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EFFICACY OF YEAST AND DATE RESIDUES (HAFSH) TREATMENTS ON PERFORMANCE, SOME PHYSIOLOGICAL PARAMETERS AND MEAT QUALITY OF JAPANESE QUAIL(1- GROWING PERIOD)

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ABSTRACT: Countries having shortage in animal protein, such as Egypt can depend on intensive production of quail to compensate a part of this shortage. So, the present study was carried out at Poultry Farm, Faculty of Agriculture, New valley Branch, Assiut University, Egypt, to study the effect of different levels of yeast and supplementation of Hafsh (nonedible dates produced from dates factories) on performance and some physiological parameters as well as meat quality of Japanese Quail (Coturnix japonica). A total of 270 chicks, one week old unsexed Japanese Quails were weighed andrandomly assigned to 9 groups housed in 3 replicate pens with 10 birds in each. Nine different treatments in a 3 x 3 factorial arrangement including three levels of yeast (0.0, 0.5, 1.0 g yeast /L) in drinking water with three date residues levels (0, 5 and 10%) supplemented into diets. The obtained data pointed out that the yeast level,hafsh levels and interactions between yeast level and hafsh level had a significant effect on growth performance (body weight, feed intake , body weight gain and feed conversion ratio), where there were growth performance of quail inhanced, and some internal members ratios in relation to live bird weight of Japanese Quail except spleen ratio was insignificant . Results showed that different treatments of yeast or date residues alone or with yeast at any level remark that significant ($p<0.05$) difference in some blood hematological ,biochemical parameters (total protein , albumin , total lipids , cholesterol and glucose concentration), liver function (AST and ALT), physical properties, chemical composition and sensory evaluation of breast and thigh muscles of quail meat. The counts of total aerobic and anaerobic bacteria and total coliform of chick intestinal were decreased due to add different treatments compared with the control . From the present work , it may be concluded that the application of 1.0g yeast/liter (in water) with 10% hafsh (in feed) improved growth performance, some physiological parameters, carcass weight and nutrients digestibility, dressing%, breast weight%, thigh weight%, meat quality of Japanese Quail and is advisable.

Keywords: yeast, date residues, quail, growth, blood constituents, breast and thigh

INTRODUCTION

The restriction and shortage of high-quality conventional poultry feed ingredients considered as major problems facing poultry industry development in many tropical and sub-tropical developing countries. Therefore, poultry nutritionists have been focused searching suitable poultry unconventional feed ingredients to replace some of the expensive common feed ingredients with locally available untraditional feedstuffs to reduce the poultry feed cost (Al-Harthi et al., 2009).The date palm (Phoenix dactylifera, L.), is a drought- tolerant woody plant cultivated in the tropical and subtropical countries for human consumption (Moghaieb et al., 2011). Dates, the fruits of the date palm tree (phoenix dactylifera) are major staple food in arid areas of North Africa and Middle East, and the date crop plays a central role in the economy and social life in these regions (FAO, 2007)

Quails could be considered a good animal protein. The edible parts of its carcass are higher as compared to those of other poultry species (Saleh, 1988). Therefore, countries having shortage in animal protein, such as Egypt can depend on intensive production of quail to compensate a part of this shortage. In this subject, Poultry species are commonly stressed by different factors affecting physiological aspects of growing and feed utilization.

In the last few years, several studies reported that date can be partially used as alternative feed ingredient for poultry nutrition to overcome traditional poultry feedstuffs shortage and to reduce feed costs and to reduce pollution problems . Some researchers indicated that dates contain higher values of Potassium, Calcium, Sulphur, Chlorine, Iron, Manganese, Cooper, and a small amount of Zink. Many attempts have been undertaken in order to improve the utilization of diet nutrients by adding dietary supplementation of several growth feed additives from different sources (Boulos et al., 1992, El-Gendi et al., 1994,Ishrud et al., 2001; Hamada et al., 2002;Al- Homidan, 2003; Aldhaheri et al., 2004; Al-Harthi, 2006; Najib and Al-Yousef, 2012; Ghasemi et al., 2014).

Probiotics, such as yeast, have the ability to stimulate digestion and aid in maintaining microbial equilibrium in the gut. Live yeast, such as Saccharomyces cerevisiae, contains numerous enzymes that could be released into the intestine and aid existing enzymes in the digestive tract in the digestion of feed. Also, yeast contains vitamins and other nutrients that may produce beneficial production responses (Kornegay et al., 1995). Moreover, yeast supplementation can inhibit pathogenic bacteria and increase the number of anaerobic and cellulyticbacteria as reported by Abdel Azeem (2002) and Soliman et al., (2003). In addition, Celik et al., (2001), Churchil et al., (2001) and Celik et al., (2003) showed that yeast additives reduce the toxic effects of Alfatoxin. While, Spring (2002) and Santin et al., (2003) revealed that yeast can improve immune response of birds. Whole yeast products or yeast cell wall components have been used to improve growth and affect the physiology, morphology and microbiology of the intestinal tract of turkeys (Huff et al., 2007; Rosen, 2007b; Solis De Los Santos et al., 2007; Huff et al., 2010) and broiler chicks (Rosen, 2007a; Yang et al., 2008b; Morales-Lopez et al.,2009). Adebiyiet al.,(2012). The authors reported that dietary inclusion of yeast culture at 1.5g/kg increased the growth performance and improved intestinal morphology and nutrient absorption.Yeast could therefore be a performance enhancer through improvement in protein utilization and a significant retention of crude fibre, thus confirms yeast as possessing the ability to degrade fibrous materials in poultry feeds. Ordinarily, poultry lack the enzymes (cellulases, hemi-cellulases and xylanases) to digest high fibrediets(Oyedeji JO, Ajayi HI, Egere T.2008). Indirect benefits can arise when yeasts and metabolic enzymes

breakdown the fibrous and nutrient components of the ration (Adejumo et al., 2005). (Pelicia, et al., 2010) also reported that fermented yeast extracts are rich in mannan-oligosaccharides, β-gluccans and other nutritional metabolites that may optimize gut health and immunity, which translates to better growth performance and lower risks of disease-borne pathogens.The benefits of Saccharomyces cerevisiae to the immune system and on coccidial infection have been reported (Gao, et al., 2008). Likewise,(Jeannine, et al., 2012) and (Silva, et al., 2012) had reported its beneficial effect on Newcastle disease. It has been reported that receiving yeast to chicks improves body weight gain and feed: gain ratio (Bonomi and Vassia, 1978; Ignacio, 1995; Onifade et al., 1999).

The purpose of this investigation was to study the effect of different levels of yeast (Saccharomyces cerevisiae)in drink water and dates residues (Hafsh which is nonedible dates produced from dates factories) in experimental diet on some physiological characteristics and productivity as well as meat quality of Japanese Quail (Coturnix japonica).

MATERIAL AND METHODS

The present study was carried out at Poultry Farm, Faculty of Agriculture, New valley-Branch, Assiut University, Egypt. The experiment was conducted during the period between March and April 2016 .

A total of 270 chicks, one week old unsexed Japanese Quails were weighed and randomly assigned to 9 groups housed in 3 replicate pens with 10 birds in each. Nine different treatments in a 3 x 3 factorial arrangement including three levels of yeast (0.0, 0.5, 1.0 g yeast /L) in drinking water with three date residues levels (0, 5 and 10%) incorporating into diets . Corn-soybean experimental diets were used as a basal diet contained 24 % crude protein (control) through the experimental periods (Table 1_a) and the chemical composition of yeast was recorded in Table (1_b) . Chicks within each treatment were fed as follows:

T1: Fed basal diet without any supplementation (control).
T2: Basal diet + 5% Hafsh.
T3: Basal diet + 10% Hafsh.
T4: Basal diet + 0% Hafsh (0.5g yeast/liter)
T5: Basal diet + 5% Hafsh (0.5g yeast/liter)
T6: Basal diet + 10% Hafsh (0.5g yeast/liter)
T7: Basal diet + 0% Hafsh (1.0 g yeast/liter)
T8: Basal diet + 5% Hafsh (1.0 g yeast/liter)
T9: Basal diet + 10% Hafsh (1.0 g yeast/liter)

Free access water and feed were available during the experiment.The birds were individually weighed at the beginning of the experiment (one weeks of age) and at the end of the experiment (6 weeks of age) .Body weight gain (BWG) was calculated. Feed intake (FI) during the experimental period (1 to 6 wks of age) were recorded for each replicate and thereby feed conversion ratio (FCR) as g feed /g BWG was calculated .

Apparent digestibility of nutrients:

Digestibility trial was conducted to test the effect of different types and levels of feed additives on apparent digestibility of nutrients e.g. crude protein (CP), ether extract (EE), crude fiber (CF), nitrogen free extract (NFE), dry matter (DM) and organic matter (OM) at 6 weeks of age, for the experimental diets.

The birds were reared in metabolic cages. Two replicates (10 chicks in each) were assigned to each of treatments. birds were fed the experimental diets for 48 hr as adaptation period followed by main experimental period of 96 hr. The excreta of birds, falling on a tray covered by plastic sheet at the bottom of the cage, were quantitatively collected during the collection period every 24 hours, cleaned from feathers and scattered feed. The excreta were sprayed with 1% boric acid solution to prevent any loss in ammonia and drying in an electric oven at 60 C° for 48 hrs. The dried excreta from each replicate during the collection period were mixed together, weighed, finely grinded and stored in plastic bags. Samples of the feed and the excreta were used for chemical analysis to determine

their digestibility values.The true protein of dried quail manure was evaluated according to Ekman et al., (1949). Samples of excreta and feeds were analyzed for their content of moisture, CP (crude protein), EE (ether extract), CF (crude fiber) and ash according to A.O.A.C., (1990) and NFE (nitrogen free extract) was estimated by subtracting previous components from one hundred and expressed on a dry matter basis. Then the estimation was made as follows (Han et al., 1976).

% Digestibility of nutrient of diet =

[(Dry weight of diet intake) x (%nutrient in diet) –(dry weight of feces voided) x (% nutrient in feces)]x100

dry weight of diet intake x % nutrient in diet

At the end of the experiment (6 weeks of age), three birds from each treated group were randomly chosen, then individually weighed and slaughtered, (the assigned birds were fasted overnight). Three blood samples from each treated group were collected. Aportion of the fresh blood was used to determine blood hematological parameters (Red Blood Cells (RBCs), Hemoglobin (Hb), Packed cells volume (PCV) and White Blood Cells (WBCs)) .Serum was obtained from the blood samples by centrifugation for 15 min. At 3000 rpm and was stored at – 20 Cº until the time of analysis . Blood biochemical parameters (total protein, albumin, total lipids, cholesterol, and glucose concentration) in blood serum were determined according to the Tiez (1999) method by using the commercial kits (Biolabosa As. Frances). Liver enzymatic activity aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were determined by using commercial kits .

After bleeding out, the birds were scalded and eviscerated. Eviscerated carcasses were individually weighed. The percentages of liver, gizzard, heart, spleen and intestine were calculated in relation to the live body weight.

Intestinal aerobic and anaerobic microflora counts were determined. Aerobic plate count (APC), total coliform count and total anaerobic count were carried out according to American Public Health Association (Apitz-Castro, et al.,1983). Serial ten fold dilutions were done on standard plate count agar, BactoMacConkeys's broth (Difco) and anaerobic agar medium respectively.

III- Meat quality for breast and thigh of quail :

Meat quality for breast and thigh of quail was carried out at Food Sci.& Techno. Dept., Faculty of Agriculture, New Valley Branch, Assuit University, Egypt.At the end of experiment 3 birds were randomly selected from the previous treatments and after 6 hours of fasting were slaughtered by decapitation with a sharp knife . After exsanguination , plucking and gutting , the carcasses were kept at about 6 ^{o}C for 24 hours . Then superficial pectoral or breast and thigh or leg muscles were isolated from the carcasses. In the obtained meat ,the following determinations were made:

I-Physical properties of meat :

- Dressed weight %= carcass weight x 100/ live body weight
- The pH values of samples were determined from a 10 g sample homogenized with 40 ml deionized water .
- Water –holding capacity based on the percentage of free water in meat according to Sonale et al.(2014)., 300 mg meat samples (weighed to 1 mg) were placed on Whatmann filter paper and subjected to pressure of 2 kg between two glass plates for 5 min. A planimeter was used to determine the area (cm2) of the two patches formed by the pressed meat juices and of the meat . In order to determine the percentage of free water in the meat , the drip area (cm2) resulting from the difference between the two patches was divided by the mass of the weighed sample .
- Thermal drip : The difference between the weight of the meat sample before and after cooking was measured to determine thermal drip, expressed as a percentage as

follow :

Thermal drip %= 100- (the weight of sample after cooking X100/ weight of sample before cooking) .

II-Chemical composition of meat :

The proximate chemical composition of quail meat was determined according to the A.O.A.C. (2005). The crude protein content was determined by the Kjeldahl method and the crude lipids content was determined by the Soxhlet method. The ash content determined by ashing the samples overnight at 550C .

III- Sensory evaluation :

Muscle samples of breasts and thighs from the studied different treatments were stored in a deep freezer (-20 ^{O}C) for 15 days . Muscle samples of breasts and thighs from each treatment were thawed in refrigerator (4 ^{O}C) for 24 h and wrapped individually in aluminum foil and roasted at 175 ^{O}C . Trays of randomized sample from the different treatments were evaluated at each session by panelists . They were instructed to record their responses for each attributes i.e. flavor, tenderness, juiciness and palatability of the meat and broth were evaluated using 1-10 point scale (10 being rated the most desirable) according to Jakubowska, et al. (2013) .

Statistical analysis: Data collected were subjected to Analysis of Variance (ANOVA). Differences among treatments were evaluated according to procedure out lined by Gomez & Gomez (1983). Significant of differences between means was defined at 5 percent level compared using the Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Growth performance and internal organs ratios of Japanese Quails:: Date wastes (Hafsh) used in the present study contains about 97.45% dry matter, 6.40% crude protein, 2,700 kcal metabolizable energy, 5.58% crude fat, 46.08% nitrogen free extract (sugar+starch %) and 16.4% crude fiber/kg. The metabolizable energy content of date wastes (Hafsh) used was calculated according to Carpenter and Clegg (1956) equation as follows: metabolizable energy (kcal/kg) = 53+38 [crude protein (%) + (2.25* ether extract (%)+(1.1* nitrogen free extract (%)]. The chemical analysis of date wastes (Hafsh) used in the present study is typically in agreement with the findings of Najib and Al- Yousef (2012). Data given in Tables (2&3) shows, irrespective of date wastes, the main effect of yeast level on growth performance (body weight, feed intake , body weight gain and feed conversion ratio) and percentages of liver , gizzard , heart , spleen and intestine The results pointed out that increasing quantity of yeast from zero to 0.5 and 1.0 g /liter in water led to an increase in body weight by 9.15 and 13.82 % , feed intake by 7.79 and 12.23 % , body weight gain by 10.03 and 15.20 % , while feed conversion ratio decreased by 2.31 and 2.91 % of the control value (without or zero yeast),respectively. This improvement could be due to the pathogenic bacterial load reduction in the intestine and improvement in the intestinal lumen health, which increased the absorption and utilization of the dietary nutrients. It could be attributed to the effect of oligosaccharides of yeast that enhances gut health with improved performance (Najib and Al-Yousef (2012).Our results are in agreement to the findings of Manal and AbouEl.Nagha (2012), who reported highest body weight gain in broilers fed dried yeast at the level of 0.3, 0.5 and 0.7%. So, beneficial effect of yeast is due to many reasons, where, Yeast cell contain proteins, vitamins and minerals (Amata, 2013) and yeast cell wall contains 1, 1-6,Dglucan and mannano-oligosaccharides (MOS), which help in promoting growth and increases growth rate because of its positive effect on mucosa of the intestine. Moreover it increases villus height, increase the number of anaerobic and cellulytic bacteria which enhance lactate utilization and moderates pH of the gut, there by improves the nutrients digestibility and growth performance (Abdel-Azeem, 2002). Along

the same line, NailaChand et al.(2014)found that overall body weight was significantly (P<0.05) affected by the replacement of yeast single cell protein (YSCP) in broiler diets and theoverall body weight was significantly(P<0.05) higher in treated groups as compared to the control.The FCR was significantly different between treated and control groups, as well among the treated groups. Also, these results indicated that increasing quantity of yeast from zero to 0.5 and 1.0 g /liter in water led to an increase in internal organs ratios in relation to live bird weight such as liver of quail by 8.08 and 9.63 %, gizzard by 9.84 and 22.95 % , heart by 5.81 and 8.19 % , spleen by 1.72 and 3.45 % and intestine by 4.83 and 11.39 % of the control value (without or zero yeast) ,respectively. In agreement with those, Onifade et al. (1998) reported a significant increase in percentage weight of liver, gizzard and heart and high carcass weight. The results may vary due to different physiological function of the different organs in different environments and different forms of the feed and yeast single cell protein. However, contrary to our results with OzsoyandYalcin (2011) who reported no effect of yeast on weight of gizzard, liver and heart in broiler chicks fed diet having 1 to 3% yeast. In the other hand, Paryad and Mahmoudi (2008) reported that the inclusion of differrent levels Saccharomycesscerevisiae in broiler chicks rations significantly affected all carcass characteristics parameters measured (dressing percentage, breast, leg, liver, heart, gizzard, and abdominal fat percentage). The other researchers Dimcho et al., (2005) and Ivanov, (2004) reported more improvements in liver, gizzard and heart of broilers, mules and ducklings by supplementing diets with probiotics. Manal and Abou El- Nagha.(2012) pointed out that the highest economical and relative economical efficiency values were obtained with the diet of 0.5% dry yeast . It may be due to the better feed conversion of birds received the experimental diet compared to other experimental diets.Results for the effect of hafsh (nonedible dates from dates factories) irrespective of yeast treatment on growth performance (body weight, feed intake , body weight gain and feed conversion ratio) and internal organs percentage - ,i.e., liver , gizzard , heart , spleen and intestine are shown in Tables (2&3). Results cleared that hafsh level had a significant effect on growth performance traits and internal organs except spleen which was insignificant. The results revealed that increasing date wastes inclusion up to 5 or 10%led to an increase in body weight by 8.03 and 12.03% , feed intake by 6.45 and 10.02% , body weight gain by 8.03 and 12.03% , feed intake by 6.45 and 10.02% , body weight gain by 8.74 and 13.16 % , while feed conversion ratio decreased by 2.31 and 4.12% of the control value(without or zero hafsh) ,respectively. These results are in agreement with those found by Najib and Al-Yousef (2012) who noted that layer hens fed 10% date pits meal without enzymes improved feed conversion ratio and increased feed consumption. Besides , results indicated that increasing quantity of hafsh from zero to 5 and 10 % of bird feed led to an increase in liver by 11.96 and 18.48 %, gizzard by4.56and 4.91%, as well as intestine by 6.75 and 7.73% of the control value (without or zero hafsh),respectively .The opposite was true with spleen weight percentage which was not different among treatments.

Generally, a significant interactions were shown in Tables (2&3) between yeast level (A) and hafsh level (B) treatments on growth performance (body weight, feed intake , body weight gain and feed conversion ratio) and internal organs in relation to live bird weight of Japanese Quail ,i.e.,-, gizzard , heart and intestine except liver and spleen which recorded insignificant percentages. It could be demonstrated that the application of 1.0g yeast/L) in drinking water with 10% hafsh (in feed) scored the highest values of

growth performance (body weight, feed intake and body weight gain) and internal organs percentages as well as improved feed conversion ratio. This result agrees with Park et al. (2001), who reported that diets with supplemental Saccharomyces cerevisiae at 0.025, 0.05 and 0.1% contain beta-glucans which has growth promoting and immune-enhancing effects in broiler chickens.Such findings are in accordance with those found by Najib and Al-Yousef (2012) and Ghasemi et al. (2014).In this trend ,Naila Chand et al (2014) indicated that higher weight gain was recorded with replacement of yeast single cell protein (YSCP) in broiler diets and lower for the control.The FCR differ significantly between treated and control group, as well among the treated groups

Blood constituents :

Data tabulated in Table (4) shows the effect of yeast levels, irrespective od date waste, on blood hematological parameters of quail (Red Blood Cell (RBCs) , Hemoglobin (Hb) , Packed cell volume (PCV) , White Blood Cell (WBCs)), blood biochemical parameters of quail ,i.e., (total protein , albumin , total lipids , cholesterol , Glucose concentration and AST and ALT). Results cleared that yeast levels had a significant effect on all the studied traits. . The data indicated that increasing quantity of yeast from zero to 0.5 and 1.0 g /liter in bird water led to an increase in RBCs by 25.90 and 41.04% , Hb by 15.64 and 26.97% , PCV% by 6.13 and 16.01%, total protein % by 23.76 and 33.33% , albumin by 9.85 and 18.14 % and total lipids by 4.58 and 23.52 % of the control value (without or zero yeast) ,respectively. Also, these results indicated that increasing quantity of yeast from zero to 0.5 and 1.0 g /liter in bird water led to decrease in WBCs of quail blood by 1.03 and 2.53 %, cholesterol % decreased by 11.11 and 29.70%, glucose concentration by 1.72 and 2.03 % , AST by 7.36 and 21.42 % and ALT by 25.60 and 59 .69 % of the control value (without or zero yeast) ,respectively. Along the same line, Onifade (1997) and Onifade et al. (1999) reported a positive correlation between dietary levels of Saccharomyces cerevisiae with the hematological indices like RBC, WBC and PCV in broiler chickens. The decrease in WBC of blood might be due to the reduction of the pathogenic bacterial load in the intestine with application of yeast according to Yalçın et al(2013).These results are in agreement with those found by Pandaetal., (2000);Kannanetal.,(2005);Gudevetal.,(2008) and Paryad and Mahmoudi, (2008) who stated that there was a decrease in plasma cholesterol for chicks fed diets contain dry yeast. Manal and Abou El-Nagha.(2012) reported that chicks fed 0.5% dry yeast inclusion had the highest total protein, albumin and globulin concentrations compared to other dietary treatments. There were no adverse effects on blood components representing liver function (as measured by ALT and AST) or kidneys functions (as measured by creatinine levels). Our observations corroborated data published by some authors (Panda et al., 2000; Kannan et al., 2005; Gudev et al., 2008 and Paryad and Mahmoudi, 2008) who stated that there was a decrease in plasma cholesterol for chicks fed diets contain dry yeast.

Data for the effect of date residues or hafsh irrespective of yeast addition on blood hematological (Red Blood Cell count (RBCs), Hemoglobin (Hb) , Packed cell volume (PCV) , White Blood Cell count (WBCs)) and biochemical parameters of quail blood ,i.e., (total protein , albumin , total lipids , cholesterol , Glucose concentration and AST and ALT). Results cleared that yeast are shown in Table (4). Results cleared that hafsh level had a significant effect on the previous parameters. The results revealed that increasing quantity of hafsh from zero to 5.0 and 10.0 % of bird feed led to an increase in RBCs by 23.95 and 26.24% , Hb % by 16.94 and 20.98% , PCV % by 12.10 and 19.06% , total protein 0f blood by 24.50 and 38 59 % , albumin by 14.59 and 21.28

% and total lipids by 9.87 and 24.79% of the control value (without or zero hafsh) ,respectively. Also, results indicated that increasing quantity of hafsh from zero to 5 and 10 % of bird feed led to decrease in WBCs of quail blood by 1.19 and 1.32 %, cholesterol % by 11.82 and 14.25%, glucose concentration by 1.15 and 1.20 %, AST by 6.99 and 13.23% as well as ALT decreased by 31.21 and 55.23% of the control value (without or zero),respectively .A significant interaction was shown in Tables (2) between yeast level (A) and hafsh level (B) of bird water and feed with regard to blood hematological (RBCs, Hb , PCV , WBCs) and biochemical parameters of quail blood ,i.e., (total protein , albumin , total lipids , cholesterol , Glucose concentration and AST and ALT). It could be revealed from the results that application of 1.0g yeast% with 10% hafsh scored the highest values of blood hematological (RBCs, Hb and PCV) and biochemical parameters of quail blood ,i.e., total protein , albumin and total lipids and the lowest values of WBCs , cholesterol , glucose concentration , AST and ALT compared to the control. Such findings are in accordance with those found by Gudevetal.,(2008) ;ParyadandMahmoudi, (2008)and Najib and Al- Yousef (2012).

Count of aerobic, anaerobic and total coliform bacteria in intestine: Effects of feeding on diets supplemented with separately or in a mixture on the intestinal microbial counts are shown in Table (5). The chick intestinal total aerobic and anaerobic counts and the counts of total coliform had been decreased due to addition different treatments of date residues alone or with yeast at any level compared to control group. These findings are in agreement with those found by Kilonzo-Nthenga et al., (2008) who stated that, several harmful pathogenic bacteria have been shown to exhibit a binding specific for the sugar mannose in Saccaromycescervicaea wall, which may cause the yeast to act as a decoy for the attachment of pathogens. Because yeast has been demonstrated not to permanently colonize animals, the yeast and any yeast-bound pathogens pass out in the bird excretion and bacterial colonization is diminished. Kabir et al., (2004) reported that probiotic microorganisms, once established in the gut, may produce substances with bactericidal or bacteriostatic properties (bacteriocins)such as lactoferrin, lysozyme, hydrogen peroxide as well as several organic acids. These substances have a detrimental impact on harmful bacteria, which is primarily due to a lowering of the gut pH, which may partially offset the low secretion of hydrochloric acid in the stomach. In addition, competition for energy and nutrients between probiotic and other bacteria may result in a suppression of pathogenic species.

Intestinal colonization is normally the first step in theinfection for orally infected birds leading to the persistent shedding of Salmonella in the feces. In many infected birds, invasion via the gastrointestinal tract results in Salmonella multiplication in reticuloendothelial tissue of liver, spleen and caecum, where caecum is the main colonization site (Thippichettypalayam, et al., 2008)

Digestibility of nutrients:

The improvement of nutrients digestibility by supplementing chick quail diets with date residues or / and yeast could be attributed to different stimulators such as change in the enteric flora and reduction of E.coli population, lowering gastric pH, synthesis of catabolic enzymes of favorable microorganisms that help in releasing cell compounds including amino acids, sugar and fatty acids into the intestinal environment and involving of active bacteria with the digestive processes and nutrient absorption in gastrointestinal tract (Wenk, 2000). In this regard, Tekeli et al. (2006) found that feed additive or replacement e.g. 120 mg yeast reduced the total length of digestive tract, but increased weight of jejunum, with increasing the number of lactic acid bacteria in jejunum. Also, El-Deeb et al. (2006) found that

botanical extract (garlic, anise, cinnamon, rosemary,thyme and yeast) and capsicum decreased intestinal absorption of lipids, and total microbial count of cecum. Radwan (2003) found that feeding broiler chicks at 28 and 49 days of age on diets supplemented with 0.25 or 0.5 % CF or 0.5 % probiotic improved digestibility of most nutrients. Haldar et al. (2011) and Ghosh et al (2012) reported that supplementation of yeast and yeast products reduced E. coli numbers in the digesta as compared with the control.

Meat quality for breast and thigh of quail:

1-Physical properties for breast and thigh muscles of JapaneseQuail: Data tabulated in Table (7) shows the effect of yeast level . irrespective of date residue on physical properties for breast and thigh muscles of quail meat ,i.e. carcass weight , dressing %, dressed weight % ,pH value , free water % and thermal drip % . Results cleared that yeast level had a significant effect on the all studied traits . The results revealed that increasing quantity of yeast from zero to 0.5 and 1.0 g /liter in bird water led to an increase in carcass weight by 12.33 and 23.58% , dressing % by3.13 and 6.06% , breast weight % by 6.98 and 13.28% and thigh weight % by 1.85 and 4.10% of the control value (without or zero yeast) ,respectively. Recently yeast and yeast products have also received considerable attention as effective growth enhancers in poultry nutrition. Also, they showed that there were significant improvement in average live body weight of quails supplemented with S. cerevisiae and probiotics, respectively. It is clearly shows that there is a decrease in free water and thermal drip of meat muscles of quail with increasing quantity of yeast from zero to 0.5 and 1.0 g. . Also, results indicated that increasing quantity of yeast from zero to 0.5 and 1.0 g led to decrease in free water % of breast muscles by 1.14 and 0.85 %, thermal drip% of breast muscles by 0.64 and 2.04% and thermal drip% of thigh muscles by 0.11 and 0.21% of the control value (without or zero yeast),respectively . Also, there is a trendency to -increase - water holding capacity (WHC) of meat muscles with increasing quantity of studied yeast . These results are in agreement with those found by LutfulKabir(2009); Taksande et al. (2009).Data for the effect of date residues or hafsh , irrespective of receiving yeast in drink water, ,pH value , free water % and thermal drip % are shown in Table (7). Results cleared that hafsh level had a significant effect on the all previous traits. The present results indicated that increasing quantity of hafsh from zero to 5.0 and 10.0 % of bird feed led to an increase in carcass weight by 9.02 and 17.14% , dressing % by 3.03 and 4.11% , breast weight % by 7.64 and 10.66% and thigh weight % by 7.65 and 10.55% of the control value (without or zero yeast),respectively. Also, results indicated that increasing quantity of hafsh from zero to 5 and 10 % of bird feed led to decrease in free water % of breast muscles by 0.57 and 0.85 %, thermal drip% of breast muscles by 0.67 and 3.19% and thermal drip% of thigh muscles by 0.08 and 0.21% of the control value ,respectively . Our results are in line with those of Jakubowska, et al. (2013) and Sonale et al.(2014).A significant interaction was shown in Table (7) between yeast level (A) and hafsh level (B) with regard to physical properties of breast and thigh muscles of quail meat ,i.e. ,pH value , free water % and thermal drip % . It could be revealed from the results that application of 1.0g yeast% with 10% hafsh scored the highest values of physical properties for breast and thigh muscles of quail meat ,i.e. %,pH value , free water % and thermal drip%. Such findings are in accordance with those found by LutfulKabir (2009); Taksande et al. (2009).Beneficial effect of yeast is due to many reasons.Firstly, Yeast cell contain proteins, vitamins andminerals (Amata, 2013) and yeast cell wall contain1, 1-6,D glucan and mannano-oligosaccharides(MOS), which help in promoting growth andincreases growth rate because of its positive effecton

mucosa of the intestine. Moreover it increasesvillus height, increase the number of anaerobic andcellulytic bacteria which enhance lactate utilizationand moderates pH of the gut, there by improves thenutrients digestibility and growth performance(Abdel-Azeem, 2002). So these factors might havebeen responsible for the increase in weight gain inbroiler chicks.

2-Chemical composition for breast and thigh muscles:

Data recorded in Table (8) shows the effect of yeast , irrespective of date waste addition on chemical composition of breast and thigh muscles of quail meat, i.e. dry matter%,total protein %, total lipids % and ash%. Data revealed that yeast level had a significant effect on the all studied traits . The results demonstrated that increasing quantity of yeast from zero to 0.5 and 1.0 g/liter in bird water led to an increase in dry matter% breast by 1.74 and 2.18% , total protein %breast by 3.13 and 6.06% , dry matter % thigh by 0.48 and 0.79% and total protein %thigh by 0.47 and 1.14% as well as it led to decrease in total lipids % breast by 3.81 and 8.76 % , ash % breast by 4.96 and 10.44 % , total lipids %thigh by 1.93 and 3.18 % and ash % thigh by 1.75 and 4.51 % of the control value ,respectively. This result might be due to the decrease in free water and thermal drip of meat muscles with increasing quantity of yeast from zero to 0.5 and 1.0 g . Also, results indicated that increasing quantity of yeast from zero to 0.5 and 1.0 g led to decrease in free water % of breast muscles by 1.14 and 0.85 %, thermal drip% of breast muscles by 0.64 and 2.04% and thermal drip% of thigh muscles by 0.11 and 0.21% of the control value (without or zero yeast),respectively . This result might be due to an increase in water holding capacity (WHC) of meat muscles of quail with increasing quantity of yeast from zero to 0.5 and 1.0 g .Yeast cells contain unidentified growth factors along with other nutrients which may be responsible for its beneficial effects (Gao et al., 2008).

Data for the effect of hafsh, irrespective of yeast treatment, on chemical composition of breast and thigh muscles ,i.e. dry matter %, total protein%, total lipids% , and ash % are shown in Table (8). Results clarified that hafsh levels had a significant effect on the all studied traits . The recorded results indicated that increasing quantity of hafsh from zero to 5.0 and 10.0 % of bird feed led to an increase in dry matter %breast by 3.92 and 5.43 % ,dry mater %thigh by 1.48 and 2.32 %, total protein% breast by 4.77 and 5.93%, total protein% thigh by 1.93 and 2.87% of the control value ,respectively. Also, the results indicated that increasing quantity of hafsh from zero to 5 and 10% of bird feed led to decrease in total lipids % breast by 7.56 and 14.15% , total lipids % thigh by 1.92 and 4.95%, ash% breast by 4.96 and 9.48 % and ash% thigh by 3.51 and 4.95% of the control value ,respectively . These results are in agreement with those found by Sonale et al.(2014).A significant interaction was shown in Table (8) between yeast levels (A) and hafsh levels (B) with regard to chemical composition for breastand thigh muscles ,i.e. dry matter % , total protein %, total lipids % , and ash % . It could be revealed from the results that application of 1.0g yeast% with 10% hafsh scored the highest values of dry matter % (28.98 and 25.71%)and total protein % (21.42 and 19.88 %) and lowest values of total lipids % (2.04 and 3.99 %) and ash % (1.15 and 1.07 %) of breast and thigh muscles , respectively

3- Sensory evaluation:

Data in Table (9) shows the effect of yeast levels on sensory evaluation of breast and thigh muscles of quail meat, i.e. flavor, tenderness, juiciness and palatability. Data revealed that yeast level had a significant effect on the all studied parameters except tenderness for breast muscles. The recorded results pointed out that application of yeast by 1.0 g/liter in bird water led to obtain the highest values of flavor (9.38 and 9.26) , juiciness (9.38 and 8.52) and palatability (8.90 and 9.24) of breast and thigh muscles

compared with application of yeast by zero and 0.5 g / liter , respectively . Also, the highest value (9.12) of tenderness of thigh muscles was scored with application of yeast by 1.0 / liter. Bonomi et al., (1999) demonstrated that enrichment of dietswith yeast could favorably improve the quality of ediblemeat from broilers. For example, edible meats frombroiler chicks fed a diet containing chromium-enrichedSaccharomyces cerevisiae yeast exhibited increased tenderness (and increased water holding capacity (Lee et al., 2002).

With regard to the effect of hafsh on sensory evaluation of breast and thigh muscles ,i.e. flavor ,tenderness, juiciness and palatability was shown in Table (9) . Data demonstrated thathafsh level had a significant effect on the all studied parameters except tenderness for breast muscles. Results indicated that application of hafsh by 10% in bird feed led to obtain the highest values of flavor (9.39) and 9.23) , juiciness (9.39 and 8.54) and palatability (8.91 and 9.35) of breast and thigh muscles compared with application of hafsh by zero and 5% in bird feed ,respectively . Besides , the highest value (9.32) of tenderness of thigh muscles was scored with application of 10% hafsh in bird feed than others.These results are in agreement with those found by Jakubowska, et al. (2013) and Sonale et al.(2014).A significant interaction between yeast level (A) and hafsh level (B) with regard to sensory evaluation of breast and thigh muscles ,i.e. flavor , tenderness, juiciness and palatability are shown in Table (9) . Data demonstrated that application of 1.0g yeast% with 10% hafsh scored the highest values of flavor (9.57 and 9.31) , tenderness (8.94 and 9.26) , juiciness (9.53 and 8.60) and palatability (8.97 and 9.41) for breast and thigh muscles compared with other , respectively .

From the present work , it could be concluded that the application of 1.0 g yeast/ liter with 10% hafsh improving growth performance in final live weight , feed intake , live weight gain , nutrients digestibility , carcass weight , dressing % , breast weight %, thigh weight % of Japanese Quail and is advisable .This helps in reducing the great gap in meat production at the national level production .

Table (1$_a$): Composition and calculated analysis of the experimental diet- through the growing period

Ingredients	%
Ground yellow corn	57.83
Soya bean meal (44%)	32.94
Fish meal (60.05%)	3.50
Corn gluten (62)	3.48
Dicalcium phosphate	0.33
Limetone	1.16
DL-Methionine	0.09
Lysine	0.07
Iodized sodium chloride	0.30
Minerals and vitamins premix	0.30
Calculated composition	
Crude protein (%)	24.00
ME (kcal/kg)	2900.00
Calorie/protein ratio (C/P	120.83
Calcium (%)	0.80
Phosphorus (%)	0.30

Table (1$_b$): The chemical composition of yeast (Saccharomyces cerevisiae).

Composition	
Dry matter%	93
ME(kcal/kg)	1990
Crude protein%	44.4
Crude fat%	1
Crude fiber%	2.7
Ca%	0.12
P%	1.4

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Table (2): Effect of different yeast and date wastes (Hafsh) levels on Growth performance of Japanese Quails.

Trait	Different yeast levels														
	Zero g Yeast / liter (Y0)				0.5 g Yeast / liter (Y1)				1.0 g Yeast / liter (Y2)				Means of Hafsh		
	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2
Initial LiveWeight(g)	17.7	17.6	17.5	17.61	17.51	17.55	17.57	17.54	17.45	17.63	17.53	17.54	17.56	17.60	17.53
Final LiveWeight(g)	183.1 h	207.8g	212.4ef	201.1 c	211.5 f	217.5 d	229.5 c	219.5 b	214.2 e	232.4b	240.1a	228.9 a	202.9 c	219.2 b	227.3 a
FeedIntake(g)	613.3 h	647.1g	684.6 e	648.3 c	669.8 f	706.9 d	719.8 c	698.8 b	683.9 e	740.0 b	759.6a	727.8 a	655.6 c	697.9b	721.3 a
LiveWeightgain(g)	165.4 h	190.1g	194.9 f	183.5 c	193.9 f	199.9 d	211.9 c	201.9 b	196.8 e	214.8b	222.5a	211.4 a	185.4 c	201.6 b	209.8 a
Feed Conversion Ratio (%)	3.71 a	3.40 e	3.51 b	3.54 a	3.45 cd	3.53 b	3.39 e	3.46 b	3.47 c	3.44 d	3.41 e	3.44 b	3,54 a	3.46 b	3.40 c

Means with the same letters are not significantly differed at ($p<0.05$) according to Duncan's multiple range test.
D0= zero hafsh (control) , D1= 5 % hafsh and D2= 10% hafsh

Table (3): Effect of different yeast and date wastes (Hafsh) levels on Carcass characteristics,liver, gizzard, heart, spleen and intestine were calculated in relation to the live body weight of Japanese Quails.

Trait	Different yeast levels														
	Zero g Yeast / liter (Y0)				0.5 g Yeast / liter (Y1)				1.0 g Yeast / liter (Y2)				Means of Hafsh		
	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2
Liver %	3.05 c	3.29bc	3.32abc	3.22 b	3.47 ab	3.49ab	3.48ab	3.48a	3.46ab	3.54ab	3.61a	3.53a	3.33a	3.44 a	3.47 a
Gizzard %	1.77 f	1.84 e	1.87 e	1.83 c	1.86 e	2.04 d	2.13 c	2.01b	1.91 e	2.30 b	2.53 a	2.25 a	1.84 c	2.06 b	2.18 a
Heart %	0.810g	0.853f	0.866ef	0.843c	0.876e	0.906bc	0.893b	0.892b	0.880de	0.923ab	0.933a	0.912a	0.855b	0.894a	0.897a
Spleen %	0.058	0.059	0.058	0.058	0.059	0.059	0.060	0.059	0.059	0.060	0.061	0.060	0.059	0.059	0.059
Intestine %	2.780f	3.040e	3.050de	2.960c	3.070e	3.100 c	3.130c	3.103b	3.070d	3.380 b	3.430a	3.297a	2.976c	3.177b	3.206 a

Means with the same letters are not significantly differed at (p<0.05) according to Duncan's multiple range test.

D0= zero hafsh (control) , D1= 5 % hafsh and D2= 10% hafsh

Table (4): Effect of different yeast and date wastes (Hafsh) levels on Blood constituents of Japanese Quails.

Trait	Different yeast levels														
	Zero g Yeast / liter (Y0)				0.5 g Yeast / liter (Y1)				1.0 g Yeast / liter (Y2)				Means of Hafsh		
	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2
RBC(N x106/mm3)	2.17 h	2.65 g	2.72 f	2.51 c	2.79 e	3.32 c	3.38 b	3.16 b	2.94 d	3.82a	3.85 a	3.54 a	2.63 c	3.26 b	3.32 a
HB(g/dl)	12.5 g	14.16 f	14.40 f	13.68c	14.40f	16.23 d	16.83 c	15.82b	14.73 e	18.26b	19.13a	17.37a	13.87c	16.22b	16.7 a
PCV%	40.80e	48.66d	49.20cd	46.22c	45.43d	49.03cd	52.70bc	49.05c	48.60 d	53.50b	58.70a	53.62a	44.96c	50.40 b	53.53a
WBC(Nx103/mm3)	46.80a	46.00b	45.86 b	46.20a	45.96b	45.66 b	45.56 b	45.73b	45.40bc	44.86c	44.93c	45.06c	46.05a	45.51 b	45.45b
Total protein (g/dl)	2.30 g	2.6 f	3.83 c	3.03 c	3.20 e	3.90 c	4.16 b	3.75 b	3.46 d	4.26ab	4.40 a	4.04 a	2.98 c	3.71 b	4.13 a
Albumin (g/dl)	1.76 g	1.93 f	2.10 de	1.93 c	1.90 f	2.20 cd	2.26 bc	2.12 b	2.00 ef	2.36 b	2.50 a	2.28 a	1.88 c	2.16 b	2.28 a
Total lipids (mg/dl)	290.3g	331.3 e	342.3 d	321.3c	320.3f	327.6ef	360.0 c	336.0b	334.3 e	379.3b	477.0a	396.9a	315.0c	346.1 b	393.1a
Cholesterol (mg/dl)	228.3a	200.0b	192.6 c	207.0a	192.0c	187.6 c	179.3 d	186.3b	178.6 d	148.0e	152.3e	159.6c	199.6a	178.5 b	174.7c
Glucose (mg/dl)	238.6a	234.6bc	236.6ab	236.6a	233.3cd	232.0 d	232.6cd	232.6b	234.7bc	232.0d	229.0e	231.9b	235.6a	232.9 b	232.8c
(AST) (U/L)	31.43 a	29.20 b	28.66 bc	29.76 a	28.26cd	28.50 bc	27.60d	27.72b	26.40 e	23.90 f	22.03 g	24.51 c	29.10 a	27.20 b	25.70 c
(ALT) (U/L)	36.03 a	29.43 b	26.53 cd	30.66 a	28.46bc	25.36 d	19.40e	24.41b	28.10 bc	15.76 f	13.73 f	19.20 c	30.86 a	23.52 b	19.88 c

Means with the same letters are not significantly differed at ($p<0.05$) according to Duncan's multiple range test.
D0= zero hafsh (control) , D1= 5 % hafsh and D2= 10% hafsh

Table (5): Effect of different yeast and date wastes (Hafsh) levels on count of aerobic, anaerobic and total coliform bacteria in intestine

Type of bacteria / Feed supplementation	Aerobic plate count	Total coliform Count	Total anaerobic count
T1	$39x10^{8}$	$72x10^{7}$	$19x10^{3}$
T2	$12x10^{3}$	$28x10^{4}$	$5x10^{1}$
T3	$11x10^{3}$	$24x10^{3}$	$3x10^{1}$
T4	$9x10^{4}$	$22x10^{3}$	$4x10^{1}$
T5	$4x10^{2}$	$13x10^{4}$	-ve
T6	$8x10^{2}$	$11x10^{2}$	-ve
T7	$9x10^{1}$	$12x10^{1}$	-ve
T8	$3x10^{1}$	$6x10^{2}$	-ve
T9	$3x10^{1}$	$6x10^{1}$	-ve

Table (6): Effect of different yeast and date wastes (Hafsh) levels on digestibility values of DM, CP, EE, CF and NFE.

Item Trait	DM (%)	CP (%)	EE (%)	CF (%)	NFE (%)
T1 (Control)	70.73^{a}	83.75^{ab}	70.00^{ab}	29.81^{b}	77.71
T2	71.75^{a}	86.40^{a}	66.84^{b}	30.13^{b}	80.12
T3	70.57^{a}	84.17^{ab}	81.23^{a}	33.43^{a}	78.59
T4	69.00^{a}	82.10^{b}	76.96^{a}	33.44^{a}	81.12
T5	69.47^{a}	84.43^{ab}	75.38^{a}	33.86^{a}	80.27
T6	69.42^{a}	83.12^{ab}	87.14^{a}	36.12^{a}	80.75
T7	64.59^{b}	87.11^{a}	78.16^{a}	34.53^{a}	76.17
T8	65.61^{b}	86.41^{a}	79.31^{a}	32.76^{b}	78.96
T9	65.18^{b}	87.09^{a}	68.98^{b}	32.38^{b}	79.11

DM: dry matters; CP: crude protein; EE: ether extract; CF: crude fiber; NFE: nitrogen free extract
Means with the same letters are not significantly differed at ($p<0.05$) according to Duncan's multiple range test.

Table (7): Effect of different yeast and date wastes (Hafsh) levels on physical properties of quail meat .

Trait	Different yeast levels															
	Zero g Yeast / liter (Y0)				0.5 g Yeast / liter (Y1)				1.0 g Yeast / liter (Y2)				Means of Hafsh			
	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean
Carcass characters																
Carcass weight(g)	122.67 g	139.80 f	143.10 e	135.19 c	143.33 e	149.10 d	163.13 c	151.86 b	151.70 d	166.47b	183.03 a	167.07 a	139.23 c	151.79 b	163.09 a	151.37
Dressing%	67.05g	69.00f	69.43 f	68.63c	69.22f	71.27d	71.84c	70.78b	70.58e	73.27b	74.53a	72.79a	69.09c	71.18b	71.93a	70.73
Breast:																
Breast wt%	28.42g	29.52f	30.61e	29.52c	29.74f	31.55d	33.46c	31.58b	31.35d	33.99b	34.97a	33.44a	29.83c	31.69b	33.01a	31.51
pH value	5.86g	5.89e	5.91d	5.88c	5.88f	5.89e	5.92 c	5.89b	5.90d	5.94b	5.97 a	5.94 a	5.88 c	5.91b	5.93a	5.91
Free water%	3.57a	3.54bc	3.53de	3.55a	3.55b	3.53cd	3.51 g	3.53b	3.54cd	3.51ef	3.50 g	3.52 c	3.55 a	3.53 b	3.52 c	3.53
Thermal drip%	35.50a	34.20d	33.74f	34.48a	35.11b	34.10e	33.57g	34.26b	33.21i	34.85c	33.31h	33.79c	34.61a	34.38b	33.54c	34.18
Thigh :																
Thigh wt%	19.17h	20.83e	21.52c	20.51c	19.77g	21.15d	21.75b	20.89b	20.24f	21.73b	22.09a	21.35a	19.73c	21.24b	21.79a	20.92
pH value	5.98	6.03d	6.05bc	6.02c	6.01	6.03d	6.04c	6.03b	6.02	6.05b	6.08 a	6.05 a	6.00 c	6.04b	6.06a	6.03
Free water%	3.77 a	3.74 a	3.74 a	3.75 a	3.75 a	3.68 a	3.65 a	3.69 a	3.72 a	3.66 a	4.64 a	4.01 a	3.75 a	3.69 a	4.00 a	3.81
Thermal drip%	37.81a	37.70c	37.65e	37.72a	37.75b	37.69c	37.62f	37.68b	37.59	37.67d	37.65e	37.64c	37.72a	37.69b	37.64c	37.68

Means with the same letters are not significantly differed at ($p<0.05$) according to Duncan's multiple range test.D0= zero hafsh (control) , D1= 5 % hafsh and D2= 10% hafsh

Table (8): Effect of different yeast and date wastes (Hafsh) levels on chemical composition of quail meat .

Trait	Different yeast levels															
	Zero g Yeast / liter(Y0)				0.5 g Yeast / liter (Y1)				1.0 g Yeast / liter (Y2)				Means of Hafsh			
	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean
Breast:																
Dry matter %	26.56 g	27.70 d	28.46 b	27.57 c	27.26 f	28.30 c	28.58 a	28.05 b	27.41 e	28.52 ab	28.59 a	28.17 a	27.07 c	28.17 b	28.54 a	27.93
Protein%	19.82h	20.46f	20.77e	20.35c	19.86h	20.86d	21.08 c	20.60 b	20.05 g	21.26b	21.42a	20.91a	19.91c	20.86b	21.09a	20.62
Lipids%	2.55 a	9.32 c	2.20 e	2.36 a	2.41 b	2.27 d	2.12 g	2.27 b	2.31 c	2.17 f	2.04 h	2.17 c	2.42 a	2.25 b	2.12 c	2.64
Ash %	1.33 a	1.27 b	1.22 c	1.27a	1.27 b	1.22 c	1.15 d	1.21 b	1.21 c	1.13 d	1.10 e	1.15 c	1.27 a	1.21 b	1.16 c	1.21
Thigh :																
Dry matter %	24.92 h	25.33 e	25.55 c	25.27 c	25.10 g	25.43 d	25.63 b	25.39 b	25.15 f	25.53 c	25.74 a	25.47 a	25.06 c	25.43 a	25.64 a	25.38
Protein%	19.10i	19.44f	19.55d	19.36c	19.16h	19.50e	19.70 b	19.45 b	19.21 g	19.66c	19.88 a	19.58 a	19.16 c	19.53b	19.71 a	19.47
Lipids%	4.31 a	4.22 c	4.12 e	4.22 a	4.24 b	4.17 d	4.02 f	4.14 b	4.16 d	4.10 e	3.99 g	4.09 c	4.24 a	4.16 b	4.04 c	4.15
Ash %	1.21 a	1.16 c	1.11 e	1.16 a	1.18 b	1.15 d	1.11 e	1.14 b	1.16 c	1.11 e	1.07 f	1.11 c	1.18 a	1.14 b	1.10 c	1.14

Means with the same letters are not significantly differed at ($p<0.05$) according to Duncan's multiple range test.
D0= zero hafsh (control) , D1= 5 % hafsh and D2= 10% hafsh

Table (9): Effect of different yeast and date wastes (Hafsh) levels on sensory evaluation of cooked breast and thigh of quail meat .

Trait	Different yeast levels															
	Zero g Yeast / liter(Y0)				0.5 g Yeast / liter (Y1)				1.0 g Yeast / liter (Y2)				Means of Hafsh			
	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean	D0	D1	D2	Mean
Breast:																
Flavor	9.12 g	9.17 f	9.32 c	9.20 c	9.21 e	9.35bc	9.27 d	9.28b	9.21 e	9.37 b	9.57 a	9.38 a	9.18 c	9.29 b	9.39 a	9.29
Tenderness	8.88abc	8.92 ab	8.77 c	8.86 a	8.90ab	8.84bc	8.97 a	8.90 a	8.85abc	8.92 ab	8.94ab	8.90 a	8.88 a	8.90 a	8.89 a	8.89
Juiciness	9.04 g	9.20 e	9.25 d	9.16 c	9.13 f	9.31 c	9.40 b	9.28 b	9.19 e	9.43 b	9.53 a	9.38 a	9.12 c	9.31 b	9.39 a	9.28
Palatability	8.62 e	8.73 d	8.84 c	8.73 c	8.72 d	8.83 c	8.91 b	8.82 b	8.84 c	8.90 b	8.97 a	8.90 a	8.72 c	8.82 b	8.91 a	8.82
Thigh :																
Flavor	9.00 f	9.12 e	9.15de	9.09 c	9.10 e	9.17cde	9.23bc	9.17 b	9.20bcd	9.27 ab	9.31 a	9.26 a	9.10 c	9.18 b	9.23 a	9.17
Tenderness	9.00 g	9.11 e	9.20 c	9.11 c	9.09 f	9.17 d	9.22 b	9.16 b	9.16 d	9.22 b	9.26 a	9.12 a	9.08 c	9.17 b	9.23 a	9.16
Juiciness	8.29 f	8.43 d	8.50bc	8.41 c	8.35 e	8.47 c	8.53 b	8.45 b	8.44 d	8.52 b	8.60 a	8.52 a	8.36 c	8.47 b	8.54 a	8.46
Palatability	9.08 h	9.18 f	9.29 c	9.18 c	9.15 g	9.22 e	9.35 b	9.24 b	9.21 e	9.26 d	9.41 a	9.24 a	9.15 c	9.22 b	9.35 a	9.24

Means with the same letters are not significantly differed at ($p<0.05$) according to Duncan's multiple range test.
D0= zero hafsh (control) , D1= 5 % hafsh and D2= 10% hafsh

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الملخص العربى
تأثير استخدام الخميره ومخلفات التمور (الحفش) على الاداء وبعض الصفات الفسيولوجيه وجوده لحم السمان اليابانى 1- فتره النمو

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تعانى كثير من الدول مثل مصر من نقص فى انتاج البروتين الحيوانى التى من الممكن ان تعتمد على الانتاج الكثيف من السمان لتعوض جزء من هذا النقص . لهذا أجرى هذا البحث فى مزرعة الدواجن بكلية الزراعة فرع الوادى الجديد، جامعة اسيوط ،مصر، لدراسة تأثير ثلاث مستويات مختلفه من الخميرة (صفر ، 0.5 و 1.0 جم / لتر ماء شرب) وثلاث مستويات من الحفش(عبارة عن التمور الغير صالحة للاكل الناتجة من مصانع التمور) مضافة للعليقة الاساسية وهى صفر ، 5 و 10 % من العلف على اداء النمو وبعض الصفات الفسيولوجيه و جودة لحم السمان اليابانى .
أخذ عدد 270 كتكوت سمان عمر اسبوع تم وزنهم وتوزيعهم عشوائى فى 9 مجموعات بكل منها ثلاث مكررات كل مكرره بها 10 كتاكيت فى حظيره منفصلة ، واستخدم تصميم Factorial (3 x 3).
واوضحت النتائج المتحصل عليها ان مستويات كل من الخميرة و الحفش والتفاعل بينهم أحدث تحسن معنويلصفات النمو (وزن الجسم ،العلف المستهلك و ووزن الجسم المكتسب والتحويل الغذائى) وكذلك نسب بعض الاعضاء الداخلية منسوبة لوزن الطائر الحى (الكبد ، القونصة ، القلب والامعاء) عدا نسبه وزن الطحال كانت غير معنويه .
وسجلت المعاملات المختلفه من الخميره بمفردها او الحفش او الاثنين معا باختلاف مستوياتهم اختلافات معنويه فى صفات الدم الهيماتولوجيه و صفات الدم الكيموحيوية (البروتين الكلى ، الالبيومين ، الليبيدات الكلية ، الكوليسترول ، تركيز الجلوكوز) و انزيمات الكبد (AST وALT) والصفات الطبيعية للحم الصدر والفخذ وصفات التركيب الكيميائى لهم . كما لوحظ تناقص فى العدد الكلى للبكتيريا الهوائية والاهوائية وبكيتريا الكوليفورم الموجودة فى امعاء الطائر مع المعاملات المختلفة المستخدمة من الحفش سواء منفردا او مع الخميرة عند اى مستوى .
بناء على الدراسة الموجودة وجد إن استخدام 1.0 جم خميرة/ لتر ماء شرب مع 10 % حفش مضاف الى العلف ادى الى تحسن صفات النمو والحاله الفسيولوجيه ووزن الذبيحة ، المواد االغذائية المهضومه ، نسبة التصافى ، نسبة وزن الصدر و نسبة وزن الفخذ فى السمان اليابانى، وهذا يساعد على خفض الفجوة الضخمة في انتاج اللحوم .