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EFFICACY OF YEAST AND DATE'S BY-PRODUCT (HAFSH) LEVELS ON PRODUCTIVE AND PHYSIOLOGICAL PERFORMANCE OF LAYING JAPANESE QUAIL UNDER HIGH ENVIRONMENTAL TEMPERATURE

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ABSTRACT: This experiment was conducted to study the effect of different levels date's by-product (Hafsh, non edible dates produced from date's factories) in the diets with yeast (*Saccharomyces cerevisiae*) supplementation in water on productive and physiological performance of laying Japanese quail reared at high ambient temperature (40ºC and 45ºC with 50 % relative humidity). 54 females of 8 weeks-old were weighed and randomly divided into nine different treatments in a 3 x 3 factorial with three replicates arrangement including three date's by-product (Hafsh) levels (0, 10 and 15%) with three levels of yeast (0, 1, 2 g yeast /L) of drinking water. The results obtained that dietary contented with Hafsh or yeast and interactions between yeast level and Hafsh level had a significant effect on all the productive performance (egg production, egg weight, egg mass/hen/day, feed conversion as (g feed / g egg)) and improved egg quality in compared with control. Hafsh treatments with or without yeast have significant ($p<0.05$) difference in some blood biochemical parameters and hormones of quail, i.e., total protein, albumin, total lipids, HDL, progesterone and triiodothyronine hormones were increased , while serum cholesterol and glucose concentrations were decreased significantly ($P< 0.05$) birds' in compared with control group. The nutrients digestibilities were improved significantly ($P< 0.05$) by treatment groups. It may be concluded that the application of 2.0g yeast/liter (in water) with diet contented 10% Hafsh improved the productive performance, egg quality, some physiological parameters, nutrients digestibilities and carcass weight of laying Japanese Quail under high environmental temperature.

Keywords: yeast,hafsh,quail, productive,physiological performance, high temperature

INTRODUCTION

The shortage and high costs of conventional poultry feed ingredients considered as major problems affecting poultry industry development in different countries worldwide. Therefore, we must searching about 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).

Heat stress, one of the most serious climate problems of tropical and subtropical regions of world, negatively affects the production performance of poultry and livestock. Concisely, heat stress is characterized by endocrine disorders, reduced feed consumption, metabolic rate, lipid per-oxidation, immune suppression, and intestinal microbial symbiosis (Sansonetti, 2004; Sohail et al., 2010, 2011).

Egypt is the world leader in date production. Each year, it produces approximately 1,084,529 metric tons of dates. This represents a little over 17% of global date production but only 3% of world exports. Egypt has increased date cultivation by more than 100% since 1993 and currently has an estimated 15,582,000 date palm trees (FAO, 2007). But, little information about the use of date's by-product in poultry diets is available (Daneshyar et al., 2013). In the last few years, several studies reported that date's by-product meal have high level of protein and energy and it can be partially used as alternative source of energy and protein in poultry feed (Al-Harthi, 2006; Najib and Al-Yousef, 2012; Ghasemi et al., 2014). Moreover, date's by-product contained about 71.8% mannose, 26.6% galactose and 9.8-22.3% beta-galactomannan polysaccharides which can replace yellow corn energy in poultry diets (Ishrud et al., 2001; Hamada et al., 2002).

Since January 2006, the use of antibiotics for animals and poultry as feed additives has been banned in different countries, influenced by the consumers' demands for products free of antimicrobial residues (Saleh et al., 2014). Recently, much research data has been gathered and suggests a potential role for yeast as natural growth promoters in poultry nutrition. Saccharomyces cerevisiae is one of the probiotics which can replaced the antibiotic and it has biologically valuable proteins, vitamin B-complex, important trace minerals and enhancement of phosphorus availability (Brake, 1991; Moore et al., 1994), reduction in cases of disease infection and increased the immunity (Line et al., 1997) in addition, improved of growth performance and feed efficiency (Day, 1997). Also, Saccharomyces cerevisiae cells respond to oxidative stress by altering their transcriptional program in a complex manner (Gasch et al., 2000; Temple et al., 2005; Saleh et al., 2013).

Therefore, this study was conducted to evaluate the effects of different levels of yeast (Saccharomyces cerevisiae) in drink water with diet content date's by-product (Hafsh) on the productive, eggs quality and some physiological performance of laying Japanese quail under hot environmental temperature.

MATERIALS 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 summer season May - June 2016 .

Birds and housing: A total number of fifty four (54) females with initial body

weight (230.3 ±1.7 g) at 8 weeks old assigned to similitude groups. All birds were kept under the same environmental conditions and housed in wire battery cages (50cm long × 40 cm wide×30 cm height). Average temperature ranged between 40□C and 45□C with 50 % relative humidity from 8 to 14 weeks of age (throughout the experimental period).

Experimental diets and design: Nine different treatments in a 3 x 3 factorial with three replicates arrangement including three date's by-product (Hafsh) levels (0, 10 and 15%) supplemented into diets with three levels of yeast (0, 1, 2 g yeast /L) in drinking water. Composition of basal diet is found in (Table 1) and The chemical composition of date's by-product (Hafsh) in (Table 2). The metabolizable energy content of 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 Hafsh used in the present study was typically in agreement with the findings of Najib and Al- Yousef (2012).Birds had free access to feed and water and subjected to a 17L: 7D light throughout the whole experimental period.

Samples taken and Measurements:

Productive performance: Egg number and egg weight were recorded daily 8th to 14th weeks of age for each replicate and calculate egg mass (g) . Feed intake were recorded and feed conversion ratio (FCR) as g feed /g egg was calculated. The egg production traits were recorded throughout the experimental period for each replicate.

Egg quality: At 14 wk of age, four eggs from each treated group were randomly chosen from the same days of production and subjected to egg quality investigation. The weights of yolk, albumen and shell (with membranes) were recorded and calculated as percentages of egg weight. Egg length, Egg wide, yolk high, yolk diameter and albumen height were measured. Also, Egg shell thickness was measured by a micrometer as an average of 3 points (top, medial and base). Yolk index was calculated as follow

Yolk index = (Yolk height/ yolk diameter)× 100.

Egg shape index = (Egg width / Egg length) x 100.

Haugh units was determined by equation, HU = 100 log (H + 7.57 – 1.7 W0.37),

where H = albumen height (mm); W = egg weight (g); 7.57= correction factor for albumen height; 1.7= correction factor for egg weight (Wells, 1968; Panda, 1996).

Blood biochemical parameters: At the end of the experiment (14 weeks of age), four birds from each treated group were randomly chosen, then individually weighed and slaughtered, (the assigned birds were fasted overnight).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, glucose concentration and high density lipoprotein (HDL)) in blood serum were determined according to the Tiez (1999) method by using the commercial kits (Biolabosa As. Frances

Hormonal assay: Triiodothyronine (T3) hormone concentrations were determined in serum with enzyme immunoassay using commercial kits obtained from Genzyme (1996). Plasma progesterone (mg/ml) was analyzed using radioimmunoassay (RIA) kits

manufactured by Diagnostic systems laboratories USA by Automatic 1275 Mini Gamma Counter LKB according to the method described by Miller (1988) and Canez et al. (1992).

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), dry matter (DM) and organic matter (OM) at 14 weeks of age, for the experimental diets was done 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 according to (Han et al., 1976).

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

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

Productive performance:

Data given in Table (3) shows that yeast irrespective of date wastes and date's by-product (Hafsh) irrespective of yeast level had significantly ($P<0.05$) higher effect on all the productive performance (egg production, egg weight and egg mass/hen/day) and improved ($P<0.05$) feed conversion as (g feed / g egg) in compared with control (zero yeast or Hafsh). Increasing date's by-product (Hafsh) in the birds fed diets from zero to 10 or 15% , as well as yeast supplemented in drinking water from zero , 1 or 2 g yeast /L water led to an increase in egg production by 7.16 and 10.74 % of the control value(zero Hafsh) , 13.76 and 18.89 % of the control value(zero yeast), egg weight by 6.79 and 5.47% of the control value(zero Hafsh), 5.2 and 12.19 % of the control value(zero yeast), , egg mass/hen/day by 18.28, 14.4 % of the control value(zero Hafsh), 19.81 and 33.71 % of the control value(zero yeast), while feed conversion (g feed / g egg) decreased by 5.76 and 4.32 % of the control value(zero Hafsh), 6.05 and 12.09 % of the control value(zero yeast), respectively.

There were significant interactions between adding dietary Hafsh into diets and yeast levels into water used in the present study on all the productive performance as shown in Table (3) .Result showed that bird treated by 2g/L yeast in water and Hafsh (10%) into diets had the higher ($P<0.05$) egg production, egg weight, egg mass/hen/day and improved ($P<0.05$) feed conversion as (g feed / g egg) compared with the other dietary treatments. The present results are in agreement with that of Whitehead et al. (1998) and Kirunda et al. (2001) who found that egg production is reduced due to elevated of environmental temperature. They suggested that decreasing in egg production was most likely due to the decreasing in hens feed consumption, and reducing the available nutrients for egg production. This depression could be attributed to higher ambient temperature and its effects on the different hens' physiological characters.

The increased egg production by both different levels hafsh (nonedible dates produced from dates factories) in the diets with yeast (*Saccharomyces cerevisiae*) supplementation in water may be due to the elongated small and large intestinal lengths as well as the their suppressing effects on stimulating effects on activity of beneficial bacteria in the intestines which increase and undesirable bacteria decreased absorptive capacity (Gibson & Roberfroid ,1995 and Chen et al. 2005; Saleh et al., 2013). Berrin (2011) showed that Supplementation of probiotic and prebiotic to the diet of quail breeders improved egg. This improvement could be due to improvement in the intestinal lumen health and the pathogenic bacterial load reduction in the intestine , 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).Recently, Ghasemi et al. (2014) reported that significant reduction in egg weight and feed conversion ratio when adding date pits meal into layer hen diets yielded. On the other hand, Hermes and Al-Homidan (2004) found that layer hens fed diets containing 10% date pits meal improved the egg weight, egg production, egg mass and feed conversion ratio (kg feed/kg egg). In addition, Najib and Al-Yousef (2012) reported that layer hens fed 10% date pits meal without enzymes enhanced the feed conversion ratio, egg production, egg mass and feed consumption, but reduced egg size compared to those fed 15% date pits meal without enzymes.

Egg quality: In Table (4) shows that yeast irrespective of date wastes and date wastes (hafsh) irrespective of yeast level had significantly ($p<0.05$) higher effect on Egg shape index, Yolk index and Haugh unit , but were no significant on Yolk weight (%),Albumin weight (%), Egg shell weight (%) and Egg shell thickness(mm) in compared with control (zero yeast or zero Hafsh).

There were a significant interactions between adding date's by-product (Hafsh) into diets and yeast levels into water used in the present study on Egg shape index, Yolk index, Egg shell thickness(mm) and Haugh unit , while were no significant on Yolk weight (%),Albumin weight (%) and Egg shell weight (%) in compared to treatment of zero yeast with zero hafsh as shown in Table (4). Results showed that bird treated by 2g yeast/L in water and 10% Hafsh into diets had the best egg quality compared with other dietary treatments.Some investigators (Balevi et al. 2001; Kurtoğlu et al. 2004) noted that the egg specific gravity was not affected by probiotics, while others (Mohan et al. 1995; Panda et al. 2003) reported improvemed egg shell thickness in laying hens.In accordance with the previous studies, probiotic increased egg shell thickness significantly, increased specific gravity and shell thickness might suggest that probiotics may improve the egg shell quality due to the increased Ca absorption from the intestine. Berrin (2011) showed that probiotic and prebiotic supplemented into diet of quail breeders improved egg shell thickness and the improvement in egg shell quality might be resulted from the increased absorption of mineral . The reason for the improvement of the eggshell thickness may be due to the improvement of the shell matrix composition. These results were supported by findings of Sawaya et al. (1984) who found higher calcium, phosphorus, sodium, potassium, iron, magnesium, manganese, zinc and copper

contents in date pits meal might be improved the shell matrix composition. Abd El-Rahman et al. (1999) found that eggshell weight percentage and eggshell thickness were not affected by adding date pits meal up to 30% into layer hen diets. Najib and Al- Yousef (2012) reported that haugh unit and yolk colour were significantly affected by date pits meal level. Kashani et al. (2013) found reduction in eggshell thickness, eggshell weight and egg yolk colour by adding date pits meal up to 21% in layer hen diets. Adding different dietary levels of date pits meal with different beta-mannanase supplementation levels had significant ($p<0.05$) differences among treatments in eggshell weight, eggshell weight percentage, eggshell thickness and eggshell weight per surface area (Hassan and Al Aqil , 2015) .

Blood constituents and hormones:

Data given in Tables (5) shows that yeast irrespective of date wastes and date's by-product (Hafsh) irrespective of yeast level had a significant ($p<0.05$) increasing in blood biochemical parameters and hormones of quail ,i.e., (total protein, albumin, total lipids , high density lipoproteins HDL, triiodothyroine T3, progesterone P4) , while serum cholesterol and Glucose concentration were significantly ($P< 0.05$) decreased compared with the control (zero Hafsh or yeast). Increasing Hafsh in the birds fed diets from zero to 10 or 15% , as well as yeast supplemented in drinking water from zero , 1 or 2 g yeast /L water led to an increase in total protein by 14.18 and 13.03% of the control value(zero Hafsh),13.6 and 28 % of the control value(zero yeast), albumin by 25.89 and 20.86% of the control value (zero Hafsh), 34.65 and 44.88 % of the control value(zero yeast), total lipids by 16.51 and 8.38 % of the control value(zero Hafsh),18.91 and 27 % of the control value(zero yeast) , HDL by 5.93 and 3.77 % of the control value(zero Hafsh), 3.25 and 7.28 % of the control value(zero yeast), T3 by 26.55 and 20.35% of the control value(zero Hafsh), 31.4 and 47.83 % of the control value(zero yeast), progesterone P4 by 28.73 and 17.68 % of the control value(zero Hafsh), 25.73 and 40.94 % of the control value(zero yeast), while cholesterol decreased by 11.84, 10.25% of the control value(zero Hafsh), 14.41 and 21.3 % of the control value(zero yeast), and Glucose concentration decreased by 10.66 and 7.74 % of the control value(zero Hafsh) , 8.12 and 16.54 % , of the control value zero yeast) ,respectively.

There were significant interactions between adding date's by-product (Hafsh) into diets and yeast levels into water used in the present study on blood constituents and hormones as shown in Table (5) .Result showed that bird treated by 2g/L yeast in water and 10% Hafsh into diets had the higher ($P<0.05$) total protein,albumin , total lipids , high density lipoproteins HDL, triiodothyroine T3, progesterone P4 and also decreased birds' serum cholesterol and Glucose concentration in compared with the other treatments . The present results are in agreement with the results of Donkoh (1989), Kutlu and Forbes (1993) and Khan et al. (2002) who demonstrated that heating increased bird's blood glucose level. They concluded that the elevation of glucose may be attributed to increased glucocorticoids secretion which increased gluconeugensis. Abramyan and Kostanyan (1990) stated that heat stress considerably decreased the concentration of the total protein in the birds' blood. Guo et al. (1998) found that exposure to

high temperature significantly reduced cholesterol. On the other hand, Tollba and Hassan (2003) reported that there were significant reduction effects of heat stress on T3 level. At high ambient temperature (T = 35°C) plasma T3 concentration was positively correlated with feed intake and live weight gain were significantly declined. Also Novero et al. (1991) showed that progesterone levels from heat stressed hens were significantly lower compared with the control. Haldara et al. (2011) reported that chicks fed diets contain (1 g/kg) of yeast (Saccharomyces cerevisiae), yeast protein concentrate (YPC) and YPC-pellets under heat stress had increased serum T3 level (P=0.001) at 21 d and decreased serum cortisol at 21 and 35 d compared to the control group (P=0.001). 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.In this subject, Fouad et al. (2017) reported that chicks quail fed diets with date wastes (hafsh) or / and yeast in water had significant increased total protein,albumin , total lipids and decreased birds' serum cholesterol and Glucose concentration compared to control.

Digestibility of nutrients:

Data given in Table (6) shows that yeast irrespective of date's by-product (Hafsh) and Hafsh irrespective of yeast level and interactions had a significantly ($p<0.05$) different effect on digestibility of nutrients: Digestibility of dry matter (DM), organic matter (OM), crude protein (CP), ether extract (EE) and NFE in compared with the control (zero hafsh or yeast).

Results showed that bird treated by 2g/L yeast in water and 10% Hafsh into diets had the beast digestibility of nutrients compared with the other dietary treatments as shown in Table (6). The improvement of nutrients digestibility by supplementing layer hens quail diets with Hafsh or / and yeast in water could be due to different stimulators such as reduction of E.coli population and change in the enteric flora , lowering gastric pH, synthesis of catabolic enzymes of favorable microorganisms that help in releasing sugar, cell compounds including amino acids 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 respect , Haldar et al. (2011) and Ghosh et al. (2012) found that supplementation of yeast and yeast products reduced E. coli numbers in the digesta as compared with the control.Also, Fouad et al. (2017)showed that nutrients digestibility improved by supplementing chick quail diets with date wastes (hafsh) or / and yeast in water.

Carcass weight :

In Tables (7) shows that yeast irrespective of date wastes and date's by-product (Hafsh) irrespective of yeast level had significantly ($p<0.05$) higher effect on liver %, gizzard %, ovare % and intestine %, but were no significant on heart % in compared with the control (zero Hafsh or yeast) .

There were a significant interactions between adding dietary Hafsh into diets and yeast levels into water used in the present study on on liver %, gizzard %, ovare % and intestine %, while were no significant on heart % in compared to treatment of zero yeast with zero Hafsh as shown in Table (7) . Result showed that bird treated by 2g/L yeast in water

and Hafsh (10%) into diets had the beast carcass weight compared with the other dietary treatments. Our results were agree with those of Paryad and Mahmoudi (2008) who showed that the inclusion of differrent levels of Saccharomyces scerevisiae in broiler chicks diet significantly affected all carcass characteristics parameters as (liver heart, gizzard ,dressing percentage, breast, leg and abdominal fat percentage). Also Dimcho et al., (2005) and Ivanov, (2004) observed that supplementing diets with probiotics had more improvements in liver, gizzard and heart of broilers, mules and ducklings. Manal and Abou El-Nagha. (2012)noted 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. In addition, Fouad et al.(2017)reported that chicks quail fed diets with date wastes (hafsh) or /and yeast in water had significant increased percentages of liver , gizzard , heart and intestine except spleen ratio was insignificant.The contrary with our results were recorded by Ozsoy and Yalcin (2011) who reported no effect of yeast on weight of liver ,gizzard and heart in broiler chicks fed diet content 1 to 3% yeast.

Table (1): Composition and calculated analysis of the basal diet.

Ingredient	**Basal diet, g/kg**	**Hafsh diets, g/kg**	
Yellow corn	600.5	493	430
Soybean meal (44%)	250	236	244.5
Corn gluten meal (62%)	57	70.5	67
Calcium diphosphate	23	23	23
Limestone	48	48	48
Vit. + Min. premix(1)	2.5	2.5	2.5
NaCl	2	2	2
DL- Methionine	0.5	0.5	0.5
L-Lysine Hcl	1.5	1.5	1.5
Cotton seed oil	15	23	31
Hafsh (nonedible dates)		100	150
Total	1000	1000	1000
Calculated analysis(2)			
Crude protein %	20	20	20
ME (kcal/kg)	2917	2915	2915
Crude fiber %	3.32	4.64	5.37
Crude fat %	4.21	5.15	5.97
Calcium %	2.42	2.42	2.42
Available phosphorus %	0.52	0.52	0.52
Lysine %	1.05	1.04	1.04
Methionine + Cystine %	0.75	0.74	0.74

(1) Layer Vit. + Min. premix: Each 2.5 kg of vitamins and minerals premix (commercial source pfiezer Co.): consist of Vit. A 12 MIU, VIT E15 KIU, Vit. D_3 4 MIU, Vit. B_1 1g, Vit B_2 8g, Vit B_6 2g, Vit B_{12} 10mg,Pantothonic acid 10.87g, Niacin30g, Folic acid 1g, Biotin 150 mg, Copper 5g, Iron 15g, manganese 70g, Iodine 0.5g, Selenium 0.15g, Zinc 60g and antioxidant 10g. (2) Calculated according to NRC (1994).

Table (2): The chemical composition of date residues (Hafsh) (nonedible dates produced from date's factories).

Composition	
Dry matter%	97.45
ME(kcal/kg)	2,699.5
Crude protein%	6.40
Crude fat%	5.58
Crude fiber%	16.4
nitrogen free extract (sugar+starch %)	46.08

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 was typically in agreement with the findings of Najib and Al- Yousef (2012).

Table (3): Effect of different yeast and date wastes (Hafsh) levels on productive performance of Japanese Quails under high environmental temperature during the summer season .

Traits	**Egg production %**	**Egg weight (g)**	**Egg mass(g/hen /day)**	**Feed conversion ratio(g feed/g egg)**
Yeast (Y) effect :				
Y0(zero yeast)control	69.75 c	11.15 c	7.77 c	2.15 a
Y1 (1 gm yeast/liter)	79.35 b	11.73 b	9.31 b	2.02 b
Y2(2 gm yeast/liter)	82.93 a	12.51 a	10.39 a	1.89 c
Pooled SEM	1.288	0.122	0.243	0.021
Date residues or hafsh (D) effect :				
D0(zero hafsh)control	72.62 c	11.33 c	8.26 c	2.08 a
D1(10% hafsh of diet)	78.82 b	12.10 a	9.77 a	1.96 c
D2(15% hafsh of diet	80.42 a	11.95 b	9.45 b	1.99 b
Pooled SEM	2.066	0.201	0.393	0.042
Interactions between Yeast (Y) and Date residues or hafsh (D):				
Y0 X D0	63.49 i	10.81 g	6.86 i	2.15 a
Y0 X D1	74.60 g	11.36 ef	8.47 g	2.11 b
Y0 X D2	70.62 h	11.28 f	7.96 h	2.18 a
Y1 X D0	76.19 f	11.43 e	8.71 f	2.10 b
Y1 X D1	79.74 d	11.83 cd	9.43 d	1.99 c
Y1 X D2	82.13 c	11.92 c	9.79 c	1.96 d
Y2 X D0	78.17 e	11.76 d	9.19 e	1.97 cd
Y2 X D1	86.90 a	13.12 a	11.4 a	1.78 f
Y2 X D2	83.71 b	12.65 b	10.59 b	1.85 e
Pooled SEM	0.523	0.038	0.073	0.012

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

Table (4): Effect of different yeast and date wastes (Hafsh) levels on egg quality of Japanese Quails under high environmental temperature during the summer season .

Traits	Egg shape index	Yolk index	Yolk weight (%)	Albumin weight (%)	Egg shell weight (%)	Egg shell thickness(mm)	Haugh unit
Yeast (Y) effect :							
Y0(zero yeast) control	76.51 b	4.75 b	33.354	53.352	13.293	19.07 a	94.68 c
Y1 (1 gm yeast/liter)	77.56 a	4.78 b	33.356	53.347	13.297	19.29 a	95.59 b
Y2(2 gm yeast/liter)	77.70 a	4.88 a	33.361	53.347	13.292	19.51 a	95.86 a
Pooled SEM	0.191	0.017	0.012	0.015	0.016	0.329	0.142
Date residues or hafsh (D) effect :							
D0 (zero hafsh) control	76.69 b	4.76 c	33.351	53.368	13.281	19.18 a	94.85 b
D1 (10% hafsh of diet)	77.54 a	4.85 a	33.361	53.339	13.300	19.29 a	95.66 a
D2(15% hafsh of diet	77.54 a	4.79 b	33.360	53.339	13.301	19.40 a	95.61 a
Pooled SEM	0.222	0.023	0.012	0.014	0.015	0.336	0.186
Interactions between Yeast (Y) and Date residues or hafsh (D):							
Y0 X D0	76.33 b	4.73 d	33.343	53.373	13.283	18.99 c	94.56 f
Y0 X D1	76.65 b	4.76 cd	33.360	53.343	13.297	19.11 bc	94.77 e
Y0 X D2	76.56 b	4.74 cd	33.360	53.340	13.300	19.11 bc	94.72 ef
Y1 X D0	76.89 b	4.77 cd	33.353	53.357	13.290	19.22 abc	95.00 d
Y1 X D1	77.79 a	4.78 c	33.350	53.357	13.293	19.11 bc	95.79 c
Y1 X D2	78.00 a	4.78 c	33.367	53.327	13.307	19.55 ab	95.97 bc
Y2 X D0	76.86 b	4.77 cd	33.357	53.373	13.270	19.33 abc	95.00 d
Y2 X D1	78 18 a	5.01 a	33.373	53.317	13.310	19.66 a	96.43 a
Y2 X D2	78.07 a	4.86 b	33.353	53.350	13.297	19.55 ab	96.14 b
Pooled SEM	0.217	0.017	0.021	0.024	0.027	0.442	0.083

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

Table (5): Effect of different yeast and date wastes (Hafsh) levels on blood parameters of Japanese Quails under high environmental temperature during the summer season .

Traits	Total protein (g/dl)	Albumin (g/dl)	Total lipids (mg/dl)	Cholesterol (mg/dl)	Glucose (mg/dl)	HDL (mg/dl)	T3 (ng/ml)	P4 (ng/dl)
Yeast (Y) effect :								
Y0 (zero yeast) control	2.50 c	1.27 c	300.3 b	178.4 a	269.7 a	41.22 b	2.07 c	1.71 c
Y1 (1 gm yeast/liter)	2.84 b	1.71 b	357.1 a	152.7 b	247.8 b	42.56 b	2.72 b	2.15 b
Y2(2 gm yeast/liter)	3.20 a	1.84 a	381.4 a	140.4 c	225.1 c	44.22 a	3.06 a	2.41 a
Pooled SEM	0.069	0.058	9.997	3.336	4.391	0.443	0.093	0.085
Date residues or hafsh (D) effect :								
D0 (zero hafsh) control	2.61 b	1.39 c	319.8 c	169.7 a	263.7 a	41.33 c	2.26 c	1.81 c
D1 (10% hafsh of diet)	2.98 a	1.75 a	372.6 a	149.6 c	235.6 c	43.78 a	2.86 a	2.33 a
D2(15% hafsh of diet	2.95 a	1.68 b	346.6 b	152.3 b	243.3 b	42.89 b	2.72 b	2.13 b
Pooled SEM	0.106	0.089	13.635	5.694	6.770	0.512	0.148	0.111
Interactions between Yeast (Y) and Date residues or hafsh (D):								
Y0 X D0	2.40 g	1.13 h	284.7 e	184.7 a	283.3 a	40.67 e	1.86 i	1.42 g
Y0 X D1	2.40 g	1.37 f	331.3 d	172.7 c	260.0 c	41.67 d	2.23 g	2.06 de
Y0 X D2	2.58 f	1.30 g	285.0 e	178.0 b	265.7 b	41.33 de	2.13 h	1.65 f
Y1 X D0	2.70 e	1.47 e	340.0 cd	166.7 d	255.3 cd	41.67 d	2.41 f	1.89 e
Y1 X D1	2.80 d	1.80 c	364.0 bcd	148.3 f	245.3 e	42.67 c	2.82 d	2.23 cd
Y1 X D2	3.01 c	1.85 bc	367.3bc	143.0 g	242.7 e	43.33bc	2.92 c	2.32 bc
Y2 X D0	2.73 de	1.56 d	334.7cd	157.7 e	252.3 d	41.67d	2.53 e	2.13 d
Y2 X D1	2.73 de	2.08 a	422.3 a	127.7 i	201.3 g	47.00a	3.53 a	2.89 a
Y2 X D2	2.73 de	1.89 b	387.3ab	136.0 h	221.7 f	44.00b	3.13 b	2.43 b
Pooled SEM	0.021	0.017	5.209	1.221	1.693	0.388	0.012	0.029

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

SEM, Standard error of mean; HDL = High density lipoprotein; T3= Triiodothyronine hormone; P4 = Progesterone hormone.

Table (6): Effect of different yeast and date wastes (Hafsh) levels on digestibility values (DM, CP, EE, CF and NFE) of Japanese Quails under high environmental temperature during the summer season .

Traits	DM (%)	CP(%)	EE (%)	CF (%)	NFE (%)
Yeast (Y) effect :					
Y0 (zero yeast) control	73.03 a	81.24 c	79.93 a	33.73 a	79.63 a
Y1 (1 gm yeast/liter)	70.21 b	82.39 b	75.95 b	33.64 a	79.20 b
Y2(2 gm yeast/liter)	69.18 c	83.96 a	74.19 c	33.53 a	78.78 c
Pooled SEM	0.323	0.366	0.695	0.137	0.113
Date residues or hafsh (D) effect :					
D0 (zero hafsh) control	71.92 a	81.22 c	79.36 a	33.15 c	79.48 a
D1 (10% hafsh of diet)	69.88 c	83.45 a	74.87 c	33.73 b	78.87 c
D2(15% hafsh of diet	70.62 b	82.92 b	75.82 b	34.01 a	79.25 b
Pooled SEM	0.593	0.415	0.862	0.084	0.138
Interactions between Yeast (Y) and Date residues or hafsh (D):					
Y0 X D0	73.43 a	80.56 g	81.81 a	32.93 f	79.59 ab
Y0 X D1	72.49 b	81.88 e	78.65 c	33.98 ab	79.55 ab
Y0 X D2	73.17 a	81.29 f	79.32 b	34.28 a	79.77 a
Y1 X D0	71.54 c	81.22 f	78.50 c	33.30 def	79.55 ab
Y1 X D1	69.34 ef	82.72 d	74.62 e	33.70 bcd	78.82 d
Y1 X D2	69.75 e	83.24 c	74.66 e	33.91 abc	79.22 c
Y2 X D0	70.79 d	81.90 e	77.76 d	33.23 ef	79.31 bc
Y2 X D1	67.80 g	85.74 a	71.34 g	33.52 cde	78.25 e
Y2 X D2	68.95 f	84.23 b	73.47 f	33.85 bc	78.78 d
Pooled SEM	0.113	0.135	0.169	0.079	0.082

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

DM= dry matters; CP= crude protein; EE=: ether extract; CF= crude fiber; NFE= nitrogen free extract.

Table (7): Effect of different yeast and date wastes (Hafsh) levels on Carcass characteristics,liver, gizzard, heart, Ovare and intestine were calculated in relation to the live body weight of Japanese Quails under high environmental temperature during the summer season .

Traits	Liver %	Gizzard %	Heart %	Ovare %	Intestine %
Yeast (Y) effect :					
Y0 (zero yeast) control	0.021 c	0.013 c	0.0090	0.021 c	0.028 c
Y1 (1 gm yeast/liter)	0.025 b	0.014 b	0.0090	0.038 b	0.035 b
Y2(2 gm yeast/liter)	0.027 a	0.017 a	0.0091	0.034 a	0.039 a
Pooled SEM	0.00056	0.00043	0.00001	0.00138	0.00103
Date residues or hafsh (D) effect :					
D0 (zero hafsh) control	0.022 c	0.014 c	0.0090	0.023 b	0.030 b
D1 (10% hafsh of diet)	0.026 a	0.016 a	0.0090	0.031 a	0.036 a
D2(15% hafsh of diet	0.025 b	0.015 b	0.0091	0.031 a	0.035 a
Pooled SEM	0.00082	0.00058	0.00002	0.00186	0.00164
Interactions between Yeast (Y) and Date residues or hafsh (D):					
Y0 X D0	0.020 h	0.013 e	0.0090	0.019 h	0.024 h
Y0 X D1	0.023 f	0.014 de	0.0090	0.024 f	0.031 f
Y0 X D2	0.022 g	0.013 e	0.0091	0.023 g	0.028 g
Y1 X D0	0.024 e	0.014 d	0.0090	0.024 ef	0.032 e
Y1 X D1	0.026 d	0.014 d	0.0091	0.030 d	0.035 d
Y1 X D2	0.027 c	0.015 c	0.0091	0.031 c	0.037 c
Y2 X D0	0.024 e	0.014 d	0.0091	0.025 e	0.033 e
Y2 X D1	0.029 a	0.020 a	0.0091	0.040 a	0.042 a
Y2 X D2	0.028 b	0.016 b	0.0091	0.038 b	0.041 b
Pooled SEM	0.00004	0.00029	0.00003	0.00032	0.00032

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

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الملخص العربى

تأثير استخدام الخميره والحفش على الأداء الانتاجى والفسيولوجى لدجاجات السمان اليابانى تحت ظروف الجو الحار

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تم اجراء هذه التجربه لدراسه تأثير مستويات مختلفه من الحفش(عبارة عن التمور الغير صالحة للاكل الناتجة من مصانع التمور) مضافة للعليقة الأساسية و مستويات مختلفه من الخميرة مضافه فى ماء الشرب على الاداء التناسلى والفسيولوجى لدجاجات السمان اليابانى تحت ظروف الجو الحار وكانت درجه الحراره تتراوح بين 40 – 45 درجه مئويه ورطوبه نسبيه 50 % خلال فتره التجربه من الاسبوع 8 وحتى الاسبوع 14 من العمر، أخذ عدد 54 انثى سمان) تم وزنهم وتوزيعهم عشوائى فى 9 مجموعات بكل منها ثلاث مكررات ، واستخدم تصميم Factorial (3 x 3). وكانت المعاملات عباره عن ثلاث مستويات من الحفش مضافة للعليقة الاساسية وهى صفر ، 10 و 15 % من العلف و ثلاث مستويات مختلفه من الخميرة (صفر ، 1 و 2 جم / لتر ماء شرب) . واوضحت النتائج المتحصل عليها ان كل من مستويات الخميرة و الحفش والتفاعل بينهم أحدث تحسن معنوى فى انتاج البيض ووزن البيض وكتله البيض والتحويل الغذائى وجوده البيض كما سجلت اختلافات معنويه فى بعض صفات الدم الكيموحيويه (البروتين الكلى ، الالبيومين ، الليبيدات الكلية، HDL ، الكوليسترول ، تركيز الجلوكوز) وبعض الهرمونات (T3 والبروجيسترون) وكذلك تحسن الهضم ، وحدث تحسن معنوى فى نسب بعض الاعضاء الداخلية منسوبة لوزن الطائر الحى (الكبد ، القونصة ، الامعاء و المبيض) عدا نسبه وزن القلب كانت غير معنويه .

بناء على الدراسة الموجودة وجد إن استخدام 2.0 جم خميرة/ لتر ماء شرب مع 10 % حفش مضاف الى العلف ادى الى تحسن الاداء التناسلى للدجاج السمان وجوده البيض والحاله الفسيولوجيه ووالهضم ووزن الذبيحة تحت ظروف الجو الحار خلال فصل الصيف .