EFFECT OF DIPPING CHICKEN EGGS IN GLUCOSE SOLUTIONS ON HATCHING CHICKS AND SUBSEQUENT GROWTH

By

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Abstract: *Two thousand nine hundred and seventy hatching eggs were obtained from Gimmizah chickens to evaluate the effect of dipping eggs before incubation in different concentrations of glucose solutions either with or without antibiotics on liver and muscles glycogen concentrations (mg. /g. tissue) during the last days of incubation, at hatch and on posthatch chicks performance. Three incubation trials were done, each one contains 990 hatched eggs and divided into nine treatments (110 eggs per each). First treatment (T1) was used as control without any treatment, eggs of second treatment were dipped in sterilized distilled water (T2), eggs for third treatment were dipped in antibiotics solution only (T3), whereas eggs for T4, T5 and T6 groups were dipped in glucose solutions (8, 10 and 12%, respectively). Eggs of T7, T8 and T9 were dipped in the same previous glucose solutions plus antibiotics, respectively.*

Highest significant concentrations of liver glycogen were recorded for embryos at days 19 and 20 of age and for chicks at hatch for T7, T8 and T9 groups compared with other treatments. Dipping eggs in glucose solutions with or without antibiotics significantly increased muscles glycogen concentrations for embryos at 20 days of incubation, chicks at hatch and at 21 days of age.

T8 group represented the highest significant muscle glycogen concentrations compared to other groups for embryos at day 20 of age, chicks at hatch and at 21 days of age.

Generally, liver and muscle glycogen concentrations decreased with the advance of embryonic age and upon hatch, then increased again for chicks at 21 days of age. The highest body weights for chicks hatched from egg groups treated with different glucose solutions either with or without antibiotics compared with other groups. Highest percentages of hatchability and economical efficiency were detected in T8 and T9 groups as compared with control groups.

In conclusion, using the method of dipping hatching eggs in 10 or 12 % glucose solutions plus antibiotics before incubation improved hatchability percentages and chicks weight at hatch beside feed intake and feed conversion for chicks during the first 21 days of age, and economic efficiency compared with other treatments and controls.

INTRODUCTION

Establishment of a stable and sufficient glucose status is critical for the late-term embryonic developmental hatching process and posthatch development of chick until feed consumption is initiated. Glucose available in egg at incubation plays an important role in the initiation of embryonic development and further as an energy substrate via anaerobic catabolism (Moran, 2007). Toward the end of incubation,

embryos use their energy reserves to meet the high demand of glucose to fuel hatching activities (Dreiling *et al.*, 1991 and Christensen *et al.*, 2001). Glucose is primarily generated from protein by gluconeogenesis or by glycolysis of glycogen reserves because oxygen is limited during the last quarter of incubation for synthesization of the fat (Bjonnes *et al.*, 1987and John *et al.*, 1987). The glycogen reserves in liver and glycolytic muscles of the bird are withdrawn as embryos go through the hatching process (Christensen *et al.*, 2001). Moreover, Humphrey and Rudrappa (2008) demonstrated that glucose availability induced metabolic changes in thymocytes that altered their energy status and survival.

Uni *et al.* (2005) reported that maintenance of glucose homeostasis during late-term embryonic development is dependent upon the amount of glucose held in reserve primarily in the form of glycogen in the liver and upon the degree of glucose generated by gluconeogenesis from protein which mobilized firstly from amnion albumen and then from muscle. A portion of the albumen is absorbed by the small intestine to expand body glycogen reserves (Moran, 2007). John *et al.* (1988) indicated that glycogen is a major source of energy during the hatching process in turkey and that glucose supplementation did enhance the overall glycogen storage in the muscles and liver. Insufficient glycogen and albumen will force the embryo to mobilize more muscle protein toward gluconeogenesis, thus restricting growth of the late-term embryo and hatchling (Hamer and Dickson, 1989, Elwyn and Bursztein, 1993, Vieira and Moran, 1999a, b and Uni *et al.*, 2005). Moreover, treatments of eggs with an antibiotic solution were also considered useful in reducing bacterial infection and then decrease the mortality (Saif *et al.*, 1970).

The objective of this study was to evaluate the effects of dipping chicken eggs before incubation in different glucose solutions with or without antibiotics on liver and muscles glycogen concentrations (mg/g tissue) during the late incubation periods, hatchability percentages, posthatch chick performance and economic efficiency.

MATERIALS AND METHODS

Two thousand nine hundred and seventy hatching eggs were obtained from Gimmizah chickens at El-Sabahia Poultry Research Station, Animal Production Research Institute, Agriculture Research Center. The eggs were incubated through three trials (patches) with 7 days interval among incubation periods. Each patch of 990 fertile eggs was divided to nine treatments (110 fertile eggs each). Eggs were incubated in forced draft-type incubator (Egyptian made) at 99.5°F temperature and 55% relative humidity in the setter and 98.6°F temperature and 65% relative humidity in hatcher unit.

Treatment solutions:- distilled water which used for preparing the solutions was autoclaved and cooled for temperature lower than that for eggs, then glucose was added with different percentages with or without antibiotics, for avoiding the bacterial infection. Eggs were dipped for 10 minutes in the experimental solutions, according to Meir and AR (1984). Eggs were dried by using electric fan, except that of first treatment as a control. The description of treatments were done as follows:-

T1:-Control (without any treatment).
T2:-Dipped in autoclaved distilled water.
T3:-Dipped in antibiotics solution (400 ppm streptomycin + 1000ppm ampicillin).
T4:-Dipped in glucose solution (8%).
T5:-Dipped in glucose solution (10%).

T6:-Dipped in glucose solution (12%).
T7:-Dipped in glucose solution (8%) + the same antibiotics showed in T3.
T8:-Dipped in glucose solution (10%) + the same antibiotics showed in T3.
T9:-Dipped in glucose solution (12%) + the same antibiotics showed in T3.

During the embryonic development, five random embryos from each treatment were sampled for analysis at 19 and 20 days of incubation and at hatch (immediately after hatching) and for chicks at 21 days of age. Embryos body, liver, and pectoral (pectorals major and pectorals minor) muscles weights were recorded for each.

Newly hatched chicks from each group were randomly assigned to 3 replicates of 30 chicks per each and housed in a floor pens (2 m^2). All chicks were fed *ad-libitum* Corn-Soy diet through the experimental period. Individual chick body weight (BW) and total feed intake (FI) for each replicate were recorded at the end of experiment (21days of age). Body weight gain (BWG) and feed conversion ratio (FCR) were calculated during the same. At 21 days of age five chicks were selected randomly and slaughtered, eviscerated, liver and pectoral muscles were dissected from the viscera and weighed.

Liver and pectoral muscle samples which dissected from embryos at different ages (19, 20 and 21 days) of incubation) and from chicks at 21 days were used to evaluate the proportional changes in the glycogen concentrations immediately as described by Allen and Ruff (1981). Economical efficiency (EE) for each treatment was evaluated using following equation (EE) = (net return / total cost) x100.

According to the price of local market at the time of experiment (Osman *et al.*, 2010).

All results were statistically analyzed by General Linear Models (GLM), one way analysis of variance, using SAS software (SAS Institute, 1990).

$$Y_{ik} = \mu + T_i + e_{ik}$$

Where:

Y_{ik} = Performance traits measured on the k th chicks in the I th treatment.

μ = Overall mean.

T_i = Effect of the treatments (i= 1, 2, 3,..).

e_{ik} = Random error effect.

Differences among means were separated using Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Table 1 shows the effect of dipping eggs in different glucose solutions on liver glycogen concentrations in embryos and subsequent hatched chicks. Dipping eggs in glucose solutions with different concentrations without antibiotics significantly ($P<0.01$) increased the glycogen concentrations in embryos at 19, 20 days and in chicks either at hatch or at 21 days of age compared to those for treatments T2 and T3 while the difference with T1 group is significant only with embryos at day 19 and for chicks at 21 days of age. Also, adding antibiotics to glucose solutions (T7, T8 and T9) significantly increased liver glycogen concentrations for both embryos at different experimented ages and for chicks at hatch compared to other treatments groups. The same trend of significant increase of liver glycogen concentration in chicks at 21 days of age was detected for the samples of treated groups with glucose plus antibiotics (T7, T8 and T9) compared with all control groups (T1, T2 and T3). Moreover, the highest significant ($P<0.01$) concentration of liver glycogen in chicks at 21 days of age (10.37 mg/g tissue) was observed in T7 group (glucose 8% + antibiotics) compared with all experimented treatments. This result is

keeping with those reported by John *et al.* (1987) who demonstrated that providing the embryo with antibiotic plus glucose improved overall glycogen in liver and enhanced the protection of incubated eggs against bacterial infection. Moreover the lowest significant concentrations of glycogen among all samples of embryos and chicks were detected for group of T2 compared with all other experimented samples. Furthermore, liver glycogen concentration was decreased ($P<0.01$) by advance in embryonic age from 19 to 20 days for all treatment groups. The reduction of glycogen concentration may be due to using the reserved glycogen by embryo to maintain its high need of energy for pipping and successful hatching which contributing of glycogen depletion. Christensen *et al.* (2001) reported that the glycogen reserves in liver and glycolytic muscles of the bird are withdrawn as embryos go through the hatching process. In addition, Humphrey and Rudrappa (2008) demonstrated that glucose availability induced metabolic changes in thymocytes that altered their energy status.

Liver glycogen concentration was not statistically changed or differed between embryos at 20 day of age and for chicks at hatch. On the other hand, liver glycogen concentration after hatching was significantly ($P<0.01$) increased by increasing the age of birds and this may be due to starting the consumption of feed and restoring the glycogen during the glycogenesis process. Table 2 shows the effect of dipping eggs in different glucose solutions on muscles glycogen concentration in embryos and for the subsequent hatched chicks. Dipping hatching eggs in different glucose solutions with or without antibiotics had no significant influence on muscles glycogen concentration for the embryos at 19 days of age. Generally, this table reveals clearly that dipping eggs in different glucose solutions either with or without antibiotics significantly increased the muscles glycogen concentrations (mg/g tissue) for embryos at 20 days of age, chicks at hatch and chicks at 21 days of age compared to those for control groups which represented in T1, T2 and T3 groups. Moreover, for chicks at hatch, the treated groups with different glucose concentrations plus antibiotics represented the highest significant ($P<0.01$) increase of muscles glycogen concentrations (T7, T8 and T9) compared to those for all other groups. Also, the results indicated that treated eggs with glucose solution 10% + antibiotics (T8) recorded the highest numerical increase of muscles glycogen concentration among the samples from embryos at 20 days of age, chicks at hatch and chicks at 21 days of age compared to those for all treated egg groups and controls. Generally, the increasing of glycogen concentration may be due to increasing the diffusion of glucose through the egg pores and supported the glycogenesis process during embryo development. These results are keeping with those reported by Uni *et al.* (2005) who reported that maintenance of glucose homeostasis during late-term embryonic development is dependent upon the amount of glucose in the form of glycogen in the liver. Furthermore, John *et al.* (1987) indicated that providing eggs with glucose may help maintain higher muscle glycogen level even during active glycogenolysis.

Muscles glycogen concentration was significantly decreased with the increase of embryonic age from, 19 to 20 days of age during incubation among all treatment groups. This case of decrease continued for chicks at hatch but the decrease difference was significant for all treatment egg groups except that for T2 group. It is clear from these data that the lowest concentrations of muscle glycogen were recorded for chicks at hatch compared with those during incubation and for chicks at 21 days of hatch. This decrease of concentration which observed for chicks could be attributed to carbohydrate utilization for muscular activity during the hatching process, in addition using the reserved glycogen to maintain the high need

of energy for pipping the egg shell and successful hatching then depleted muscles glycogen. These results are in agreement with the results of John *et al.* (1987, 1988), Dreiling *et al.* (1991) and Christensen *et al.* (2001) who reported that toward the end of incubation embryos use their energy reserves to meet the high demand for glucose to fuel hatching activities. Beside, supporting to our results, John *et al.* (1988) observed that muscle glycogen decreased between pipping and posthatch and liver glycogen decreased progressively between knocking and posthatch besides significant drop in pectoral muscle glycogen content is indicative of a considerable amount of glycogen being utilized by the muscle during this period and implies an active participation of this muscle in hatching.

Some authors explained this process as George and Iype (1963) and Bakhuis (1974) reported that the pectoral muscle plays a significant role in the hatching process in the chick. In chick embryos during every burst of hatching activity, the limbs are extended and flexed, finally returning to the original resting position (Bakhuis, 1974). This process is believed to help hold the body tightly against the shell while the beak cracks the shell. It was also postulated that the rotation of the embryo within the shell during the process of hatching is affected by the combined effort of both fore and hind limbs.

On the other hand, data of this table demonstrate that muscle glycogen concentrations significantly increased again for chicks at 21 days of age. This increase which coincides with the increase of birds age could be due to starting the consumption of feed by chicks as reported in liver glycogen.

Table 3 shows the effect of dipping eggs in different glucose solutions on BW, BWG, FI and FCR. No significant differences were observed between egg weights for all experimented egg groups. Apparently treated eggs with glucose plus antibiotics in groups T7, T8 and T9 significantly increased ($P<0.01$) BW at hatch compared with controls (T1, T2 and T3). Whereas treatment the eggs with glucose without antibiotics (T4, T5 and T6) significantly increased ($P<0.01$) chick BW at hatch compared with those for T2 group only.

Dipping the eggs in different concentrations of glucose either with or without antibiotics did not represent any significant influence on chick weight at 21 days of age and chick BWG during this period. Moreover, dipping the eggs in glucose solution 12% + antibiotics (T9) represented the highest numerical record for chick weight at 21 days of age (209.40 g) and chick BWG during the first 21 days of age (166.10 g) compared with those for all experimented egg groups. The same table also represents that chicks produced from T8 group significantly ($P<0.01$) consumed the lowest amount of feed (338.50g/bird / 21days period) compared with other groups, also the chicks of this group recorded the best FCR (2.05). Chicks produced from eggs of T2 group significantly ($P<0.01$) consumed the highest amount of feed during the same period (446.30g /bird / period) compared with those for chicks produced from the rest of egg treatment groups. Chicks produced from the same egg group (T2) realized the worst numerical record of FCR (2.71). Results herein in this table are in accordance with those reported by Uni *et al.* (2005) who hypothesized that administration of carbohydrate and β-hydroxy-β-methylbutyrate into the embryonic amnion fluid prior to hatch would support the energy status of the hatchling by elevating the glycogen reserves, moderating the use of muscle proteins, and thus contributed to enhanced posthatch performance.

Hatchability percentage of fertile and total eggs were significantly ($P<0.01$) different among all experimented treatments (Table 4). Dipping eggs in autoclaved water (T2) recorded the lowest significant ($P<0.01$) percentages of hatchability either from fertile

or total eggs compared with those for other treated egg groups and control. The bad effect of dipping eggs in autoclaved water as represented in the previous results of hatchability could be due to the spread of microorganisms on the shell surface and penetration of egg shell through the pores, then affected embryonic development and finally reduced hatchability percentage. While the highest records of hatchability percentage were recorded for egg groups which dipped in 10% and 12% glucose solutions with antibiotics (T8 and T9) compared with those for the other groups. In conclusion from these results, dipping eggs in either 10 or 12% glucose solutions with antibiotics is recommended for increasing hatchability percentages. These results are in harmony with those reported by Moran and Reinhart (1981) who showed that providing eggs with glucose and antibiotics improved the hatching success.

Economical evaluations of the experimented treatments and controls are shown in Table 5. According to the input–output analysis, it appears that dipping eggs in glucose solutions with concentrations of 10% and 12 % plus antibiotics (T8 and T9) recorded the best net return (206.7 and 191.4 LE, respectively). Also, the same both egg groups of T8 and T9 realized the best economical efficiencies (4.96 and 4.56) compared with those for all treatment groups.

The results in this study demonstrate the benefits of adding external nutrients as glucose for dipping hatching eggs before incubation.

In conclusion, using the method of dipping hatching eggs in glucose solutions concentrations of 10 or 12% plus antibiotics before incubation improved hatchability percentages, chick weight at hatch, feed intake and feed conversion ratio for chicks during the first 21 days of age, and in turn economic efficiency also was improved

Table1:- Effect of dipping eggs in different glucose solutions on liver glycogen concentration in embryos and subsequent chicks.

Treatment	Liver glycogen concentration (mg/ g Tissue)				Sig
	Embryo at 19th day of age	Embryo at 20th day of age	Chicks at batch	Chicks at 21days of age	
T1	D 5.66±0.6^{a}	BC 4.45±0.5^{b}	C 4.15±0.6^{b}	C 5.69±0.6^{a}	**
T2	E 3.82±0.6^{b}	E 2.87±0.5^{c}	E 2.53±0.1^{c}	D 4.51±0.7^{a}	**
T3	C 6.00±.8^{a}	D 3.91±0.6^{c}	D 3.22±0.7^{c}	C 5.19±0.6^{b}	**
T4	B 7.08±0.8^{a}	B 5.02±0.5^{bc}	BC 4.74±0.6^{c}	B 7.20±0.5^{a}	**
T5	B 6.80±0.6^{b}	BC 4.65±0.6^{c}	BC 4.49±0.3^{c}	B 8.10±0.6^{a}	**
T6	B 7.69±0.6^{ab}	BC 4.75±0.4^{c}	BC 4.54±.3^{c}	B 8.10±0.6^{a}	**
T7	A 11.14±0.8^{a}	A 7.38±0.7^{c}	A 6.85±.9^{c}	A 10.37±0.9^{ab}	**
T8	A 11.51±0.6^{a}	A 7.97±0.9^{bc}	A 6.98±0.5^{c}	B 8.2±1.3^{b}	**
T9	A 11.61±0.5^{a}	A 7.13±0.7^{bc}	A 6.67±0.7^{c}	B 7.46±0.9^{b}	**
Significant	**	**	**	**	

A,B,C,.... Means in the same column with different superscripts are significantly different at (P<0.01).

a,b,c,..... Means in the same raw with different superscripts are significantly different at (P<0.01).

T1= control. T2 = dipped in autoclaved water. T3=dipped in antibiotic solution.

T4= dipped in glucose solution 8%. T5=dipped in Glucose solution 10%.

T6= dipped in glucose solution 12%. T7= dipped in glucose solution 8%+antibbiotic

T8= dipped in glucose solution 10%+antibiotic.

T9= dipped in glucose solution 12%+antibiotic. ** Significant at P<0.01.

Table 2:- Effect of dipping eggs in different glucose solutions on muscles glycogen concentration in embryos and subsequent chicks.

Treat.	Muscles glycogen concentration (mg/ g Tissue)				Sig
	Embryo at 19th day of age	Embryo at 20th day of age	Chicks at hatch	Chicks at 21days of age	
T1	0.77±0.5^{a}	C 0.52±0.03^{bc}	D 0.35±0.4^{c}	CD 0.67±0.03^{b}	**
T2	0.72±0.06^{a}	D 0.45±0.03^{c}	D 0.34±0.2^{d}	D 0.57±0.02^{b}	**
T3	0.82±0.3^{a}	CD 0.48±0.02^{c}	C 0.42±0.04^{c}	CD 0.69±0.03^{a}	**
T4	0.72±0.02^{a}	B 0.60±0.04^{bc}	B 0.49±0.01^{c}	AB 0.73±0.02^{a}	**
T5	0.79±0.05^{a}	AB 0.69±0.05^{ab}	B 0.51±0.03^{b}	AB 0.75±0.07^{a}	**
T6	0.78±0.03^{a}	B 0.62±0.6^{bc}	B 0.51±0.03^{c}	AB 0.74±0.05^{a}	**
T7	0.71±0.07^{ab}	AB 0.68±0.07^{bc}	A 0.57±0.07^{c}	AB 0.75±0.02^{a}	**
T8	0.80±0.04^{a}	A 0.77±0.07^{bc}	A 0.60±0.05^{c}	A 0.83±0.08^{a}	**
T9	0.89±0.4^{a}	AB 0.70±0.09^{bc}	A 0.60±0.04^{c}	AB 0.75±0.04^{ab}	**
Significant	NS	**	**	**	

A,B,C,.... Means in the same column with different superscripts are significantly different at (P<0.01).
a,b,c,..... Means in the same raw with different superscripts are significantly different at (P<0.01).
T1= control. T2 = dipped in autoclaved water. T3=dipped in antibiotic solution.
T4= dipped in glucose solution 8%. T5=dipped in Glucose solution 10%.
T6= dipped in glucose solution 12%. T7= dipped in glucose solution 8%+antibbiotic
T8= dipped in glucose solution 10%+antibiotic.
T9= dipped in glucose solution 12%+antibiotic. ** Significant at P<0.01.
NS: - Significant

Table 3:- Effect of dipping eggs in different glucose solutions on chick weight, chick gain, feed intake (FI) and feed conversion ratio (FCR).

Treatments	Egg weight (g)	Chick Weight		Chick weight gain (0-21days) (g)	FI g/bird/period (21daysof age)	FCR (g feed/g gain)
		at hatch(g)	at 21days of age (g)			
T1	56.97±2.1	39.0±1.9^{b}	202.9±11.7	163.6±11.5	380.2±4.21^{bc}	2.31±0.01^{ab}
T2	57.72±2.1	38.7±1.5^{c}	202.2±10.9	163.7±10.3	446.3±3.21^{a}	2.71±0.01^{a}
T3	57.31±2.1	38.8±1.5^{bc}	204.9±11.3	165.1±8.0	396.2±3.56^{b}	2.39±0.03^{ab}
T4	56.89±2.1	39.7±1.4^{ab}	202.8±11.3	162.5±10.9	374.3±4.22^{bc}	2.28±0.01^{ab}
T5	58.55±1.9	39.5±1.4^{ab}	202.7±13.1	162.9±12.9	354.6±3.25^{c}	2.18±0.02^{ab}
T6	57.25±2.1	39.7±1.5^{ab}	204.2±11.8	164.4±11.4	358.4±3.24^{c}	2.18±0.03^{ab}
T7	57.69±2.1	40.9±1.4^{a}	206.9±10.1	165.1±9.8	381.3±4.21^{bc}	2.31±0.01^{ab}
T8	57.87±1.9	41.4±1.5^{a}	207.9±12.3	165.8±10.2	338.5±3.26^{d}	2.05±0.01^{c}
T9	58.16±2.1	41.2±1.7^{a}	209.4±11.4	166.1±11.3	353.3±4.12^{c}	2.12±0.02^{ab}
Sig	NS	**	NS	NS	**	**

a,b,c,..... Means in the same column with different superscripts are significantly different at (P<0.01).
T1= control. T2 = dipped in autoclaved water. T3=dipped in antibiotic solution.
T4= dipped in glucose solution 8%. T5=dipped in Glucose solution 10%.
T6= dipped in glucose solution 12%. T7= dipped in glucose solution 8%+antibbiotic
T8= dipped in glucose solution 10%+antibiotic.
T9= dipped in glucose solution 12%+antibiotic. ** Significant at P<0.01.
NS :- Significant

Table 4:- Effect of dipping eggs in different glucose solutions on hatchability percentage.

Treatments	Hatchability %	
	Fertile eggs	Total eggs
T1	88.9 ± 0.6^{bc}	84.9 ± 2.7^{bc}
T2	83.9 ± 2.8^{d}	80.6 ± 3.9^{d}
T3	89.1 ± 0.8^{bc}	82.4 ± 0.8^{bc}
T4	88.1 ± 0.6^{bc}	85.5 ± 1.2^{abc}
T5	90.8 ± 0.1^{abc}	84.7 ± 0.3^{bc}
T6	90.6 ± 1.7^{abc}	85.9 ± 0.7^{ab}
T7	91.20 ± 3.4^{ab}	86.10 ± 3.3^{ab}
T8	92.4 ± 1.5^{a}	89.3 ± 1.6^{a}
T9	93.4 ± 2.1^{a}	89.6 ± 2.8^{a}
Significant	**	**

a,b,c,..... Means in the same column with different superscripts are significantly different at (P<0.01).
T1= control. T2 = dipped in autoclaved water. T3=dipped in antibiotic solution.
T4= dipped in glucose solution 8%. T5=dipped in Glucose solution 10%.
T6= dipped in glucose solution 12%. T7= dipped in glucose solution 8%+antibbiotic
T8= dipped in glucose solution 10%+antibiotic.
T9= dipped in glucose solution 12%+antibiotic. ** Significant at P<0.01.

Table 5:- Effect of different treatments on economic efficiency (EE) for produced chicks.

Treatments	Hatch %	Chicks numbers [A]	Market Price [B] (LE)	Tr. Cost [C] (LE)	Total cost [D] (LE)	Net Return [E] (LE)	EE [F]
T1	84.9	2521.5	4160.5	0	4009.5	150.98	3.78
T2	80.6	2393.8	3949.8	2	4011.5	- 61.70	- 1.54
T3	82.4	2447.3	4038.0	12	4021.5	- 16.51	- 0.41
T4	85.5	2539.4	4189.9	120	4129.5	60.43	1.46
T5	84.7	2515.6	4150.7	150	4159.5	- 8.78	- 0.21
T6	85.9	2551.2	4209.5	180	4189.5	20.03	0.48
T7	83.1	2468.1	4072.3	130	4139.5	- 67.18	- 1.62
T8	89.3	2652.2	4376.1	160	4169.5	206.65	4.96
T9	89.6	2661.1	4390.8	190	4199.5	191.35	4.56

Egg price=1.35LE, Chick price=1.65LE.
Total hatching eggs = 2970 eggs
Total cost of hatching eggs = hatching eggs (2970) x Egg price (1.35).
T1= control. T2 = dipped in autoclaved water. T3=dipped in antibiotic solution.
T4= dipped in glucose solution 8%. T5=dipped in Glucose solution 10%.
T6= dipped in glucose solution 12%. T7= dipped in glucose solution 8%+antibbiotic
T8= dipped in glucose solution 10%+antibiotic.
T9= dipped in glucose solution 12%+antibiotic.
A:- Chicks numbers (Ch.N.) = hatchability of total eggs (Hatch.%) X 5000.
B: Market price:= Chicks numbers X Chick price (1.65 LE)
C: Treatment cost (Tr. Cost) = cost of autoclaving water and the other additions (glucose and antibiotics).
D: Total cost= eggs price+ management costs (Incubates + treatments cost).
E:Net return = Differences between market price and total cost,
F: Economic Efficiency(EE) = (net return / total cost)x100.

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الملخص العربي

تأثيرتغطيس بيض الدجاج فى محاليل من الجلوكوز على التفريخ ونمو الكتاكيت بعد الفقس

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أستخدم فى هذا البحث عدد ألفان وتسعمائه وسبعون بيضة تفريخ من دجاج الجميزة وذلك لدراسة تأثير غمر البيض قبل الدخول لماكينة التفريخ فى محاليل مختلفة التركيز من الجلوكوز بإضافة أو بدون إضافة مضادات حيوية على تركيز الجليكوجين فى الكبد والعضلات خلال الأيام الأخيرة من التحضين فى ماكينة التفريخ وعند الفقس وكذا على أداء الكتاكيت بعد الفقس.

تم عمل ثلاثة تجارب تحضين للبيض تحتوى كل منها على ٩٩٠ بيضة تفريخ مقسمة الى ٩ معاملات (١١٠ بيضة لكل معاملة). المعاملة الأولى: استخدم البيض ككنترول بدون اى معاملة. المعاملة الثانية: تم تغطيس البيض فى مياه مقطرة معقمة. المعاملة الثالثة: تم تغطيس البيض فى محلول مضادات حيوية فقط. فى حين تم تغطيس بيض مجاميع المعاملات ٤ و ٥ و٦ فى محاليل جلوكوز بتركيزات ٨ و ١٠ و ١٢ % على التوالى. تم تغطيس بيض المعاملات ٧ و ٨ و ٩ فى نفس تركيزات محاليل الجلوكوز السابقة مضافا إليها المضادات الحيوية على التوالى.

أعلى تركيزات معنوية لجليكوجين الكبد سجلت للأجنة عند الأيام ١٩ و ٢٠ من العمر وكذا الكتاكيت عند الفقس بالنسبة للمجاميع ٧ و ٨ و ٩ مقارنة بكل المعاملات الخاصة بالمجاميع الأخرى.

أدى تغطيس البيض فى محاليل الجلوكوز مع أو بدون إضافة المضادات الحيوية الى رفع تركيز الجليكوجين بالعضلات بالنسبة للأجنة عند عمر ٢٠ يوم من التحضين وللكتاكيت عند الفقس وعند عمر ٢١ يوم من العمر.

أظهرت المعاملة رقم ٨ أعلى تركيز معنوى لجليكوجين العضلات فى الأجنة عند عمر ٢٠ يوم وللكتاكيت عند الفقس وعند ٢١ يوم من العمر مقارنة بالمجاميع التجريبية الأخرى.

وعلى وجه العموم انخفضت تركيزات جليكوجين الكبد والعضلات مع التقدم فى العمر الجنينى حتى الفقس ثم ارتفعت مرة اخرى بالنسبة للكتاكيت عند ٢١ يوم من العمر.

سجلت مجاميع البيض المعاملة بمحاليل مختلفة من الجلوكوز مع أو بدون مضادات حيوية أعلى أوزان جسم للكتاكيت عند الفقس مقارنة بتلك الخاصة بالمجاميع.

أظهر بيض تفريخ المجاميع ارقام ٨ و ٩ أعلى وأفضل نسبة تفريخ مع وجود اختلاف معنوى مع مجاميع الكنترول وأيضا سجلت نفس المجموعتين أفضل قيم للكفاءة الأقتصادية.

ومن ذلك يمكن استنتاج أن إستخدام طريقة غمر بيض التفريخ قبل الدخول لماكينة التفريخ فى محاليل جلوكوز بتركيزات ١٠ او ١٢ % والمضاف اليها المضادات الحيوية قد حسن نسب الفقس وأوزان الكتاكيت الحديثة و معدل التحويل الغذائى للكتاكيت الناتجة حتى عمر ٢١ يوم اضافة الى تحسين الكفاءة الأقتصادية.

حققت كل من المعاملتين ارقام ٨ و ٩ أعلى نسب فقس وكفاءة اقتصادية مقارنة بالمجاميع المقارنة.