# Effects of the whole grain, *Saccharomyces cerevisiae* and yoghurt on performance and some organ characteristics in Turkeys

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ABSTRACT

In this experiment carried out on whole grain and *Saccharomyces Cerevisiae* on 200 turkey chickens, the following parameters were compared: weight of the body, carcass, liver, hearth, spleen, gizzard, full-empty of small intestine, caecum length of small intestine and caecum. In addition, the effect of *Saccharomyces cerevisiae* ($3{,}44x10^8$ CFU/g-1, 5 %) and ½ yoghurt-water. were given by daily and twice in a week to the birds till the end of the experiment (70 days). At the end of experiment, 40 animals were slaughtered by sex and it was observed that there was no effect of probiotics and whole grain on body weights ($P>0.05$), on the other hand sex was found statistically different on body weights of animals ($P<0.001$). The evaluated results indicated that there were no statistical differences on different organs of the turkeys which fed on 1, 5 % *S. cerevisiae*, ½ yoghurt-water and whole grain treatments with body-organ weight and lengths of birds.

Key words**:** whole grain, pasture, *Saccharomyces cerevisiae,* yoghurt, performance, organs

## INTRODUCTION

Because alternative feeding sources used to feed animals are limited, the search for alternative sources, besides efficient use of already existing sources, has become a subject matter due to instability and abnormal increase in the income prices, rapidly increasing world population, and inclination of people towards healthy and quality products. In accordance with the society's welfare standard, consumers' sensitivity is increasing day by day. Yet when it was understood that use of antibiotic as growth and product promoter is inconvenient and possible human and animal health dangers, its use was banned in Sweden in 1986 for the first time in the world; similar decisions were made by the EU and its use were restricted on 1st June, 1999. After the decision made by the EU, in Turkey the Ministry of Agriculture made a similar decision on 30th September, 1999 and banned the use of antibiotic in feeding substance as product promoter (Nir and Şenköylü, 2000; Saygıcı and Günal 2004, Öztürk and Yıldırım, 2004). Antibiotics having been used as growth promoter for years

have been banned, to large extent, in the EU countries. Interest in antibiotics has decreased steadily because of waste it leaves behind in the animal's carcass, lack of resistance against microorganisms and health hazards. Today, probiotics are regarded as alternative promoters to antibiotics (Kahraman et al, 1996). Probiotic is preferred in the sector because it can diminish ammoniac, toxic amines and bacterial toxins, and increase the rate of animal's benefit from the feeding substance by forming beneficial effects in the animal while preserving microbial balance (Kahraman et al., 1996; Cartney E., 2002). On the other hand, it is also known that many gastrointestinal diseases result from pathogenic gut microflora. Therefore, to form out healthy gut microflora probiotics are used as live microorganisms cultures (Conway and Wang, 1997; Choct, 2001; Koenen *et al*., 2002).

Probiotics are added to feed substances to get rid of irregularities resulting from the presence of stress, to regulate the digestion system (Esteive et al., 1997; Denli et al.,.2003; Karaayvaz and Alçiçek, 2004). Yeast culture having a remarkable portion in the sector as probiotics are important natural substances used in the stockbreeding. Since they penetrate into blood in a short time, leave no waste and result in no undesirable negative changes in the microflora, they have superiorities in comparison with antibiotics. Especially, in fight against Gram (-) bacteria, while importance of *Saccharomyces cerevisiae* is increasing in the sector, preparations including various enzymes along with live bacteria, fungus and fungus cultures are being used as commercial probiotics .

Remarkable developments have been achieved in stockbreeding as a result of improvements in genetics and biotechnology, and in production conditions in addition to these product rates. For instance, weight of turkey races can reach up to 20-25 kg. On the other hand, feeding the chicks with grain wheat enlarges the gizzard; 50% larger than the ones fed with ground feeds and this enlargement increases the secretion of acid HCl and, thus, hinders the development of pathogens (Nir and Şenköylü, 2000). In semi-intensive breeding systems, it is of great importance to create a pasture for turkeys. These pastures are generally used for two reasons. One is to provide a remarkable portion of turkeys' feeds need from the pastures; the other is to let the turkeys move freely and to benefit from the abundant sun light and fresh air. Turkeys could make better use of pasture in comparison with other fowls and feeding in the pasture results in approximately 15-20 % feeding substance saving; hence, such a breeding formulation as pasture+seed is more economical. But, the foundation of delicious, quality, nutritious and ever green pastures being able to provide adequate taking are especially important in the areas having pastures of poor quality. Besides the fact that breeding relying on pasture decreases the feed consumption, it has great importance in terms of the animals' health. Turkeys grazing in the pasture are healthier than ones fed indoor (Şengül et al.,1999).

In Turkey where turkey breeding is commonly in the hand of small family entrepreneurs, such an idea hasn't been able to ripen. Turkey meat production is a significant nutrient in Turkey, where there is protein scarcity and protein

hunger, for it has rich protein content, a poor fat rate, and for it can be produced in a shorter period and in a cheaper way than red meat. In this study, some organ features and some performance criteria in the turkey chickens which have been given probiotic (SC) and whole grain have been researched

## MATERIAL AND METHODS

In the study, 200 American Bronze turkey chicks have been used as animal materials. The chicks of 3 d-old and of different sexes have been provided from Bigadiç Turkey Breeding Station of Balıkesir Directorate of Agriculture. The research has been performed with two groups; one is experimental, the other is control and each has 100 chicks. All animals received turkey starter feed (1-55 days), turkey starter feed and wheat 55-70 as *ad libitum* for two weeks after pasture grazing. Plastic manger has been used and till the 55$^{th}$ day they have been fed in intensive conditions and on the 56$^{th}$ day the animals have been let to graze in the pasture between 08:00 am and 07:00 pm. In the research, ¼ seed-wheat mixture has been used. Wheat feeding has started on the 70$^{th}$ day and has been practiced in three successive periods till the end of the 24$^{th}$ week. The seeds have been supplied from a seed factory and nutrition content has been stated as shown in Table 1.

Table 1. Nutrient composition of the experimental diet of Turkey (%-mg/kg)

| **Ingredient** | **Starter** | **Grower** |
|---|---|---|
| Crude Protein | 28 | 19 |
| Crude Cellulose | 6 | 8 |
| Ash | 8 | 8 |
| Metabolic energy K.Cal/kg | 2800 | 2900 |
| Lysine | 1.6 | 1.1 |
| Methionine % | 0.6 | 0.35 |
| Methionine + Cystine | 1.0 | 0.65 |
| Ca | 1.0–1.5 | 0.75–1.1 |
| P | 0.8 | 0.7 |
| NaCl | 0.35 | 0.35 |
| Na | 0.15–0.18 | 0.13–0.18 |
| Mn mg/kg | 70 | 70 |
| Zn mg/kg | 60 | 60 |

While *Saccharomyces cerevisiae* (dry yeast) has been added to the seeds of experiment group with a proportion of 1.5 kg per tone (Table 2), yoghurt-water mixture having 1/2 proportion has been given as *ad libitum* two days a week. To illuminate the experiment place day light has been benefited from in day time and at night fluorescent lamps have been used and program has been applied in light for 23 hours and in dark for 1 hour during the experiment. Animals have

been numbered by labelling the wings. From the 70th day to 24th week every individual turkey's body weight and body weight gain have been determined. Equal numbers of turkeys of the same sexes have been chosen; totally 40 animals, 10 female and 10 male have been chosen randomly. After the slaughtering, full and empty weight and length of warm carcass, heart, gizzard, spleen thin and thick guts have been measured. Minitab (13.0) and SPSS (11.0) statistic package programs have been used for the analysis of the data elicited from the research

Table 2. Composition of dry yeast

| **Component** | **%** |
|---|---|
| Moisture | 2 |
| Crude protein | 50 |
| Real protein | 42 |
| Nucleic Acids | 6 |
| Minerals | 7 |
| Fats | 4 |
| Carbohydrate | 31 |

* (Reed and Nagodawithana, 1991)

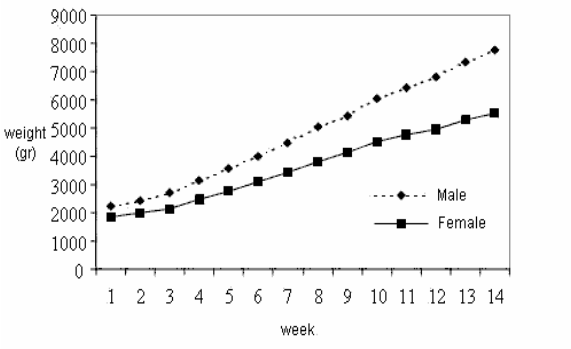


Figure 1.Body weight of control group birds

RESULTS AND DISCUSSION

According to the variance analysis in the repeating measuring experiment setting created for the purpose of evaluating body weight increase of the male and female turkeys in the control and experiment groups between the 11th and 24th weeks, it has been determined that the interactions "group X week (P=0,0239)" and "gender X week (0,00)" are statistically important. The utterance that group X week interaction is important indicates that the differences have changed by week. According to the results of the *Bonferroni* multi-comparison test performed in order to determine in which weeks the difference is important between the groups, it has been determined that the difference between the experiment and control groups is statistically important between the 15th, 16th and 17th weeks. It can be seen of body weight gain during 14 weeks on Figure 1 and Figure 2.

Figure 2 Body weight of treatment group birds

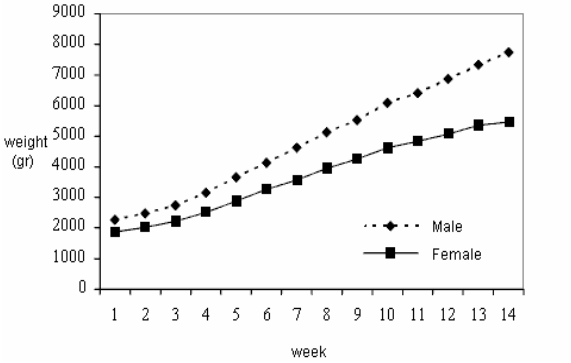

Table 3. The effects of probiotics and whole grain on male and female Turkeys' body and some organs.

| Parameters | Sex | Control | Treatment | X±Sx | P |
|---|---|---|---|---|---|
| Live weight (g) | Male | 8405 ± 116 | 8445 ± 180 | 8445 ± 180 | *** |
| | Female | 5470 ± 84 | 5480 ± 84.3 | 5480 ± 84.3 | |
| Hot Carcass (g) | Male | 5951 ± 77 | 5942 ± 144 | 5942 ± 144 | *** |
| | Female | 3889 ± 63 | 3892 ± 62.4 | 3892 ± 62.4 | |
| Filled Gizzard | Male | 301± 315 | 299.7± 328 | 299.7± 328 | *** |
| (g) | Female | 222.4 ± 7.0 | 224.6 ± 8.0 | 224.6 ± 8.0 | |
| Empty Gizzard | Male | 196.2 ± 5,5 | 196.7 ± 5.6 | 196.7 ± 5.6 | *** |
| (g) | Female | 122 ± 5.2 | 125.4 ± 5.3 | 125.4 ± 5.3 | |
| Liver (g) | Male | 120 ± 3.62 | 125.3 ± 3.62 | 125.3 ± 3.62 | *** |
| | Female | 84 ± 2 | 79.1 ± 2 | 79.1 ± 2 | |
| Large Intestines | Male | 16,4 ± 0.5 | 16.6 ± 0.5 | 16.6 ± 0.5 | *** |
| Filled (g) | Female | 12.4 ± 07 | 12.7 ± 0.9 | 12.7 ± 0.9 | |
| Large Intestines | Male | 13.6 ± 0.7 | 13.4 ± 0.3 | 13.4 ± 0.3 | *** |
| Empty(g) | Female | 8.2 ± 0.6 | 8.6 ± 0.4 | 8.6 ± 0.4 | |
| Large Intestines | Male | 12.2 ± 0.4 | 12.2 ± 0.4 | 12.2 ± 0.4 | *** |
| (cm) | Female | 12.3 ± 0.4 | 12.1 ± 0.3 | 12.1 ± 0.3 | |
| Small Intestines | Male | 195.8 ± 6.0 | 195.1 ± 6.0 | 195.1 ± 6.0 | *** |
| Filled (g) | Female | 126.0 ± 5.2 | 127.2 ± 5.3 | 127.2 ± 5.3 | |
| Small Intestines | Male | 132.8 ± 4.0 | 132.4 ± 4.0 | 132.4 ± 4.0 | *** |
| Empty (g) | Female | 88.3 ± 2.9 | 87.8 ± 2.6 | 87.8 ± 2.6 | |
| Small Intestines | Male | 226.3 ± 6.3 | 225.8 ± 4.6 | 225.8 ± 4.6 | *** |
| (cm) | Female | 193 ± 6.3 | 192.9 ± 2.3 | 192.9 ± 2.3 | |
| Heart (g) | Male | 37.21 ± 0.9 | 37.15 ± 0.9 | 37.15 ± 0.9 | *** |
| | Female | 23.32 ± 0.6 | 22.96 ± 0.6 | 22.96 ± 0.6 | |
| Spleen (g) | Male | 5.2 ± 0.2 | 5.2 ± 0.2 | 5.2 ± 0.2 | *** |
| | Female | 3.30 ± 0.1 | 3.38 ± 0.1 | 3.38 ± 0.1 | |

*** not statistically important for $P<0.01$

As a result of the variance analysis performed to evaluate the cutting weight in terms of hot carcass, internal organ weights and lengths, it has been understood that group X gender interaction is not statistically important in the light of all the features taken into consideration ($P>0.05$) The gizzard is the only organ in the gastrointestinal tract that is affected by whole grain feeding, with the weight of the crop, proventriculus and small intestine being the same regardless of feed form. Compared to pelleted diets, whole grain feeding increases gizzard weight. Both the muscles mass and the digesta content of the gizzard are increased by whole grain feeding although the muscle mass increases more dramatically as the level of whole wheat is increased. An important difference hasn't been able to be found between the groups in terms of these features ($P>0.05$). Except the length of the thick gut, in terms of other features the differences between the sexes are important ($P<0.001$). Ahmad, (2004) has been reported that the growth pattern of treated birds showed an increase in weight gain relative to the control, up to 1.0 gram per 10 kg feed but

beyond that the pattern was reversed. Similar results were found in this research. According to another research, G.P.D. Jones; (2001) has been reported that, the use of whole grain in the pelleted feed produced similar bodyweight responses to when ground triticale was incorporated in the feed. Feed conversion efficiency was enhanced when whole triticale was used compared to ground triticale and was similar to basic diet. The incorporation of whole wheat into the pelleted feed produced similar production responses to the use of ground wheat. In this research results indicated that sex is effect on body weights of animals statistically ($P<0.001$). Present study showed, while total seed consumption of the groups in the process of experiment has been 4650 kg, the consumption has consisted of 1300 mixture seed and 3350 kg grain wheat. In the probiotic group, the turkeys have consumed 53.5% of the total, whereas this percentage has been 46.5% in the control group. In the experimentation process, mortality has been overlooked. The results are in agreement with the previous studies by Koenen et al., (2002).

## CONCLUSIONS

Research findings have shown that the effects of adding probiotic in the turkey rations and giving additive ayran (*Lactobacillus bulgaricus* and *Streptococcus thermophilus*) after the return from pasture in order to promote the growth are not statistically important for live weight increase, various organs' weights and lengths. In the research it has been realized that adding probiotic as growth promoter to the ration will not yield an important beneficial result, in the conditions equal to biological habitat of the animals, which are isolated from the factors causing stress and have a hygiene level similar to optimum. However, similar studies carried out in conditions and large groups having more developed substructure especially recommend the use of probiotic to feed the fowls effectively. Probiotics offer serious alternatives in the health practices and in the compensation of the economical lost when antibiotics are completely withdrawn from the seeds. But rapid developments in the animal feeding science and problems caused by antibiotics support this mentality.

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