and using tables to nutrient requirement of poultry (NRC1994) were arranged and prepared. Experimental diets consist of basal diet as control (T1), basal diet plus 0.5% *Saccharomysec cerevisiae* (T2), basal diet plus 0.1% *Saccharomysec cerevisiae* (T3), basal diet plus 0.15% *Saccharomysec cerevisiae* (T4) and basal diet plus 0.2% *Saccharomysec cerevisiae* (T5), were fed to birds throughout 1 to 49 day breeding period. At the age of 49 day, one bird from each replicate was selected, slaughtered and then the visceral and immune organs were measured. data will be analyzed and variance by SAS software and average data will be compared by multi tolerance test of Donken in probability level of 5 percent. The results showed that *Saccharomysec cerevisiae* have significant effect on visceral (Proventriculus, Small intestine, Colon, Cecum, Lung) and Immune organs (Spleen, Gall bladder, bursa of fabricius) all traits ($p<0.05$). But, price diet did not have a statistically significant of broiler chickens.

Key words: Broiler · Chicken · Immune · Performance · Ross · *Saccharomysec cerevisiae* · Yeast

INTRODUCTION

Today, In addition to using probiotics in human nutrition, they are used in different animals as disease preventer, growth stimulator, fermentation corrector in ruminators and better breeding [1]. Probiotics are chosen bacteria and used in meat chickens to replace in animals digestive system and improve physiologic condition, gaining weight, feed conversion ratio, mortality rate decreasing [2] and protection immune organs [3]. Besides using bacteria as probiotics, yeasts and fungi are also used as probiotics in broiler nutrition [4]. The most common one is *Saccharomysec Cerevisiae* [1].

Zhang *et al.* [5], Bhatt *et al.* [6] and Bradley *et al.* [7] reported *Saccharomyces cerevisiae* causes tissue changes, improvements and development of the ileum of broiler chickens.

Santin *et al.* [8, 9] showed improved performance and activity of the *Saccharomyces cerevisiae* is the intestinal mucosa. Hogg [10] report observational disaccharidase activity of *Saccharomyces cerevisiae* in the intestinal mucosa is increased and improved absorption of carbohydrates. Khalghipour [11] showed that the *Saccharomyces cerevisiae* in carcass traits had no significant effect, but have shown significant effects on the immune response of broiler chickens. Yalcinkaya *et al.* [12] reported that *Saccharomyces cerevisiae* significant effect on pancreatic weight and carcass traits, but no significant increase in weight has bursa of fabricius.

Nazeradl & Sufisiyavash [13] reported that *Saccharomyces cerevisiae* decreased growth, animal productivity and increasing production costs. Taheri [14] and Hosseini [15] reported that *Saccharomyces cerevisiae* was a no significant effect on performance and carcass parameters. Hashemichelavy *et al.* [16] probiotics significantly improved bowel function and the relative weight of the blind.

The goal of using living microbic products in broiler food is to affect microbic actions in animal digestive system, in other words, to confirm and intensify good

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microbic actions for improving animal's growth and health [16]. This research goal is to examine using yeast in meat chickens protection immune organs and performance.

MATERIALS AND METHODS

An experiment in a completely randomized design with 5 treatments (basal diet as control (T1), basal diet plus 0.5% *Saccharomysec cerevisiae* (T2), basal diet plus 0.1% *Saccharomysec cerevisiae* (T3), basal diet plus 0.15% *Saccharomysec cerevisiae* (T4) and basal diet plus 0.2% *Saccharomysec cerevisiae* (T5.)), 4 replicates and each replicate included 20 male chicks of strain, "Ross 308" was used in 49 days.

Table 1: Composition of basal diet in different periods of the experiment

Ingredient %	Starter (0-21d)	Grower (21-35d)	Finisher (35-49d)
Corn	57	59	59.0
Soybean meal	39	36,2	35,5.0
Vegetable oil	0	0,8	1,6.0
DCP	1,9	1,9	1,9.0
Oyster	0,9	0,9	1.0
DL-methionine	0,2	0,175	0,165.0
L-lysine	0,1	0,11	0,08.0
Vitamin - Mineral premix*	0, 5	0,485	0,475.0
Salt	0,2	0,23	0,23.0
Anzymite	2	2	0.5
Total	100	100	100.0

* The broiler premix provided the following per kg of complete diet: 1400 IU Vitamin A, 3000 IU Vitamin D_3, 3 mg Vitamin B_6, 3 mg Vitamin B_{12}, 60 mg niacin, 20 mg pantothenic acid, 0.2 mg folic acid, 150 mg choline, 48 mg CA, 3.18 mg P, 100 mg Mn, 50 mg Fe, 80 mg Zn, 10 mg Cu, 0.25 mg Co, 1.5 mg Iodine

Table 2: Analysis of nutrient material in testing portion of different period of growing Nutrient

Analysis of nutrient material	Starter	Grower	Finisher
ME, kcal/kg	2900	2950	3050
Crude protein, %	21	20.5	19
Calcium, %	0.94	0.87	0.78
P available, %	0.42	0.38	0.34
Methionine, %	0.52	0.48	0.5
Lysine, %	1.3	1.1	1.1
Methionine + cystine, %	1.03	0.92	0.84
Treonine	0.8	0.76	0.71

Adjustment and supplying food diets is perform by UFFDA programming and is balances in nutrients materials. Food portion in test were in 3 different periods of growing which are starting period (0-21 days), growing period (21-35 days), finisher period (35-49 days) and are supplied by nutrient requirement of poultry (NRC1994) [17] and applied for chickens. *Saccharomysec cerevisiae* applies in lineage SC^{47} and is made by France Co of Lesaffre and its commercial name is Biosaf. This yeast is as small granules with cream color and with amount of 8×10^{9} CFU/g.

In day of 49 and after experiment final weighting, from each experiment one piece of bird were randomly selected. After installing feet No, for discharging digestion system, they will not feed for 12 hours and then weight them again and will remove their feather in dry method. Then then the visceral and immune organs (Proventriculus, Small intestine, Colon, Cecum, Lung, Spleen, Gall bladder, bursa of fabricius)were measured.

Finally, data will be analyzed and variance by SAS software [18] and average data will be compared by multi tolerance test of Donken [19] in probability level of 5 personages. The statistical model is as follows:

$$Y_{ij} = \mu + T_i + e_{ij}$$

RESULTS AND DISCUSSION

Regarding Table 3 shows that *Saccharomysec Cerevisiae* has developed statistically significantly visceral organs of broiler chicken ($p<0.05$).

The highest Lung and Proventriculus to T2 and lowest treatment is to T5 and T3. These results are accordance with findings of Hooge [10], Hashemichlavy *et al.* [15] but are not accordance with findings of Taheri [2], Khaleghipour *et al.* [11], Yalcinkaya *et al.* [12] and Hosseini [14]. The highest Colon (length and percent) to T2 and lowest treatment is to T5. The highest cecum (length and percent) to T3 and lowest treatment is to T1. The highest spleen and gall bladder to T2 and T5 and lowest treatment is to T1.

These results are accordance with findings of Zhang *et al.* [5], Bhatt *et al.* [6], Bradly [7], Santin *et al.* [8, 9], Hooge [10] and Hashemichlavy *et al.* [15] but are not accordance with findings of Taheri [2], Nazeradl and Sufisiyavash [13] and Hosseini [14]. Regarding Table 4 shows that *Saccharomysec Cerevisiae* has developed statistically significantly immune organs of broiler chicken ($p<0.05$). The highest bursa of fabricius to T5 and lowest treatment is to T3. These results are accordance with

Table 3: Effect of using *Saccharomysec Cerevisiae* on visceral organs of broiler chicken

	Treatment						
Parameter	T1	T2	T3	T4	T5	SE	Significant
Proventriculus (%)	0.41^{c}	0.55^{a}	0.36^{d}	0.49^{b}	0.49^{b}	0.066	*
Small intestine (cm)	33.21^{c}	47.01^{b}	32.43^{d}	33.09^{cd}	48.35^{a}	0.344	*
Small intestine (%)	0.96^{b}	1.18^{a}	0.91^{b}	0.91^{c}	1.19^{a}	0.063	*
Colon (cm)	157.30^{b}	176.51^{a}	155.47^{b}	142.97^{c}	133.85^{d}	0.702	*
Colon (%)	4.04^{a}	4.93^{c}	3.37^{d}	3.83^{b}	3.27^{d}	0.111	*
Cecum (cm)	17.78^{e}	19.68^{b}	20.69^{a}	19.26^{c}	18.49^{d}	0.244	*
Cecum (%)	0.27^{e}	0.56^{b}	0.69^{a}	0.47^{b}	0.35^{a}	0.071	*
Price diet ($)	2.30^{a}	2.31^{a}	2.31^{a}	2.37^{a}	2.38^{a}	0.092	N.S
Lung (%)	0.50^{b}	0.55^{a}	0.46^{c}	0.46^{c}	0.44^{c}	0.046	*

Different letters in each column indicate significant differences at the 5% level

Table 4: effect of using *Saccharomysec Cerevisiaet* on immune organs of broiler chicken

	Treatment						
Parameter	0	0.5	1	1.5	2	SE	Significant
Spleen (%)	0.046^{c}	0.165^{a}	0.091^{b}	0.087^{b}	0.16^{a}	0.050	*
Gall bladder (%)	0.041^{d}	0.091^{a}	0.046^{b}	0.044^{c}	0.44^{c}	0.013	*
Bursa of fabricius (%)	0.092^{a}	0.082^{c}	0.046^{d}	0.087^{b}	0.087^{b}	0.001	*

Different letters in each column indicate significant differences at the 5% level

findings of Khaleghipour *et al.* [11] and Yalcinkaya [12]. The highest price diet to T5 and lowest treatment is to T1. These results are accordance with findings of Nazeradl and Sufisiyavash [13].

It seems that the *Saccharomysec Cerevisiae* effects on digestive system microbic activity are from good microbes confirmation and bad microbes aggregation, improving food digestion and absorption, increasing existence condition for food materials, decreasing pathegon microorganisms, protection system intensification or increasing and animal health maintenance.

It is inferred that yeast would be on its best effects if it were in chickens' nutrition from the beginning. These effects maybe from mentioned bacteria competing with digestive system microbic fluorine and pay attention that as more time microorganism yeasts have, success possibility against bowel micro fluorine could be more. On the other hand, because young chickens microbic fluorine are not complete yet, yeast has the best chance to place in digestive system fluorine and increase absorption surface in small intestine.

The other reason to have unfit results could be also not having equivalent methods and yeast preparing condition, yeast microorganism dormancy, animal growth periods, yeast sort and animal raising sanitation condition.

In conclusion, this results showed that *Saccharomysec Cerevisiae* has significant effects on visceral and Immune organs; and causes meat chickens protection and health and if the yeast were used accurately with good management and good feeding methods, it would be an effective food complimentary in domestic animals' nutrition.

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