Role Of Yeast (Saccharomyces Cereviciae) As A Source Of Probiotics In Poultry Diets.

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ABSTRACT:

The aim was to evaluate the yeast saccharomyces cereviciae (Sc) in broiler diets on performance, blood characterize and percentage of edible parts. Two hundred fifty boilers (1 to 42 day old) were distributed into four treatments. The results shows sigmficant effect (P 0.05) for chicks fed with the percentage levels 0.75% , 1.00% level shows the highest weight gain, low feed conversion ratio large gizzard, low mortabilty low H/L ralio and low cholesterol.
Key words: broiler, blood characterize, yeast (Saccharomyces cervisiae)

1. INTRODUCTION

Antibiotics are normally used by poultry production in order to get a healthy effects and better performance. Some researchers tried to use as alternative to antibiotics which can be found naturally in many means like yeasts or beneficial bacteria. But it have been shown that yeasts are more effective as a source of probiotics than others, like Lactobacillus, to improve birds performance (Gaggia et al. 2010).
Sacchromyces cereviciae is one important microbes which used in microbial fermentation because of its high ability for growth and easily to control, therefore it's used widely in industries in addition to their high content and health safety (Kadhum and Abbas, 2014). This yeast have multiple uses in many fields such as bread making , glycerol production and enzyme production such as glucose 6 phosphate dehydrogenase and it's safe and don't produce any toxins (Al-Soufi, 2009).

Scientists have been used different concentrations of yeast as a prebiotic to reach the optimum amount added to the diet. Some of them tried to use both yeasts and bacteria fermented products added to the feed. It could be used naturally fermented products or microbial inoculum one. In addition, all environmental conditions should be monitored like water activity, pH and temperatures (Haldar et al. 2011).
The backer yeast is well known by their high content of proteins, amino acids and vitamins. All these properties encourage the scientists to use it in diet in addition to their probiotics on the health performance. In poultry, yeast probiotics have been found more effective than other probiotics to improve performance of birds (Reisinger et al., 2012).
The goal of this study is to find out the effects of probiotics produced by Sacchromyces cereviciae on broiler performance as well as the biochemical blood properties and on the edible viscera wights.

2. MATERIALS AND METHODS

All experiments trail were carried at private poultry production field by Baghdad (Iraq). The sample (300 Hubbard chicks) were separated into 5 groups. Each group was then divided into two replicates. Yeasts were added as follows: 0.0%, 0.25%, 0.5%, 0.75% and 1.00%.
Ground pens (1.5 x 1.5 meter) were used to raise the chicks with mulch of wood shavings. The feeding program was divided for two levels, starter and finisher, for 21 and 42 age respectively.
The same ingredients for each patch were mixed for each period. Based on National Research Council (NRC, 1994), all mixes are formulated to meet the nutritional requirements. The feed and water were provided *ad ibtum*.
Vaccines was given to all chicks against many common infectious diseases like Newcastle and bronchitis. Chicks weight gaining was measured during the feeding period, as well as feeding intake. 5 chicks were randomly chosen from each replicate to register the weight body gaining as live body weight (LBW).
Sharp knife was used to kill all chicks and picked off the feathers. All organs were weight separately as part of the carcass and also the whole bird and calculated as percentage. All data were subject to statistical analysis using the general linear model procedure of SAS 92001) because multiple test was used to expose the differences ($p<0.05$) through different group means.

Mix of fermented corn and yeasts was prepared according to Shalesh et al., (2010) and used in diet for production performance.
Age three Chicks were fed on starter ration followed by finisher ration which 6 weeks and with 42 gm as average weight.
Preparation of yeasts
Suitable size grind corn were weighted for a specific amount in PVC bags with 50% water plus S.C. purchased from the local market. 4 gm dry yeasts was added for one Kg corn. The mixes were kept in tightly closed bags and stored in room temperatures 24-30 centigrade Celsius for three trials 6, 12 and 24 hrs. Maximum yeast yields were achieved after 24 hrs. All bags then opened and left drying on a clean floor and then added to the diets.

Table (1): The ratio of feed Materials in the formation of initiator ration and the growth ration used in the experiment with the calculated chemical composition of both rations.

Feed material	The initiator ration (1-21 day)	The growth ration (22-42 day)
Iraqi yellow corn	48.2	58.7
Local wheat	8.0	7.5
Soybeans meal (44 protein)	28.5	20.5
Protein concentrate(*)	10.0	10.0
Vegetable oil	4.0	2.5
Limestone	1.0	0.5
Food salt	0.3	0.3
Total summation	100.0%	100.0%
Representative energy kcal/ kg	3079	3102.6
Crude protein (%)	22.06	19.37
Lysine + Methionine	2.03	1.78

Raw fiber (%)	3.54	3.2
Calcium (%)	1.2	0.95
Available phosphorus	0.44	0.42

(*) A Belgin protein center established according NRC requirement (1994).

3. RESULTS AND DISSCUSION

The productive performance in broilers depends on many factors such as ambient environment, farm management and nutrients used in diets fed during the different stages of growth. It's very important to choose correct ingredients of diet suited that geographic zone to have more economic feeds (Aviagen, 2012). Then the different productive response in each broiler can be related to the natural additives used, and their influence in healthy gut, as threonine and Sacchromyces cereviciae.

Table (2) shows a significant increase for all trials compared to control beginning the third week until end of the experiment and this is exactly what Bandy and Risam (2008). They supplemented the probiotics include Sacc.cer. When the shown significant increasing for body live weight. But this results were not completely comparable with Karaoglu and Durdag (2005) which they found that no effect on increasing body weight by adding probiotics. S.C. Shown increasing after 4 weeks.
The high weight values increased because of adding baker yeasts as a probiotic and this led to high performance of crude protein which increased and produced many nutritional compounds like dissolved vitamins in the water and specifically B-complex and some essential amino acids.The same results was found by Abdul Jalil (2006) but not completely alike with Karaoglu and Durdag (2005) results.
The weekly weight increasing belong to the effects of baker yeasts which made the nutritional balance inside the digestive tract and improved the immune local system through production of many amino acids and vitamins (Kim, Drust et al., 1995 , Wysong, 2003).
The baker yeasts enhanced the health and the physiological status of the birds and have a big roll in the prevention of stress achievement through the production of many important components like vitamins as biotin (Stanley et al., 1993).

In case of the feed consumption, the table show high feed consumption beginning the fourth weeks when we observed a high value at the sixth week of the experiment period ($p<0.05$) for feed consumption.

Al Shididi (2004) discovered the roll of probiotics in feed to produce many essential nutritional elements which are important for growth and beyond to increasing the availability of nutritional components inside the digestive tract leading to best beneficial of feed taken. This conclusion was also confirmed by Santin (2003) who found that the addition of S.C. cell walls to the broiler feed mixes with 0.1% led to reduce the feed consumption because of high protein content of the yeasts reached to about 40% (Ross, 1988) and any additional protein to the feed will resulted to decrease feed consumption by the birds.

Table (3) shows a significant decrease ($p<0.05$) in mortality percentage to control because of bird health improvement and stress effects on experimental birds, and this is the same found by Daraohlu and Durdag (2005) when they concluded that if probiotics were used in feed mixes will reduce the mortality rate.

Table(3) showed also increasing in all trials fed with probiotics (yeasts) as confirmed by Alkaisi et al. (2006). The gaining in net weight is because of

From table (3) we found weight increasing of gizzards percentage which confirmed also by Abdul Jalil (2006). But disagreed with AlSudani(2005) when he mentioned that there were no significant differences in gizzards weights for all trials by using probiotics I feeds. The cause of gizzards high weights was connected with increasing of increasing birds consumption of feed for this group comparing to other trials.

Table (4) reflects the high numbers if RBC because of the health improvement of the birds which fed it with yeast supplements. Only low increased numbers of WBC was observed.

Low H/L indicated of low thermal stress for birds fed with yeasts as Karaoglu and Durdag (2005) confirmed.

Table (5) shows some biochemical properties of blood , clear decline in cholesterol concentrations in all trials fed with yeasts was observed and this is because of glucan which is a part of yeast cell walls(Mensink, 2006) which is also reflects the low level of cholesterol concentrations.

Cellular blood properties

Healthy birds showed increasing in RBC and also high percentage of white blood cells connected with the stimulus action of immunity system like lymphatic cells.

Decreasing of H/L caused by probiotics which decreased the thermal stress (Karaoglu and Durdag, 2000). Some hormones, especially testosterone were released from the adrenal gland through the thermal stress. This hormone has a direct effect on lymphatic cells destruction and then reflected on increasing the alternative cells leading to H/L elevation.

Biochemical properties of blood

Table (4) shows some of biochemical properties of experimental birds indicated cholesterol lowering of blood at significant level to control.

The low cholesterol values may attributed to glucan rolls being in the diet and exactly in the cell wall of the yeasts which also lowered the LDL. This achievement has been shown by bell et.al, (1990) as they observed the cholesterol lowering through:

1. Binding with bile salt acids in the elementary tract resulting to cholesterol stimulating to produce cholesterol, as well as a fermentation process was occurred for glucan fiber inside the elementary tract which allows to produce short chain fatty acids like propionate, acetate and butyrate which absorbed through the portal vein to the liver, beside, this fiber maintained inside the gut and decreased the sugar absorption and followed by decreasing the insulin of the blood leading to cholesterol lowering production, in addition to that, the undissolved fibers decreased the absorption of fats included cholesterol via viscous intestines.

Masse et al. (1994) pointed out that S.C. yeasts added to the feed at 2% level will inhibit any signs of vitamin B six deficiency and also prevent any nervous disturbance and caused increasing in calcium and phosphorus ions of birds plasma. Many researchers showed that adding yeasts to chick feed at level of 0.05 and 0.1% will decrease the cholesterol, uric acid and triglycerides at a significant level in broiler and it was observed also a significant increasing in proteins and albumin.

Table (2):

Different lends of yeast (S.C) effect on performance on broiler $\mp$ SD.

Treatments	Parameters	
	3 Weeks	6 Weeks

	BWG	FCR	FC	BWG	FCR	FC
Control T_1	710.5∓13.2 b	1.97∓0.03 a	1400.0∓41.6 b	2240.8∓41.6 b	1.93∓0.01 a	4324.7∓38.5 c
0.50% S.C T_2	823.4∓12.6 a	1.67∓0.04 c	1375.1∓38.7 bc	2570.4∓37.4 b	1.78∓0.06 b	4575.3∓41.8 b
0.75% S.C T_3	842.7∓14.2 a	1.81∓0.05 b	1525.3∓44.7 a	2475.3∓36.9 a	1.89∓0.09 a	4678.3∓48.5 a
1.00% S.C T_4	853.4∓10.8 a	1.57∓0.07 b	1339.8∓42.6 c	2650.2.1∓41.8 bc	1.79∓0.07 b	4743.8∓31.2 a

BWG = Body weight gain FC = Feed consumption
FCR = Feed conversion ratio a b, c – indicated the extensive of significance between treatments in the column.

Table (3):
Different levels of yeast (S.C) effect on weight of eatable invective dressing proportion and mortality percentage ∓ SE.

Treatments	Traits				
	Eatable invective				
	Heart %	Liver %	Gizzard %	Dressing proportion	Mortality percentage
Control T_1	0.39∓0.02 b	2.08 ∓0.04 a	2.80 ∓0.13 b	71.26∓41.6 b	13.92 ∓0.21 a
0.50% S.C T_2	0.41∓0.01 ab	2.04∓0.03 a	2.83 ∓0.14 bc	79.34∓0.31 a	4.70 ∓0.06 b
0.75% S.C T_3	0.40 ∓0.03 b	2.0 ∓0.18 a	2.88 ∓0.09 a	78.23 ∓0.32 a	3.83 ∓0.13 b
1.00% S.C T_4	0.43 ∓0.02 a	2.00 ∓0.24 a	3.00 ∓0.11 a	76.13 ∓0.31 a	3.41 ∓0.12 b

a b, c – indicated the extensive of significant difference between treatments in the same column.

Table (4):
Biological properties for Blood to experimental broiler ∓ SE.

Treatments	H/L Ratio	Hb gm/100ml	WBC 10^3×cell/mm^3	PCV%	RBC 10^6×cell/mm^3
Control	0.340∓0.003 a	7.4 ∓0.61 b	21.8 ∓1.14 b	34.10 ∓0.11 a	3.10 ∓0.76 c
0.50% S.C T_1	0.289∓0.002 b	8.7 ∓0.58 a	22.7 ∓1.17 ab	33.96∓0.17 a	3.50 ∓0.83 a
0.75% S.C T_2	0.282 ∓0.003 b	8.8 ∓0.59 a	22.9 ∓1.18 a	33.98 ∓0.14 a	3.39 ∓0.84 b
1.00% S.C T_3	0.297∓0.004 b	8.7 ∓ a 0.61	23.0 ∓ a 1.22	33.95 ∓0.13 a	3.45 ∓0.83 ab

a b, c – indicated the extensive of significant difference between treatments in the same column.

Table (5):
Biological properties of Blood to experimental broiler ∓ SE.

Treatments	Cholesterol	Protein	Albomin	Globulin	Glucose
Control	198.6 ∓0.92 [a]	5.41 ∓ 0.90 [b]	1.9 ∓ 0.03 [b]	3.9 ∓0.11[a]	217.6∓ 3.48 [a]
0.50% S.C T_1	186.5 ∓0.91 [b]	6.85 ∓ 0.11 [a]	2.6 ∓ 0.04 [b]	3.8 ∓ [a] 0.13	205.4 ∓3.61 [a]
0.75% S.C T_2	184.7 ∓0.88 [b]	6.87 ∓0.14 [a]	2.4 ∓ [a] 0.05	3.8 ∓ 0.12 [a]	212.3 ∓ 4.10[a]
1.00% S.C T_3	182.6 ∓0.96 [b]	6.88 ∓0.13 [a]	2.8 ∓0.03 [a]	3.7 ∓ [a] 0.3	207.3 ∓ 3.81[b]

a b, c – indicated the extensive of significant difference between treatments in the same column.

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