



## EFFECT OF ADDING *YUCCA SCHIDIGERA* POWDER TO DOMYATI DUCKLINGS DIETS ON SOME PRODUCTIVE CHARACTERISTICS AND ECONOMIC EFFICIENCY DURING SUMMER SEASON

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**ABSTRACT:** A 320 males Domyati ducklings, 20-day-old were utilized, weighed and partitioned into four empirical groups (five replicates each) to assess the dietary *Yucca Schidigera* (YS) addition (0.0, 0.15, 0.30 and 0.45 g/kg diet) effects on growth characteristics, some blood parameters and economic efficiency during summer season within a complete randomized design. Results cleared the dietary YS addition produced heavier ( $p < 0.001$ ) body weight (BW) for ducklings at 80 d-old. Moreover, both BW gain and feed efficiency were ameliorated ( $P < 0.001$ ) by adding all YS levels, however feed consumption was escalated ( $P < 0.001$ ) by adding 0.15 g/kg diet and diminished ( $P < 0.001$ ) by 0.30 g YS/kg than the control group during the entire period (20-80 d-old). Adding all YS levels to duckling's diet produced a significant ( $P \leq 0.01$ ) hike in blood Hb, RBCs and WBCs count as well as lymphocytes (L) cells (%), furthermore, they minimized the heterophils (H) cells (%) and H/L ratio than the control group. Serum triglycerides was attenuated ( $P < 0.001$ ) consequent to dietary YS addition than the control, while both total cholesterol and LDL-cholesterol were lowered ( $P < 0.026$ ) by adding 0.15 g YS/kg only. Antioxidant enzymes activity were ( $P < 0.001$ ) promoted owing to dietary YS addition compared with the control, while MDA was lowered ( $P > 0.05$ ). Abdominal fat (%) was significantly attenuated by dietary YS, but eviscerated carcass and total edible parts (%) were ( $P < 0.001$ ) better by all YS levels addition than the control. Net return and economic efficiency were improved ( $P < 0.001$ ) for ducklings fed 0.45 g YS/kg diet than the control at 80 d-old. So, the results signalized that inclusion YS addition with 0.45 g/kg could be maximize and ameliorate the productive performance and carcass traits as well as economic efficiency of males Domyati ducklings throughout growth phase under Egyptian summer conditions.

**Key words:** Domyati ducks, *Yucca Schidigera*, growth traits, carcass, antioxidants

## INTRODUCTION

Duckling's production is one of the utmost gainful, enterprise accountable for rural labor assemble specially weakly and negligible producers in Egypt. Moreover, rising inhabitances, unsteady behavior, food habits shifting, speedy civilization, growing capita revenue, and understanding health care are owing to a rising demand of ducks products. High ecological temperature in conjunction with high wetness through summer season impulse to bad heat stress in poultry. Heat stress may shatter the balance of body redox that can lead to various hurtful impacts on livestock productivity, such as high animal morbidity, mortality, and reduction in growth, immediately resulting in perceptible economic losses of domestic animal industry (Renaudeau et al., 2012). Also, mounting heat stress may encourage reactive oxygen species (ROS) and induce anti-oxidant system disorders, which affect nutrient absorption and metabolism (Yang et al., 2010).

Phytogetic additives (phytobiotics or botanicals) are ordinarily confined as plant- deduced integrations, which added to livestock feeds for improving their productivity through amelioration feed properties, promoting growth and improving food quality derived from them (Collington et al., 1990). *Yucca schidigera* is a medical plant that emerges vastly in the deserts. It's a source of steroidal saponins which physically binds ammonia, reducing free ammonia level in farm, and it has an antioxidant characteristics. *Yucca schidigera* had worthy effect on amelioration lucrative traits that lead up maximal production level with better characteristics (Nazeer et al., 2002). Moreover, YS is a source of polyphenolics, inclusive of resveratrol

and a numeral of other stilbenes (yuccaols A, B, C, D and E). These phenolics have anti-inflammatory efficacy and antioxidant vigor (Cheeke et al., 2006). So, *Yucca schidigera* outputs are used as feed additives and pharmaceutical manufacture (Chrenkova et al., 2012).

*Yucca schidigera* powder or extract are utilized as livestock feed additives because their helpful effects such as improving growing rate and feeding efficiency as well as NH<sub>3</sub> reduction in atmospheric within closing livestock farms. Moreover, it anti- protozoa, adjustment ruminal microbe inhabitants, suppression Gram<sup>+</sup> bacteria (Cheeke and Otero, 2005). Also, dietary YS inclusion recorded positive effects on BW gain (Sahoo et al. 2015), feeding efficiency (Wang and Kim 2011) and chick's haleness (Alfaro et al. 2007). But, no found available data on utilizing YS in ducklings diets to protect or mitigate the possibility negative effects from oxidative stress within summer. So, the current study aimed to elucidate the effect of the inclusion *Yucca Schidigera* (YS) powder as a natural antioxidant and growth promoter of ducklings during growing phase under summer season

## MATERIALS AND METHODS

### Animals, experimental design and feeding:

The current investigation carried out at El – Serw Water Fowl Research Station, Animal Production Research Institute, Egypt, throughout June to August months (summer conditions). A 320 of males Domyati ducklings-20 d-old (initial body weight of 425.0±5.0 g) were partitioned into four empirical groups in a complete randomized design. Each group consisted of five replicates (of 16 ducklings each). Each replicate was housed in a pen as 2.3

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ducks /m<sup>2</sup> in an open-sided house. Throughout the empirical period, feed and fresh water were available all the time. Four graded levels of *Yucca schidigera* (YS) powder 0.0, 0.15, 0.30 and 0.45 g/ kg diet were added to the basal grower diet and used in feeding empirical groups. The ingredients, composition and calculated analysis of the basal empirical diet are shown in Table 1. *Yucca schidigera* purchased from Free Trade Egypt Company, Behira, Egypt. Vaccination and medical schedule were done under a licensed veterinarian.

### **Data collections:**

#### **Growth traits:**

Ducklings were weighed at 20, 40, 60 and 80 day-old. Mortality was recorded during the entire experiment. Feed consumption (FC), body weight gain (BWG) and feed conversion ratio (FCR) were calculated during the period of 20-40, 41-60, 61-80 and the entire period 20-80 day old.

#### **Carcass evaluations:**

At experiment ending (80 d-old), twenty ducklings (five per each group) were randomly taken for carcass evaluations, then weighed and manually slaughtered. Carcass parts weight (the main body, head, liver, heart and gizzard) was determined, then expressed as a percentage of live weight. Total edible parts percentage was recorded (carcass weight plus giblets weight) as a percentage of live body weight.

**Blood metabolize parameters:** At the 70<sup>th</sup> day of age, blood samples were collected in vial tubes containing EDTA as anticoagulant from five ducklings per each treatment to determine hematological traits such as hemoglobin, white blood cells count, heterophils (H) and lymphocytes (L) percentages (Gross

and Siegel, 1986). Also, another blood samples were collected from sacrificed ducklings in clean sterile tubes. Samples were let to coagulate and centrifuged at 3000 rpm for 15 min to obtain serum and serum samples were kept in Eppendorf tubes at -20°C until analyzed. The following serum biochemical parameters were determined: triglyceride, total cholesterol, high density lipoprotein cholesterol (HDL) and low-density lipoprotein (LDL) cholesterol were determined spectrophotometrically using commercial diagnostic kits provided by Biodiagnostic Co. (Giza, Egypt). Also, serum samples were subjected to the measurement of superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) activities and reduced glutathione (GSH) as well as malondialdehyde (MDA) levels by spectrophotometric methods using a spectrophotometer. Activity of SOD was measured according to Winterbourn et al. (1975). Activity of GSH-Px was detected according to Hafeman et al. (1974). Reduced glutathione (GSH) concentration was analyzed by the methods of Beutler et al. (1963). The MDA level was analyzed according to Jensen et al. (1997).

**Economic evaluation:** Economic parameters were calculated at the end of the studied period according to the price of feed ingredients, *Yucca schidigera* powder (600 LE/kg), live body weight sales (30.0 LE/ one kg) at investigation time (June month, 2020).

#### **Statistical analysis:**

Data was subjected to analysis of variance procedures appropriate for a completely randomized design using the GLM procedures of SPSS (2008). Differences among treatment means were

estimated by Duncan's multiple range test (Duncan, 1955).

## RESULTS AND DISCUSSION

### Growth performance:

Ducklings live body weight (LBW) at 40, 60 and 80 d-old was ( $p < 0.001$ ) heavier in groups fed dietary *Yucca schidigera* (YS) than the control (Table 2). Also, cumulative body weight gain was ( $p < 0.001$ ) elevated for ducklings fed YS in their diets through the entire period (20-80 d), it's improved by 13.27 – 17.56% than that fed control diet. Feed consumption (FC) not ( $P > 0.05$ ) affected through the first period (20-40 d-old), while it significantly affected within the other empirical periods owing to adding YS to the diet than control group. Ducklings fed 0.15 g YS/kg diet consumed more FC amount, while those fed 0.30 g YS/kg recorded the lesser FC through the full tested period (20-80 d of age) compared with the control (Table 2). Feed conversion ratio (FCR) was ( $p < 0.001$ ) best in all YS groups than the control group in both 20-40 and 20-80 d-old phases of experiment, while ducklings fed both 0.15 or 0.45 g YS/kg recorded the best FCR value at 41-60 and 61-80 d old than other groups.

Improving final LBW may be linked to YS saponins content that can promote nutrients absorption within intestinal area (Wang and Kim, 2011). Elevation of duckling's weight could owing to active physiologic YS components such steroidal saponins that growth promoting (Piacente et al. 2005). Also, polyphenols in YS could acts as antioxidant and anti-inflammatory (Cheeke et al., 2006). Better FCR within YS groups could attributed to enhance BW gain and YS saponins and phenolic contents that performed to emulsification oil fats, promoting their digestion and absorption

(Alfaro et al., 2007; Alagawany et al., 2014). These results are in the line with Cabuk et al. (2004) who explored broilers BW increased with 120 mg YS/kg diet. Zhang et al. (2014) found that daily weight gain significantly enhanced on 400 mg *Yucca schidigera* extract (YSE) /kg diet of broilers. Sahoo et al. (2015) indicated the use of 125 mg YS extract /kg in broilers diet increased their growth through the first 6 wks-old. Jun-Ling et al. (2016) noticed the broiler chickens fed 100 mg YS extract /kg diet recorded the higher BW and BWG than the control at 42 d-old. Su et al. (2016) stated dietary YS (100 mg/kg) addition improved broilers body weight gain during the finisher period.

Also, YS supplementation with 250 mg /kg to rabbit's diet improved FCR conversion (Hussain et al., 1996). Sahoo et al. (2015) indicated, adding 125 mg YS extract /kg to broilers diet revealed lesser FC and better FCR through the first 6 wks-old. Su et al. (2016) cleared an improvement in feed efficiency by dietary YS powder addition with 100 mg/kg of broilers. Also, Jun-Ling et al. (2016) cleared the broiler chickens fed YS diets (100 or 200 mg YS extract /kg) diet recorded a positive effects on feed efficiency than the control. Ayoub et al. (2019) showed that chicks received *yucca schidigera* had lesser feed consumption and better feed conversion ratio.

### Blood metabolites parameters:

All studied blood hematological parameters for ducklings fed YS diets are illustrate in Table 3. Blood Hb, RBCs and WBCs count were significantly elevated by adding YS to duckling's diet in comparison with the control group. Moreover, lymphocytes cells (L) percentage was significantly increased, while both heterophils cells (H) and H/L

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ratio were significantly lowered by feeding YS diet as compared with the control. The significant decrease in hemoglobin and L cells, while, the significant increase in H cells (%) and H/L ratio for ducklings in control group may be referred to heat and alimentation stress during summer season, which deteriorate blood cells synthesis (Oladele et al., 2001). These findings are similar with Cetin et al. (2009) who demonstrated a decrease in leucocytes and lymphocytes (%) during the months of July to October in Angora rabbits. Also, blood hemoglobin and L cells (%) significantly decreased for ducks reared within summer season (Awad et al., 2016). Broilers fed 100 mg YS/kg diet exhibited increase ( $P < 0.05$ ) lymphocyte counts compared with the control (Begum et al., 2015). These results may be due YS phenolic content that acts anti-inflammatory and antioxidant action (Cheeke et al., 2006). Or, YS is commercially important source for various enzymes, saponins, antioxidants, and resveratrol which they act to prevent occurs heat stress (Saeed et al., 2018). Moreover, YS saponin content can provide some immunomodulatory effects (Oelschlager et al., 2019).

Data of Table 3 shows serum biochemical parameters of ducklings fed YS diets. A significant differences were observed in studied lipid profile constituents, serum triglycerides was significantly attenuated in all YS groups, while both total and LDL cholesterol were significantly decreased by 0.15 g YS/kg as compared with the control. On the other hand HDL cholesterol was elevated by adding YS to the diet with or without significant effect comparing with the control. These decrease may be due to saponin in YS could inhibit cholesterol synthesis and

enhance the catabolic pathway (Shi et al., 2014). These findings are agreed with Pasaribu et al. (2014) who reported that the use of saponin (125-500 mg/100 g diet) reduced triglyceride, total cholesterol and LDL-cholesterol in chicken blood plasma. In contrary, these results were disagreed with Ashour et al. (2014) who cleared that adding 0.4 and 0.6 g YS / kg diet decreased HDL-cholesterol and increased ( $p < 0.05$ ) triglycerides in YE groups compared to the control diet.

Malondialdehyde level manifest a ticklish indicator to lipids oxidation (Shafey et al., 2015), while SOD is a paramount and exists substance in tissues and organisms to memorizing from superoxide radical harms (Kurutas, 2016). In vitro, YS phenolic prevent and decrease reactive oxygen species (ROS) production (Olas et al., 2005). The results of serum antioxidant are illustrated in Table 3. Both glutathione enzymes and superoxide dismutase activity were increased ( $p \leq 0.001$ ) by adding different YS level, while malondialdehyde (MDA) tend to decrease compared with the control. Lowering MDA and elevating SOD level could owing to YS ability can scavenge free radicals or prevent superoxide and hydrogen peroxide formation (Enginar et al., 2006). Glutathione (GSH), superoxide dismutase (SOD) increase by adding YSE up to 0.10 g/kg laying hens diet, while Malondialdehyde (MDA) decreased (Alagawany et al., 2016). Su et al. (2016) demonstrated using 100 mg YE/kg diet stimulates growth and immune functions owing to their polyphenols content. These findings are similar with Alagawany et al. (2016) who stated YSE addition elevated SOD and glutathione (GSH), and lowered MDA level laying hens blood. Also, YSE addition to rats decreased MDA, and

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increased the GSH in blood and tissue (Cigerci et al., 2009).

### **Carcass characteristics**

Data of carcass traits are present in Table 4. Relative eviscerated weight was significantly affected, it higher ( $p<0.001$ ) for ducklings fed YS diets comparing with the control. Similarly, total eating parts was ( $p<0.001$ ) more for YS group than the control, while no any difference were observed in total giblets weight (%). Abdominal fat recorded a significant decrease in all YS group's carcasses comparing with the control. The same findings were established by Nazeer et al. (2002). Asad et al. (2020) observed the dressing percentage and the weights of carcass significantly elevated by YS addition to broilers diet. Abaza and El-Said (2005) found the abdominal fat was ( $p<0.05$ ) decreased in all YS group's carcasses comparing with the control, however, they found ( $p<0.05$ ) decrease in dressing % when YS increased in rabbit diet.

### **Economic evaluation:**

The effect of dietary YS addition on economic evaluation parameters of Domyati ducklings was illustrated in

Table 5. The addition YS cost was ( $p<0.001$ ) increased in YS groups. Feed consumed cost was lowered by adding 0.3 g YS/kg diet , while total cost was increased ( $p<0.001$ ) for duckling fed 0.15 and 0.45 g YS/kg diet compared to control. On the other hand, total sales was significantly enhanced by 10.89 -14.44 %for ducklings fed different YS levels than the control through the studied period. Both net revenue and economic efficiency ratio were elevated ( $p<0.001$ ) by increasing YS level in the diet compared with the control group. These findings may be due to the decrease of feed consumed with YS addition and improving final body weight of ducklings.

### **CONCLUSION**

Obtained results explained that, the best results in most studied traits were recorded for *Yucca Schidigera* (YS) addition to duckling's diets with 0.45 g / kg through growing phase. So, it could be advised that adding YS may be an alternative method to maximize the productivity of Domyati ducklings with no adverse effects on their performance and economic efficiency.

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**Table (1):** Composition and calculated analysis of the basal diet fed to Domyati ducklings throughout the experimental period

<b>Ingredients %</b>	<b>Starter (20-40 d-old)</b>	<b>Grower (41-80 d-old)</b>
Yellow corn	65.95	67.55
Soya bean meal (44%)	30.25	23.6
Wheat bran	0.0	4.95
Di-calcium phosphate	1.70	1.70
Limestone	1.40	1.50
Vit & Min. premix *	0.30	0.30
NaCl	0.30	0.30
DL. Methionine (97%)	0.10	0.10
Total	100	100
<b>Calculated Analysis **</b>		
Crude protein %	19.01	17.00
ME ( Kcal / kg )	2885	2855
Calcium (%)	1.01	1.03
Av. phosphorus (%)	0.45	0.45
LE, kg	5.101	4.934

\* Each 3kg of premix contains 100 million IU Vit A; 2 million IU Vit.D3; 10 g Vit.E; 1 g Vit.K<sub>3</sub>; 1 g Vit B1; 5 g Vit B2 ; 10 mg Vit.B12 ; 1.5 g Vit B6; 30 g Niac ; 10 g Panto acid ; 1g Folic acid; 50 mg Biotin ; 300 g Cho.; 50 g Zinc; 4 g Copper; 0.3 g Iodine ; 30 g Iron; 0.1 g Selenium; 60g Manganese ; 0.1 g Cobalt; and carrier CaCO<sub>3</sub> to 3000 g .

\*\*According to NRC (1994)

**Table (2):** Effect of yucca schidigera powder (YS) addition to Domyati ducklings diet on growth performance parameters

Age (day)	Yucca Schidigera levels, g/kg diet				Pooled SEM	P-value
	0.0	0.15	0.30	0.45		
<b>Live body weight (g) at</b>						
20	421.4	428.0	421.8	428.2	2.5	0.662
40	992.2 <sup>c</sup>	1035.4 <sup>b</sup>	1206.8 <sup>a</sup>	1206.8 <sup>a</sup>	23.2	0.001
60	1661.8 <sup>c</sup>	1788.0 <sup>b</sup>	1910.8 <sup>a</sup>	1927.8 <sup>a</sup>	25.9	0.001
80	2164.2 <sup>c</sup>	2402.0 <sup>b</sup>	2399.0 <sup>b</sup>	2477.0 <sup>a</sup>	29.2	0.001
<b>Body weight gain (g)</b>						
20-40	570.8 <sup>b</sup>	607.4 <sup>b</sup>	785.0 <sup>a</sup>	778.6 <sup>a</sup>	23.4	0.001
41-60	669.6 <sup>b</sup>	752.6 <sup>a</sup>	704.0 <sup>ab</sup>	721.0 <sup>ab</sup>	10.3	0.021
61-80	502.4 <sup>bc</sup>	614.0 <sup>a</sup>	488.2 <sup>c</sup>	549.2 <sup>a</sup>	13.5	0.001
20-80	1742.8 <sup>b</sup>	1974.0 <sup>a</sup>	1977.2 <sup>a</sup>	2048.8 <sup>a</sup>	29.0	0.001
<b>Feed consumption per duckling (g)</b>						
20-40	2390.2	2348.6	2393.4	2392.4	17.4	0.791
41-60	2921.8 <sup>b</sup>	3022.0 <sup>a</sup>	2915.8 <sup>b</sup>	2859.6 <sup>b</sup>	18.1	0.005
61-80	3250.4 <sup>b</sup>	3381.0 <sup>a</sup>	3019.0 <sup>c</sup>	3217.0 <sup>b</sup>	34.2	0.001
20-80	8562.4 <sup>b</sup>	8751.6 <sup>a</sup>	8328.2 <sup>c</sup>	8469.0 <sup>bc</sup>	43.7	0.001
<b>Feed conversion ratio (g feed : g BWG)</b>						
20-40	4.20 <sup>a</sup>	3.88 <sup>b</sup>	3.05 <sup>c</sup>	3.07 <sup>c</sup>	0.12	0.001
41-60	4.37 <sup>a</sup>	4.02 <sup>b</sup>	4.15 <sup>ab</sup>	3.97 <sup>b</sup>	0.05	0.001
61-80	6.48 <sup>a</sup>	5.53 <sup>c</sup>	6.23 <sup>ab</sup>	5.87 <sup>bc</sup>	0.12	0.016
20-80	4.91 <sup>a</sup>	4.44 <sup>b</sup>	4.21 <sup>c</sup>	4.14 <sup>c</sup>	0.08	0.001

a,b,c, :means in the same row within each item bearing different superscript are significantly different ( $P \leq 0.05$ ).

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**Table (3):**Effect of yucca schidigera powder (YS) addition to Domyati ducklings diet on blood metabolites parameters at 80 day of age.

Constituents	Yucca Schidigera levels, g/kg diet				Pooled SEM	P-value
	0.0	0.15	0.30	0.45		
<b>Blood hematological parameters</b>						
Hemoglobin	11.81 <sup>b</sup>	13.24 <sup>a</sup>	13.38 <sup>a</sup>	13.24 <sup>a</sup>	0.19	0.002
Red blood cells	3.58 <sup>b</sup>	4.03 <sup>a</sup>	4.02 <sup>a</sup>	4.01 <sup>a</sup>	0.06	0.005
White blood cells	16.60 <sup>b</sup>	19.86 <sup>a</sup>	19.34 <sup>a</sup>	17.06 <sup>b</sup>	0.42	0.002
Heterophils (H), %	27.80 <sup>a</sup>	14.54 <sup>b</sup>	14.44 <sup>b</sup>	13.82 <sup>b</sup>	1.38	0.001
Lymphocytes (L), %	63.00 <sup>b</sup>	79.00 <sup>a</sup>	77.60 <sup>a</sup>	78.80 <sup>a</sup>	1.57	0.001
H/ L ratio	0.442 <sup>a</sup>	0.184 <sup>b</sup>	0.187 <sup>b</sup>	0.175 <sup>b</sup>	0.03	0.001
<b>Serum lipids profile</b>						
Triglycerides, mg/dl	117.73 <sup>a</sup>	96.80 <sup>b</sup>	69.00 <sup>c</sup>	62.84 <sup>c</sup>	5.73	0.001
Total cholesterol, mg/dl	216.20 <sup>a</sup>	183.06 <sup>b</sup>	199.30 <sup>ab</sup>	198.24 <sup>ab</sup>	4.10	0.026
HDL cholesterol, mg/dl	92.40	107.80	103.60	114.20	3.07	0.066
LDL cholesterol, mg/dl	93.08 <sup>a</sup>	69.66 <sup>b</sup>	79.34 <sup>ab</sup>	77.86 <sup>ab</sup>	2.97	0.029
<b>Antioxidants status</b>						
Glutathione reductase	29.92 <sup>d</sup>	40.74 <sup>c</sup>	44.68 <sup>b</sup>	47.50 <sup>a</sup>	1.55	0.001
Glutathione oxidase	23.82 <sup>d</sup>	38.16 <sup>c</sup>	43.14 <sup>b</sup>	48.46 <sup>a</sup>	2.16	0.001
Superoxide dismutase	26.18 <sup>c</sup>	32.14 <sup>b</sup>	34.00 <sup>a</sup>	31.18 <sup>b</sup>	0.71	0.001
MDA	4.56	3.99	3.92	3.97	0.12	0.177

a,b,c, :means in the same row within each item bearing different superscript are significantly different ( $P \leq 0.05$  ).

**Table (4):** Effect of yucca schidigera powder (YS) addition to Domyati ducklings diet on carcass parameters at 80 day of age.

Carcass parameters	Yucca Schidigera levels, g/kg diet				Pooled SEM	P-value
	0.0	0.15	0.30	0.45		
Live weight, g	2258.0	2295.0	2284.0	2309.0	9.77	0.318
Eviscerated carcass, %	68.18 <sup>c</sup>	71.03 <sup>b</sup>	71.15 <sup>b</sup>	72.07 <sup>a</sup>	0.36	0.001
Total giblets,%	5.54	5.54	5.29	5.20	0.07	0.268
Liver , %	1.51	1.57	1.57	1.51	0.03	0.756
Gizzard, %	3.35	3.22	3.02	2.93	0.07	0.123
Heart,%	0.68 <sup>b</sup>	0.75 <sup>a</sup>	0.70 <sup>ab</sup>	0.77 <sup>a</sup>	0.01	0.046
Total edible parts, %	73.72 <sup>c</sup>	76.57 <sup>ab</sup>	76.44 <sup>b</sup>	77.27 <sup>a</sup>	0.33	0.001
Abdominal fat,%	1.02 <sup>a</sup>	0.54 <sup>b</sup>	0.74 <sup>b</sup>	0.66 <sup>b</sup>	0.06	0.046
Spleen, %	0.06	0.19	0.05	0.06	0.03	0.372
Pancreas,%	0.34	0.36	0.29	0.26	0.02	0.163

a,b,c, :means in the same row within each item bearing different superscript are significantly different ( $P \leq 0.05$  ).

**Table (5):** Effect of yucca schidigera powder (YS) addition to Domyati ducklings diet on economic efficiency parameters at 80 day of age.

Carcass parameters	Yucca Schidigera levels, g/kg diet				Pooled SEM	P-value
	0.0	0.15	0.30	0.45		
Total feed consumed cost , LE <sup>1</sup>	42.65 <sup>ab</sup>	43.57 <sup>a</sup>	41.49 <sup>c</sup>	42.19 <sup>bc</sup>	0.22	0.001
Total YS consumed cost, LE <sup>2</sup>	0.00 <sup>d</sup>	0.79 <sup>c</sup>	1.50 <sup>b</sup>	2.29 <sup>a</sup>	0.19	0.001
Total cost , LE <sup>3</sup>	52.65 <sup>b</sup>	54.36 <sup>a</sup>	52.99 <sup>b</sup>	54.48 <sup>a</sup>	0.23	0.001
Total sales, LE <sup>4</sup>	64.93 <sup>c</sup>	72.06 <sup>b</sup>	71.97 <sup>b</sup>	74.31 <sup>a</sup>	0.88	0.001
Net revenue, LE <sup>5</sup>	12.28 <sup>b</sup>	17.70 <sup>a</sup>	18.98 <sup>a</sup>	19.84 <sup>a</sup>	0.76	0.001
Economic efficiency <sup>6</sup>	0.234 <sup>b</sup>	0.326 <sup>a</sup>	0.358 <sup>a</sup>	0.364 <sup>a</sup>	0.01	0.001

a,b,c, :means in the same row within each item bearing different superscript are significantly different (P≤ 0.05 ).

LE, Egyptian pound

- 1- Means total feed consumed for each starter diet (20-40d) and grower diet (40-80d) per duckling x one kg feed price (LE).
- 2- Means total yucca addition per duck x yucca price (600.0 LE/kg)
- 3- Total cost = one duckling price at 20 d-old (10.0 LE) +feed cost + yucca cost
- 4- Final live body weight per duckling x one kg price (30.0 LE)
- 5- Total sales – total cost
- 6- net revenue ÷ total cost

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## الملخص العربى

تأثير إضافة مسحوق اليوكا لعلائق كتاكيت البط الدمياطى على بعض الصفات الإنتاجية والكفاءة الاقتصادية خلال فصل الصيف  
عوض لطفى عوض ، هانى نبيل فهيم ، عبدالغنى محمد الشحات  
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أجرى هذا البحث لتحديد تأثير اليوكا على بعض الصفات الإنتاجية والكفاءة الاقتصادية لكتاكيت البط الدمياطى خلال الفترة ٢٠ - ٨٠ يوم من العمر. تم اختيار عدد ٣٢٠ كتكوت دمياطى (ذكور) عمر ٢٠ يوم وتم وزنها وتقسيمها عشوائياً إلى أربعة مجموعات متساوية (فى خمسة مكررات) . تم تكوين العليقة الأساسية ( بادية وناهى) وتمت تغذية المجموعة الأولى على اى منها كمجموعة للمقارنة بدون أى إضافة بينما المجموعات الأخرى غذيت على العليقة الأساسية المضاف لها مسحوق اليوكا بمعدل ٠.١٥ ، ٠.٣٠ ، ٠.٤٥ جم / كجم عليقة على التوالي حتى عمر ٨٠ يوم.

أظهرت النتائج تحسن وزن الجسم معنوياً عند عمر ٨٠ يوم بينما تحسن معدل الزيادة فى وزن الجسم وكفاءة التحويل الغذائى معنوياً بإضافة المستويات المختلفة من اليوكا للعليقة مقارنةً بالكنترول خلال الفترة الكلية للتجربة (٢٠-٨٠ يوم) بينما ارتفع معدل استهلاك العليقة معنوياً بإضافة ٠.١٥ جم يوكا/ كجم فى حين انخفض معنوياً بإضافة ٠.٣٠ جم يوكا /كجم بالمقارنة بالكنترول. لوحظ أن إضافة المستويات المختلفة من اليوكا أدت الى ارتفاع معنوى فى صفات الدم مثل الهيموجلوبين وعدد كل من كرات الدم الحمراء ونسبة الخلايا الليمفاوية فى كرات الدم البيضاء بينما انخفضت نسبة الخلايا المتعادلة ونسبة الخلايا المتعادلة الى الليمفاوية مقارنة بالكنترول . كما لوحظ انخفاضاً معنوياً لمحتوى الدهون الثلاثية فى السيرم بإضافة المستويات المختلفة من اليوكا لعلائق الكتاكيت بينما انخفض كل من الكلسترول الكلى والكلسترول منخفض الكثافة معنوياً بإضافة ٠.١٥ جم يوكا/كجم عليقة فقط بالمقارنة بالكنترول. كما ارتفع محتوى مضادات الأكسدة معنوياً بإضافة اليوكا للعليقة وانخفض معنوياً محتوى الدم من MDA بالمقارنة بالكنترول. كما لوحظ تحسن نسبى الذبيحة المفرغة ومجموع الأجزاء القابلة للأكل بإضافة اليوكا لعلائق الكتاكيت خلال مرحلة النمو. كما تحسن العائد الصافى ونسبة الكفاءة الاقتصادية معنوياً بإضافة مستويات اليوكا المختلفة للعليقة مقارنة بالكنترول. لذا يمكن التوصية بإضافة مسحوق اليوكا الى عليقة كتاكيت البط الدمياطى بمعدل ٠.٤٥ جم /كجم عليقة لتأثيرها الإيجابى على الأداء الإنتاجى وصفات الذبيحة فضلاً على الكفاءة الاقتصادية خلال فصل الصيف.