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Effect of adding different levels of Lycopene to the ration on some lipid profile traits of the Laying hens ISA-Brown*

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Abstract
This research was conducted to study the effect of adding different levels of Lycopene powder to the ration on some lipid profile traits of laying hens ISA-Brown. Used in this experiment 345 layer hens ISA Brown and were 23 week old were randomly allotted in 5 groups , 3 replicates (23 hens per replicate) For the period from 7/1/2013 to 23/6/2013 . Experiment included five treatments and by the following :First treatment : a negative control group without of any addition , treatment second group control positive was added 200 mg / kg feed (vitamin E) to the ration , and treatments, third, fourth and fifth represents add lycopene powder into the ration at rates 100, 150 and 200 mg / kg feed respectively . Included experiment estimate some lipid profile traits (cholesterol , cholesterol egg yolk , triglycerides , high density lipoprotein (HDL) and low density lipoprotein (LDL) The results of the experiment get decline of improvement ($p < 0.05$) to the level of cholesterol, cholesterol egg yolk , triglycerides and low density lipoprotein (LDL) when compared with first treatment (control) , and increased to the level of high density lipoprotein (HDL) in the blood serum laying hens for treatments lycopene powder and vitamin E treatment during the periods experiment .
Key word : Lycopene , HDL , LDL , cholesterol egg yolk .

Introduction

Lycopene is a natural dye manufactured by plants and microorganisms during the process of photosynthesis to protect them from the activity light and increase light sensitivity (Rao, 2000; Rao and Rao, 2003; Rao ,2004) is found in vegetables and some types of fruit with red dye (such as pineapple , orange , tomatoes , grapefruit , strawberries and sweet peppers) and is tomato main source of his in the human diet , and quantity of existing depend on the type and maturity of tomato (Sies and Stahl, 1995; Stahl and Sies, 1996; Gerster, 1997; Rao and Agarwal, 1999; Markovic and et al. 2006) which is a powerful antioxidant that provides protection against damage to the cells of the body due to free radicals , and dietary antioxidants such as carotenoids role in health and disease , which has increased the interest in them is largely to make sure the benefits of these compounds in the diet as is of great importance in the fight against the free radicals generated as a result of oxidative stress and protect cells from damage (Nierenberg et al , 1997; Leal and et al , 1999) . there are more than 700 kinds of carotenoids have been identified , but only six forms of which are present in food and in the blood and tissues of the body and this carotenoids are α-and β-lycopene and β-cryptoxanthin, lutein, zeaxanthin, carotene (Borel and et al , 2007) . and lycopene effectiveness is very high in the fight against diseases , a preventive measure against heart disease, cardiovascular and cancer of the prostate gland and the gastrointestinal tract , skin , pancreas, uterus , and there are many studies indicate the importance of lycopene to humans in health and disease (Ševčíková and et al , 2008) . also, a diet rich in tomato increases the levels of high-density lipoproteins high Density Lipoprotein and reduces the level of lipoproteins and low-lying density Low Density Lipoprotein(Napolitano and et al , 2007) . either vitamin E is one of the most powerful antioxidants and has played a major role in many vital functions within the body and use extensively as additives to animal feed to improve the performance and enhance the immune status and improve the quality of meat , eggs and increase vitamin E in animal products increases the content within the human body during eating these products(Sunder and et al , 1997; Flachowsky, 2000). has pointed(Chan and Decker ,1994) the inability of poultry to manufacture vitamin E , therefore, should be affixed to the feed as one of the basic requirements fodder has been observed that added to the diets of birds improves growth and productive performance and improves the quality of the meat against oxidative deterioration as well as the role of the powerful antioxidant scavenging ability on free radicals (Skrivan and et al. , 2010; Guo and et al. 2001) .Given the importance of antioxidants as additives fodder and for its role in improving the qualities of productivity as the researcher found (Ševčíková et al. , 2008) that lycopene is important in the fight against free radicals and this importance be useful for poultry as consisting of free radicals in the body of the chicken at higher temperatures and in cases of stress, when the rapid growth in cases of higher production and metabolism . Therefore, this study aimed to determine the Effect of adding different levels of Lycopene powder to the ration on some lipid profile traits of the Laying hens ISA-Brown.

Materials and methods

This study was carried out at the poultry farm of Animal Resource college of Agriculture, University of Tikrit from 7/1/2013 to 23/6/2013. and used the 345 layer chickens type ISA-Brown age 23 a week . The birds were distributed randomly on five treatments at the rate of 69 hens per treatments , and each treatments was made up of three replicates and by 23 per hen to duplicate . Been breeding birds in the hall with dimensions of 45 m in length 22:00 casually rise 3 divided by barriers of metal wire in the form of indwelling (Pens) area of each Pen (2 × 2) m . The experimental treatments as follows: first treatment : control group negative free of any addition , second treatment: control group positive addition of vitamin E to the diet concentration of 200 mg / kg feed , third treatment : Add powdered lycopene to feed concentration of 100 mg / kg feed , fourth treatment : Add powder to the bush lycopene concentration of 150 mg / kg feed and fifth treatment : Add powder to the bush lycopene concentration of 200 mg / kg feed . Lycopene powder was presented to the birds two weeks before the beginning of the experiment until the end of the probation period as a period amounting to 6 months before the start of a preliminary experiment did not collect the data . Were imported material lycopene used in the experiment of Turkey , and fed the birds on a ration hens (Table 1) and offered the bird to (16) hour Lighting for the duration of the experiment using lamps strongly (60 watts) to ensure that the intensity of illumination to all the cages as required . The recorded temperature in the hall of laying hens length of the experiment day (eight o'clock in the morning and evening) using a thermometer (2) placed at both ends of the hall. Was estimated by some qualities productivity and quality of eggs : (cholesterol , cholesterol egg yolk , triglycerides , high density lipoprotein (HDL) and low density lipoprotein (LDL) .

Table (1) ration of production used during the experiment and its chemical composition

Ingredients	(%)
Yellow corn	55.56
Soybean meal(44%) Protein	29.1
Premix *	2.5
Vegetable oil	2.7
Limestone	8.36
Salt	0.3
Dicalcium phosphate	1.4
Lysine	0.04
methionine	0.04
	100
****Chemical analyses**	
ME (kcal/kg2)	2753
Crude protein3 (%)	17.52
Phosphorus3 (%)	0.60
Calcium3 (%)	4.02
Lysine (%)	1.0
Methionine(%)	0.47
methionine+ Cisten	0.76

* Each kg of Albraimax consists of: 4% crude protein 0.550 Kalusarh energy represented 0.16% calcium, 10.6% phosphorus, 4.0% sodium 0.2750 mg manganese 0.1670 mg iron 0.2670 mg zinc 0.335 mg Cu, 8.35 mg Cobalt 0.50 mg like, 6.7 mg Selenium 0.27 mg Mithaaonin, 27.6 Mithaaonin with Sistine, 1.350 mg niacin 400,000 IU of vitamin A, 85000 mg vitamin D3, 1400 mg of vitamin E, 100 mg vitamin K3, 85 mg of vitamin B1, 200 mg vitamin B2, 400 mg vitamin B6 and 680. 0 mg vitamin B12.
** Was calculated according to the chemical composition analysis silo contained in the NRC (1994).

Design and use of indiscriminate full Completely Randomized Design (CRD) to evaluate the effect of different treatments on the traits and each period of the experiment. And compared the differences between the averages of the moral test transactions using polynomial Duncan (Duncan, 1955). And use the statistical program ready SAS (SAS, 2010) to analyze the data.

Results and Discussion

Shown in Table (2) The effect of different concentrations of powdered lycopene or add vitamin E to the diet compared with control in the concentration of cholesterol (mg / 100 ml plasma) in laying hens , where we find the lack of significant differences between all of the treatments at the time the production of (24 -27 a week) , and the periods when productivity (28 - 31.32 to 35.36 - 39.40 to 43 and 44-47 weeks) appeared significant decrease ((P <0.05 where the treatment recorded the fifth lowest concentration of cholesterol in the blood serum and reached (183.00 , 179.10 , 178.31 , 172.23 and 184.54 mg / 100 ml plasma) , respectively , followed by

treatment of the fourth (184.42 , 181.00 , 177.67 , 172.62 and 185.00 mg / 100 ml plasma) , respectively, as compared to the first (control) , which recorded the highest concentration of cholesterol in serum and was (191.55 , 201.64 , 204.61 , 206.30 and 208.62 mg / 100 ml plasma) , respectively .

Table (2) Effect of lycopene powder to the ration on cholesterol (mg / 100 ml blood serum) for laying hens ISA Brown (average ± standard error)

Timers productivity (Week)	The first treatment (Control group)	The second treatment (200 mg vitamin E / kg feed)	The third treatment (100 mg lycopene / kg feed)	The fourth treatment (150 mg lycopene / kg feed)	The fifth treatment (200 mg lycopene / Kg feed)
24 -27	13.41±185.31 a	12.62±183.00 a	11.09±184.36 a	11.81±183.31 a	14.52±182.46 a
28 -31	19.05±191.55 a	10.11±184.34 b	12.42±186.65 b	9.13±184.42 b	6.56±183.00 b
32 -35	12.23±201.64 a	11.41±188.62 b	13.22±189.31 b	9.31±181.00 c	8.52±179.10 d
36 -39	21.13±204.61 a	14.32±182.51 bc	16.75±187.33 b	14.31±177.67 c	13.72±178.31 c
40 - 43	23.62±206.30 a	10.51±183.34 b	11.34±186.08 b	10.72±172.62 c	9.61±172.23 c
44 -47	18.22±208.62 a	16.62±190.30 b	17.41±194.31 b	12.53±185.00 c	11.35±184.54 c

Various characters within each class indicate the presence of significant differences at the level of probability ($p < 0.05$).

The results also showed referred to in the table (3), which shows the concentration of cholesterol egg yolk (mg / g yolk) for laying hens to the five treatments does not appear significant differences between all of the treatments at the time of production (24-27 weeks) and periods when productivity (28-31 week) (32-35 weeks) and (36-39 weeks) and (40-43 weeks) and (44-47 weeks) appeared significantly decreased ($P < 0.05$) where the treatment recorded the fifth lowest concentration of cholesterol in egg yolk , as recorded (12.88 mg / g yolk) and (12.62 mg / g yolk) and (12.41 mg / g yolk) and (12.29 mg / g yolk) and (11.80 mg / g yolk) , respectively , followed by treatment of the fourth and recorded (13.34 mg / g yolk (f) 12.95 mg / g yolk) and (12.72 mg / g yolk) and (12.57 mg / g yolk) and (12.26 mg / g yolk) , respectively, as compared to the first (control) , which recorded the highest concentration of cholesterol egg yolk and was (14.61 mg / g yolk) and (13.93 mg / g yolk) and (14.00 mg / g yolk) and (13.89 mg / g yolk) and (13.45 mg / g yolk) , respectively .

Table (3) Effect of lycopene powder into the ration at the level of cholesterol egg yolk (mg / g yolk) for laying hens ISA Brown (average ± standard error)

Timers productivity (Week)	The first treatment (Control group)	The second treatment (200 mg vitamin E / kg feed)	The third treatment (100 mg lycopene / kg feed)	The fourth treatment (150 mg lycopene / kg feed)	The fifth treatment (200 mg lycopene / Kg feed)
24 -27	2.61±13.53 a	3.40±13.50 a	6.31±13.56 a	6.52±13.52 a	5.41±13.48 a
28 -31	3.52±14.61 a	6.09±13.42 b	5.73±13.52 b	8.61±13.34 b	4.53±12.88 c
32 -35	5.74±13.93 a	6.63±13.16 ab	3.51±13.22 b	7.64±12.95 c	2.55 ±12.62 c
36 -39	9.17±14.00 a	5.32±12.76 b	6.84±12.85 b	4.32 ±12.72 b	3.89±12.41 c
40 - 43	5.27±13.89 a	4.86±12.61 b	2.18± 12.65 b	2.73±12.57 b	3.21±12.29 c
44 -47	8.31±13.45 a	5.66±12.35 b	4.91±12.42 b	5.81±12.26 b	1.72±11.80 c

Various characters within each class indicate the presence of significant differences at the level of probability ($p < 0.05$).

Notes the lack of significant difference in the rates of concentration triglycerides (mg / 100 ml blood serum) for laying hens when productivity duration (24-27 weeks) Table (4) , while the note for a significant decrease ($p < 0.05$) in the concentration of triglycerides blood serum of laying hens when productivity periods (28 – 31,32 - 35,36 – 39,40 -43 and 44-47 weeks) , as recorded treatment fifth lowest rate since it was (157.06 , 155.26 , 155.00 , 159.46 and 162.36 mg / 100 ml plasma) , respectively , followed by treatment of the fourth (159.46 , 158.43 , 155.26 , 160.35 and 168.82 mg / 100 ml plasma) , respectively, as compared to the first (control) , which recorded the highest concentration of triglycerides triple in the blood serum of laying hens reached (171.63 , 175.37 , 178.36 , 182.30 and 185.42 mg / 100 ml plasma) , respectively .The effect of powder lycopene to the ration or add vitamin E and compared with the control treatment in the concentration of high-density lipoproteins (mg / 100 ml plasma) in laying hens are shown in the table (5) , it is clear the lack of significant differences between all experimental treatments when term productivity from (24-27 weeks) , and the periods when productivity (28 - 31.32 to 35.36 - 39.40 to 43 and 44-47 weeks) , recorded the fifth highest rate of treatment in the concentration of high-density lipoproteins in the laying hens reaching (43.52 , 45.63 , 46.10 , 46.61 and 43.51 mg / 100 ml plasma) on the ranking , followed by treatment fourth (41.63 , 43.51 , 45.31 , 45.56 and 43.65 mg / 100 ml plasma) on the arrangement as compared to the first (control) , which recorded the lowest concentration of proteins high density lipoproteins and was (35.00 , 33.42 , 35.16 , 37.20 and 36.42 mg / 100 ml plasma) , respectively .

Table (4) the effect of adding lycopene to the ration on triglycerides (mg / 100 ml blood serum) for laying hens type ISA Brown (average ± standard error)

Timers productivity (Week)	The first treatment (Control group)	The second treatment (200 mg vitamin E / kg feed)	The third treatment (100 mg lycopene / kg feed)	The fourth treatment (150 mg lycopene / kg feed)	The fifth treatment (200 mg lycopene / Kg feed)
24 -27	9.12±165.32 a	7.32±163.00 a	10.13±164.10 a	8.16±162.43 a	11.14±164.36 a
28 -31	14.11±171.63 a	9.52±161.20 b	8.14±165.23 b	9.87±159.46 c	6.68±157.06 c
32 -35	3.71±175.37 a	4.58±159.31 c	3.43±162.46 b	5.62±158.43 c	4.33±155.26 c
36 -39	8.91±178.36 a	6.39±157.41 c	5.41±160.30 b	4.47±155.26 c	3.40±155.00 c
40 - 43	7.42±182.30 a	5.25±161.43 b	3.18±165.23 b	3.32±160.35 bc	1.27±159.46 c
44 -47	8.33±185.42 a	3.20±166.31 b	5.36±169.52 b	3.61±163.82 c	2.46±162.36 c

Various characters within each class indicate the presence of significant differences at the level of probability ($p < 0.05$).

Table (5) Effect of lycopene powder into the ration on the high-density lipoproteins (mg / 100 ml blood serum) for laying hens ISA Brown (average ± standard error)

Timers productivity (Week)	The first treatment (Control group)	The second treatment (200 mg vitamin E / kg feed)	The third treatment (100 mg lycopene / kg feed)	The fourth treatment (150 mg lycopene / kg feed)	The fifth treatment (200 mg lycopene / Kg feed)
24 -27	8.16±35.21 a	4.12±38.30 a	5.38±38.26 a	3.15±37.34 a	4.21±38.56 a
28 -31	7.51±35.00 c	4.05±39.62 b	5.10±39.33 b	3.27±41.63 ab	6.25±43.52 a
32 -35	7.82±33.42 d	6.83±40.31 b	5.08±38.21 c	4.71±43.51 ab	2.21±45.63 a
36 -39	9.11±35.16 c	6.23±42.62 b	5.31±41.73 b	4.26±45.31 a	5.17±46.10 a
40 - 43	8.23±37.20 c	4.51±43.46 b	3.37±42.31 b	2.41±45.56 a	3.25±46.61 a
44 -47	6.31±36.42 c	5.26±41.31 b	6.71±40.62 b	3.55±43.65 a	3.82±43.51 a

Various characters within each class indicate the presence of significant differences at the level of probability ($p < 0.05$).

As can be seen , Notes from the results table (6) The lack of significant differences ($p < 0.05$) in the concentration of lipoproteins and low-lying density Low Density Lipoprotein (mg / 100 ml plasma) in the study birds transactions when the first -term productivity of the age of the experiment (24-27 weeks) , and when the periods productivity (28 - 31.32 to 35.36 - 39.40 to 43 and 44-47 weeks) , recorded all transactions powder lycopene and treatment of vitamin E, a significant decrease ($p < 0.05$) in the concentration of lipoproteins and low-lying density as compared to the the first (control) , as recorded transaction fifth lowest concentration of proteins and fatty sessile density at these periods productivity and total (108.07 , 102.42 , 101.21 , 93.73 and 108.56 mg / 100 ml plasma) , respectively , followed by treatment of the fourth and recorded (110.90 , 105.81 , 101.31 , 94.99 and 108.59 mg / 100 ml plasma) , respectively, without significant differences between them and then came the transaction (third and second) and Sjlta concentration of proteins and fatty sessile density was (114.28 and 112.48 mg / 100 ml plasma) , respectively, and (118.61 and 116.45 mg / 100 ml plasma) , respectively, and (113.54 and 108.41 mg / 100 ml plasma) , respectively, and (110.73 and 107.60 mg / 100 ml plasma) , respectively, and (119.79 and 115.73 mg / 100 ml plasma) , respectively and without significant differences between them compared to the first (control) , which recorded the highest concentration of protein and fatty sessile density and total (122.23 , 133.15 , 133.78 , 132.64 and 135.12 mg / 100 ml plasma) , respectively .

Table (6) Effect of lycopene powder into the ration on lipoproteins and low-lying density (mg / 100 ml blood serum) for laying hens ISA Brown (average ± standard error)

Timers productivity (Week)	The first treatment (Control group)	The second treatment (200 mg vitamin E / kg feed)	The third treatment (100 mg lycopene / kg feed)	The fourth treatment (150 mg lycopene / kg feed)	The fifth treatment (200 mg lycopene / Kg feed)
24 -27	9.38±117.04 a	6.29±112.10 a	5.21±113.28 a	8.16±113.49 a	7.36±111.03 ab
28 -31	10.13±122.23 a	6.42±112.48 b	5.83±114.28 b	4.20±110.90 bc	2.33±108.07 c
32 -35	8.43±133.15 a	4.51±116.45 b	7.13±118.61 b	5.21±105.81 c	4.54±102.42 c
36 -39	10.63±133.78 a	6.51±108.41 bc	6.70±113.54 b	5.43±101.31 c	3.60±101.21 c
40 - 43	8.11±132.64 a	6.00±107.60 b	5.83±110.73 b	4.62±94.99 c	2.64±93.73 c
44 -47	11.72±135.12 a	7.19±115.73 b	11.05±119.79 b	7.21±108.59 c	5.33±108.56 c

Various characters within each class indicate the presence of significant differences at the level of probability ($p < 0.05$).

For the results of transactions in addition lycopene , which lowered the morale of fat are harmful cholesterol in serum cholesterol in egg yolks, lipoproteins and low-lying density and triglycerides and raised instead of fat offices , a high-density lipoproteins , this is consistent with previous studies which indicated that the lycopene and vitamin E are among the lines of defense the first antioxidant especially lipid oxidation and has an important role in lowering cholesterol in the blood serum and egg yolk of chicken eggs ((McDowell, 1989; Roa and Agarwal, 1998) as well as the role of lycopene -reducing oxidation and reduce stress and thus reduce the signs of stress , such as cholesterol and glucose (2000 , Sturkie), as well as vitamin E 's role in reducing the stress of all kinds and this vitamin is non-toxic and added excess of vitamin E is beneficial for an animal in conditions of stress (Surai 2003,), it works vitamin E to reduce the proportion Mortality by improving the overall health of the bird (Bird and Boren 1999,).

And noted Sahin et al (2006) that the addition of lycopene (100 mg / kg feed) has led to a significant decrease ($p < 0.05$) in the level of serum cholesterol in liver tissue in addition to the low concentration of cholesterol in egg yolk compared to the control group . He Safamehr et al. (2011) to the existence of significant differences ($p < 0.05$) when using the Bethel tomatoes in the diets of laying hens increased by 0-12 % compared to a set of control as it outperformed all transactions in addition Bethel tomato in the qualities of productivity increase the proportion of added with low cholesterol yolk compared control group . I've explained Boileau et al., (2002) that lycopene absorbed transported to the liver through the lymphatic circulation . Studies have suggested that the cis form is more absorbed than the cells of the intestinal wall through the speed of its association with bile to form the emulsion and this explains the increased absorption of lycopene to eat high-fat diets by stimulating the

production of bile (Kiran and et al., 2006) . Accumulates lycopene uptake in adipose tissue and stored in the prostate, adrenal glands and testes and liver as a result of the presence of a large number of receptors lipoproteins low density Low Density Lipoprotein (LDL) and low- density very Very Low Density Lipoprotein (VLDL) in these tissues for transporting lycopene (Stahl and others , 1992 ; Rao and Agarwal, 1998a; Pratik and Vishal, 2007) this may be the reason behind the decline in lipoproteins and low-lying density as a result of association with lycopene .

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