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EFFECT OF YUCCA SHIDIGERA EXTRACT AND ALUMINUM CHLORIDE ON PEN'S ATMOSPHERIC AMMONIA, PRODUCTIVE, REPRODUCTIVE AND PHYSIOLOGICAL PERFORMANCE OF SILVER MONTAZAH COCKS.

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ABSTRACT: *A total number of 240 Silver Montazah cocks 32 weeks old were randomly divided into 4 equal groups with two replicates each of 30 cocks. Group 1: Received the basal diet and kept on untreated litter (control- CO). Group 2: Received the basal diet supplemented with 0.2 g Yucca/kg diet and kept on untreated litter (YU). Group 3: Received the basal diet and kept on treated litter with 250 g aluminum chloride / m^2 (AL). Group 4: Received the basal diet supplemented with 0.2 g Yucca / kg diet and kept on treated litter with 250 g aluminum chloride / m^2 (YU-AL). At 44 weeks of age 4 cocks from each treatment were chosen and confined with 40 hens received the same corresponding treatment to determine fertility and hatchability tratits. The main results were as follows: All experimental treatments had recorded observable reduction in ammonia (NH_3) emission either at 2 cm above the litter or atmospheric NH_3 volatilization at the level of bird. Both of AL and YU-AL treatments significantly ($P \leq 0.05$) increased final body weigh (FBW) comparing with CO group. Body weight gain (BWG) was significantly ($P \leq 0.05$) increased, while feed intake (FI) was not affected by all experimental treatments. All experimental treatments significantly increased semen ejaculate volum compared with CO while, semen pH and color as well as sperm concentration and mass motility were not significantly affected. The percentage of live sperm significantly ($P \leq 0.05$) increased, while the percent of abnormal sperm was significantly ($P \leq 0.05$) decreased for all experimental groups. The fertility percentage was significantly ($P \leq 0.05$) increased for YU and YU-AL treatments, meanwhile, it was not affected by AL treatment comparing with CO. There was a significant ($P \leq 0.05$) increase in hatchability percent for AL treatment, while this increase was not significant for YU and YU-AL treatment. All experimental treatments displayed a significant ($P \leq 0.05$) increase in plasma total proteins concentration, while plasma urease and urea were*

significantly ($P \leq 0.05$) reduced. Treatments of YU and YU-AL significantly increased plasma uric acid, while the significant increase in plasma triiodothyronine (T_3) was attained by YU treatment only. Blood pH was significantly reduced by YU-AL treatment. The YU and YU-AL treatments displayed a significant ($P \leq 0.05$) increase in testis relative weight, while lung relative weight was significantly ($P \leq 0.05$) increased by all experimental treatments comparing with control.

From this study its clear that the YU-AL treatment resulted in the lowest pen's atmospheric NH_3 and the best performance of Silver Montazah cocks.

INTRODUCTION

Ammonia is the most noxious gas in animal housing. It is a large component of the gaseous from poultry operations produced in birds manure by the enzymatic conversion of urea and bacterial breakdown of manure uric acid (Belyavin, 1992), which affect birds health and the safty of people working in these environments. For example, chickens continuously exposed to 20 ppm ammonia exhibit significant respiratory tract damage after only six weeks, while chicks exposed to 20 ppm ammonia for 72 hours were much more susceptible to Newcastle disease than those reared in ammonia-free environments (Anderson *et al.*, 1964). Caveny *et al.*, (1981) reported that high ammonia levels within poultry houses were associated with impaired mucus flow, ciliary's action in the bronchi and adversely affected broiler cockerel feed efficiency. The high concentrations of ammonia gas significantly decreased egg hatchability percent and increased early embryonic mortality in eggs exposed to 50 ppm ammonia (Az-Aldeen, 2006). Charles and payne (1966) showed that 100 ppm of ammonia caused reductions in carbon dioxide production and depth of respiration and decrease of 7 to 24% in the respiration rate of laying hens. The same investigators reported that birds reared in atmospheres containing high concentrations of ammonia consumed less food and grew at a slower rate. Due to the problems associated with increasing NH_3 levels in poultry houses cited above, it has become increasingly necessary to focus on new ways to face these problems one way to reduce the impact of these problems is through the use of natural compounds such as Yucca extract either in the diet or sprayed on poultry excreta. The other way is through the use of chemical amendments for litter.

Yucca schidigera is believed to inhibit the production of ammonia by bacteria in the gut or by binding ammonia in poultry excreta (Al-Bar *et al.*, 1998). Feeding of Yucca extract resulted increases in average daily gain

and improvement in feed conversion (Walker, 1993). The active ingredients in the plant are glycosides and compound saponin, they are used as ammonia inhibitor and growth promoter in broilers, layers and rabbits (Nazeer *et al*, 2002). Saponin is a steroidal compound has the potential to enhance growth rate and improves feed efficiency (Yejuman *et al.*, 1998). Saponins from variety of sources have also been shown to assist the absorption of nutrients by increasing the permeability of the small intestinal mucosa (Seeman *et al.*, 1973). Yucca extract has been found to increase birds performance by reducing intestinal and blood ammonia levels, which result in poor performance (Balog *et al.*, 1994). The same previous authors added that the effect of Yucca is much more pronounced with sufficient ventilation. Miah *et al.*, (2004) reported that saponin addition to male broiler diets significantly increased testis weight. Inhibiting NH_3 volatilization from poultry litter with chemical amendments has been shown to increase productivity. Aluminum chloride was one of the most efficient compounds for reducing NH_3 volatilization.

Some ammonia volatilization experiments were conducted to assess the efficacy of different chemicals to reduce ammonia emissions. These studies showed that many of the chemicals such as ethylene glycol, calcium-iron silicates, and sodium bisulfate had no significant effect on NH_3 volatilization from litter over a 42-day period when applied at the manufacturers recommended rate. However, the effective treatments were aluminum compounds (Moore *et al.*, 1995 a, 1996).

Several benefits of Alum-treatment were reported by Moore *et al.* (1995 b) who evaluated alum-applications to poultry litter in 10 commercial broiler houses for a one-year period. They found that birds weight gains were significantly higher in houses with alum-treated litter than those in control houses. Feed conversion was also better for birds grown on litter treated with aluminum compounds.

Therefore, objectives of this study was to reduce atmospheric ammonia level in pen around the birds by using natural compound (Yucca extract) in the diet and chemical compound (Aluminum chloride) in the litter and the effects of the previous compounds on productive, reproductive and physiological performance of Silver Montazah cocks.

MATERIALS AND METHODS

This work was carried out in Inshas poultry Research Station Animal Production Research Institute, Agricultural Research Center.

Bird's management and experimental design:

Two hundred and forty Silver Montazah cocks 32-wks old were randomly divided into 4 equal groups, each of 60 cocks, with two replicates (30 cocks each) with similar average live body weight. The birds were housed in 8 identical pens measuring 2 x 3 m (each treatment in two pens) on clean wheat straw littered floor (10 cm depth). All birds were kept under normal environmental conditions including temperature which fluctuated between 23 °C and 17 °C and relative humidity of 65 % ±5 depending on outside environmental conditions, each pen had four windows which they were alternatively oppend to insure sufficient fresh air during the experimental period. Cocks were fed a commercial layer diet (16 % crude protein and 2700 kcal ME/kg) during the experimental period. Feed and water were supplied *ad libitum*. Light was provided for 17 hours daily during the experimental period which lasted for 12 weeks from November 2006 to January 2007.

The experimental treatments were:

Group 1: Received the basal diet and kept on untreated litter (control- CO).

Group 2: Received the basal diet supplemented with 0.2 g Yucca/kg diet and kept on untreated litter (YU).

Group 3: Received the basal diet and kept on treated litter with 250 g aluminum chloride / m^2 (AL).

Group 4: Received the basal diet supplemented with 0.2 g Yucca / kg diet and kept on treated litter with 250 g aluminum chloride / m^2 (YU-AL).

In groups 3 and 4 aluminum chloride ($AlCl_3$) as a powder was mixed with litter (250 g/ m^2) from the beginning to the end of experimental period.

Measurements:

1. Atmospheric ammonia:

Air ammonia (NH_3) concentrations inside the experimental pens were taken biweekly intervals by using NH_3 detector tubes (Dragger Gas Detector). NH_3 measurements were taken at approximately 2 cm above the litter and at the level of bird in randomly three different locations at approximately the same time (10 am).

2. Productive traits:

A) Initial and final live body weight (LBW) were obtained and body weight gain (BWG) was calculated.

b) Feed intake (FI) was recorded biweekly for each treatment during the whole experimental Period (12wks).

3. Semen characteristics:

At 44 wks of age semen was collected from 48 well trained cocks (12 cocks from each treatment) by massage method. Semen samples were examined for the following characteristics.

1. Ejaculate volume was measured to the nearest 0.01 ml by using graduated syringe.
2. Mass motility score (From 1 to 5 grades).
3. Sperm concentration was measured by hemocytometer in counting the sperms per cubic millimeter.
4. Live sperm. The differentiation of live from dead sperms was done by a buffered brom-phenol blue and nigrosine solution technic.
5. Semen pH was determined using comparative pH papers.
6. Semen color was also determined.

The previous characteristics were determined according to (Kalamah *et al.*, 2000)

4. Fertility and hatchability:

At 44 wks of age four cocks from each treatment were selected and confined with 40 hens (1 cock / 10 hens) received the same corresponding treatment. Eggs produced by each experimental group were collected at 42, 43 and 44 wks of age. The eggs of each treatment were incubated of each treatment and hatched separately to determine fertility percent (number of fertile eggs / number of eggs set x 100) and hatchability percent (number of hatched chicks / number of total eggs set x 100).

5. Blood biochemical analysis:

At the end of experiment (44 wks) a total of 24 cocks (6 cocks from each treatment) were randomly taken to collect blood samples and get some body organs. The birds were individually weighed and slaughtered blood samples (about 3 ml) were then collected during exsanguinations into heparinized test tubes and centrifuged at 3000 rpm for 10 minutes. Plasma was separated and stored at – 20°c until assayed for total protein, uric acid, urease enzyme and urea, which determined calorimetrically by using available commercial diagnostic kits. Plasma triiodothyronine (T3) level

was assayed by RIA procedure. A small amount of fresh blood samples was used to determine the blood pH by pH meter equipment.

6. Internal body organs

The slaughtered cocks were manually eviscerated, lungs, liver, heart and testis were removed and their percentages to LBW were calculated.

7. Statistical analysis

Data were subjected to ANOVA using SAS software (SAS Institute, 1998). Significant differences between treatment means were determined using Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

1. Atmospheric ammonia

Atmospheric ammonia (NH_3) concentrations from the various treatments are shown in Table (1). At 2 cm above the litter, the experimental treatments significantly ($P \leq 0.05$) reduced pen's air NH_3 concentrations comparing to control (CO) at all ages studied except at 8^{th} wk. However, there were no significant difference in NH_3 levels among Yucca (YU), aluminum chloride (AL) and Yucca plus aluminum chloride (YU-AL) treatments. Generally, at the 12^{th} wk concentrations of NH_3 emission were reduced by about 9.2, 10.1 and 13.8% for YU, AL and YU-AL treatments below the CO group.

The trend of atmospheric NH_3 concentrations at the level of bird as affected by the experimental treatments was somewhat similar to that observed at 2 cm above the litter, where all the experimental treatments (YU, AL and YU-AL) caused a significant ($P \leq 0.05$) reduction in atmospheric NH_3 at the 2^{nd} and 6^{th} wks. However, with the exception of 10^{th} wk the YU-AL treatment had the best efficient in reducing NH_3 concentration at all ages tested followed by AL treatment, meanwhile YU treatment was less efficient in reducing air NH_3 comparing with both AL and YU-AL treatments. These results are agree with those obtained by Rowland *et al.*(1976) and Cheeke and Nakuae (1993) who found that dietary Yucca shidigera extract significantly reduced atmospheric NH_3 in poultry houses. Also, Rizkalla *et al.* (2008 a) found that NH_3 level in the ambient air decreased by adding Yucca schidigera in the diet of Dandrawi and Dokki4 chicks. On the other hand, Johanston *et al.* (1981) found that there was no significant reduction in atmospheric NH_3 levels due to use Yucca in broiler diets. Regarding $AlCl_3$ effects, our findings are confirmed by those obtained by Choi (2004) and Choi and Moore (2008) who stated

that impacting $AlCl_3$ (100, 200 and 300g $AlCl_3$ /kg litter) in broiler litters significantly reduced atmospheric NH_3. The same authors added that $AlCl_3$ addition at the lower rates can provide significant positive environmental benefits for broiler operations. The reduction in atmospheric NH_3 due to use $AlCl_3$, because it is a dry acid and its applications reduces litter pH, which decreased NH_3 volatilization from the litter and resulted in significant reductions in atmospheric NH_3 in the aluminum-treated houses.

2. Productive traits

The results of productive performance are present in Table (2). It could be noticed that AL and YU-AL treatments caused a significant ($P \leq 0.05$) increase in final live body weight while YU treatment caused a nonsignificant increase as compared with CO group. The rates of increment in final live body weight as a percentage of initial body weight were 18, 21.0 and 20.8 % for YU, AL and YU-AL treatments versus 14.7 % for CO group.

Concerning the body weight gain, it is clear that all experimental treatments significantly ($P \leq 0.05$) improved body weight gain compared to CO group (Table 2). However, the increase in body weight gain valued about 22.3, 42.1 and 41.2% for YU, AL and YU-AL treatments over the CO group.

Regarding feed intake, Table (2) shows that there were no significant differences in FI among experimental treatments each others and CO group. However, FI tended to be greater in YU-AL treatment.

Our finding of live body weight and body weight gain are closely agreement with those obtained by Johanston *et al.* (1981) who reported that broiler male chicks receiving Yucca saponin were significantly heavier than controls. Cheeke and Nakuae (1993) reported that dietary Yucca schidigera extract significantly increased growth rate of chickens. Also, Rizkalla *et al.* (2008 b) showed that adding Yucca schidigera extract to Dandrawi and Dokki- 4 male chicken diets significantly ($P \leq 0.05$) increased live body weight and body weight gain than the controls.

The increase in body weight obtained in this study due to added Yucca schidigera in the diet may be due to one or more of these reasons 1) Yucca is used as NH_3 inhibitor consequence it improves the air quality around the birds which increases their performance. 2). The level of Yucca used in this experiment is considered as a growth promoter because it may be contains enough amounts of saponins which have a surfactant properties would help to increase nutrients absorption. In this respect, Seeman *et al.*

(1973) stated that Yucca saponins would help to increase nutrients absorption from the intestine by increasing villi diameter which is permeable for large molecules like ferritin and this fact may be responsible for better growth rate.

Regarding the effect of $AlCl_3$-treated litter, our results are accordance with those obtained by Moore *et al.* (1999) who found that broilers grown on aluminum chloride-treated litter were heavier than the controls. Also, Choi and Moore (2008) reported that $AlCl_3$ treatments were improved weight gain while there were no significant differences in feed intake between control and $AlCl_3$ treatment to poultry litter.

Moore *et al.* (1997) hypothesized that the differences in weight gains were either due to the decrease in atmospheric NH_3 levels or due to change in microbiology of the litter.

3. Semen characteristics

a- Semen physical examination

Table (3) shows all experimental treatments resulted in a significant ($P \leq 0.05$) increase in ejaculate volume as compared with CO group. However, the highest value for ejaculate volume was recorded for YU and YU-AL treatments being 0.55 ml. On the other hand, there were no significant differences in semen pH and color could be observed between all experimental groups each others and CO group.

b- Semen microscopic examination

As shown in Table (3) all experimental treatments displayed a significant ($P \leq 0.05$) increase in the ratio of live sperm and significant ($P \leq 0.05$) decrease in the percent of abnormal sperms compared with the CO group. However, the YU treatment was attained the highest percent for live sperms (92.0%) and the lowest percent for abnormal sperms (16.6%), while the opposite was true for CO group.

On the other hand, in all treated groups, sperm concentration and progressive motility tended to be slightly higher than CO group, but the differences between all of them were not significant. It is interest to notice that ammoniated environment was associated with changes in acid-base balance in the bird's blood (Burger *et al.*, 1974). In an experiment on the effect of interactive between NH_3 and light intensity on broiler's physiological status, Olanrewaju *et al.*, (2008) indicated that NH_3 exposure significantly caused alterations in some blood variables such as increasing hemoglobin and decreasing blood oxygen saturation and this may be related to the increased metabolic activity needs under relatively stressful

conditions. Thus, in this study the reduction in pen's atmospheric NH_3 may be prevented the previously mentioned attractions and improved the physiological status of the cocks which resulted in improvement in their reproductive and fertility traits.

4. Fertility and hatchability

Cocks of YU and YU-AL treatments had recorded significantly ($P \leq 0.05$) higher fertility percent than those of CO and AL groups (Table 3). The cocks of AL and CO groups had recorded closely similar values for fertility percent (91.67 and 91.66%), respectively. The highest hatchability percent was achieved by AL treatment being (88.8), while the lowest percent was recorded for CO group being (82.4). Meanwhile, hatchability percent was 86.1 and 85.2% for YU and YU-AL treatments, respectively.

Regarding the increase in fertility and hatchability percentages, there are two assumptions, the first one may be the reduction of atmospheric NH_3 concentrations around the egg laid reflects on its interior quality such as egg PH and albumen quality where, these traits are strongly relate with hatchability results. In this respect. Az-Aldeen (2006) reported that NH_3 significantly ($P \leq 0.05$) affected the interior egg quality as indicated by the pH which was high in both albumen and egg yolk as indicated by the albumen height and yolk index depression, thus early embryonic mortality percentage was increased in eggs exposed to different levels of NH_3. Also, egg hatchability percent was significantly decreased. The second assumption in which the improvement obtained in semen characteristics may be beneficially reflects on cocks fertility and eggs hatchability by increasing their percentages.

5. Blood constituents

Data for blood constituents are presented in Table (4). It could be observed that the highest plasma total proteins concentration was exhibited by YU treatment followed by YU-AL treatment and then AL treatment, while the least concentration was recorded by CO group. The differences in plasma total proteins concentrations were significant ($P \leq 0.01$) between all experimental treatments each others and CO group.

As shown in Table (4) there was a significant reduction in blood pH to YU-AL comparing with other treatments. The significant reduction in blood pH due to use Yucca with Aluminum chloride together may be related with the significant reduction in atmospheric NH_3 by YU-AL treatment, Olanrewaju *et al.* (2008) reported that the high levels of atmospheric NH_3 in broiler houses significantly increased blood pH. The pH of the blood is

maintained within a very narrow range because sudden changes can result in cellular damage via protein ionization (Eckert, 1988). Therefore, changes in the acid-base balance of the blood associated with exposing to ammoniated environments may be excrete a negative effects on animal performance (Davidovich *et al.*, 1977).

Plasma uric acid concentrations were significantly ($P \leq 0.05$) increased by YU and YU-AL treatments, conversely to that for plasma urease activity (Table 4). On the other hand, the concentrations of plasma uric acid and urease were not significantly affected by AL treatment comparing with CO group. However, the increase in plasma uric acid levels valued about 21.6, 0.2 and 20.8%, while the reduction in plasma urease activity was 35.4, 18.8 and 40.6% for YU, AL and YU-AL treatments, respectively comparing to CO group.

Plasma urea concentrations were significantly ($P \leq 0.05$) reduced by all experimental treatments compared with CO group (Table 4). Its concentrations were reduced by about 33.9, 35.8 and 39.0% for YU, AL and YU-AL treatments, respectively.

Plasma triiodothyronine (T3) concentration was significantly ($P \leq 0.05$) increased by YU treatment, while the both of AL and YU-AL treatments appeared nonsignificant increase compared with control group (Table 4).

As regards the effect of Yucca the previous results are partly agree with the findings of Balog *et al.* (1994) who obtained a significant ($P \leq 0.05$) decrease in blood urea and significant ($P \leq 0.05$) increase in blood uric acid levels due to use urease inhibitor (Yucca) in broiler diets. However, our results regarding plasma total proteins and urease concentrations are consistent with those obtained by Rzkalla *et al.* (2008 a) where they stated that plasma total protein concentrations were significantly increased and urease activity significantly decreased by dietary Yucca treatments comparing with controls. In contrast, our findings concerning uric acid were not consistent with the finding of the previous authors who obtained a significant reduction in blood uric acid level due to feeding Yucca schidigera to local strain chicks.

The increase in plasma uric acid which accompanied by decrease in plasma urea and urease activity in this experiment may be considered as indicator to reduce NH_3 production in the blood which results from converting blood uric acid to urea and then to ammonia via urease enzyme. Also, in this study either significant and nonsignificant increase in plasma T3 concentrations due to Yucca and $AlCl_3$ treatments may be related to the

significant increase in body weight gain which attained by YU, AL and YU-AL treatments, where it is well known that thyroid activity is important in controlling metabolic rate. Generally, it is accepted that T3 is the principal metabolically active thyroide hormone in birds.

6. Internal body organs

Data presented in Table (5) showed that both of YU and YU-AL treatments caused a significant ($P \leq 0.01$) increase in testis relative weight, while AL treatment caused insignificant increase compared with CO group. These findings with regard to the effect of Yucca are partly supported by those of Hong-Bj *et al.* (1976) who reported that there was an increase in the percentage of testical weight in cockerels receiving diet containing saponin. The authors returned this increase to the increase testis seminiferous tubules diameters. Also, Miah *et al.* (2004) reported that saponin addition to male broiler diets significantly ($P \leq 0.05$) increased percentage of testis weight.

The relative weight of lung was significantly ($P \leq 0.01$) increased by all experimental treatments comparing with CO group (Table 5). The highest relative .ung weight was exhibited by AL treatment, while the lowest lung percent was recorded for CO group. The decrease of lung relative weight in birds of CO group may be correlated with the high levels of atmospheric ammonia around the birds in the pens of this treatment which cause hypoxia, thus the demands of O_2 increase as a result of ammonia stress. This case was explained by Vidyadaran *et al.* (1990) who reported that lung per unit body weight is 20 to 33 % lower (as a result of hypoxia) for a modern layer breeds than its wild ones. Even though layer breeds have an increased surface area for gas exchange, the net result was a 28 % thicker blood gas barrier when compared with the wild birds. This increase had led to a 25% lower anatomical O_2 diffusion capacity of blood-gas tissue barrier per unit body weight in the domestic layer.

Table (5) shows that there were no significant changes in the heart relative weight due to experimental treatments except for YU-AL treatment which attained a significant ($P \leq 0.05$) increase in heart relative weight comparing with AL and CO treatments. In this respect Balog *et al.* (1994) reported that heart weight as a percentage of body weight was not affected by adding urease inhibitor (Yucca) to broiler diets.

Liver weight as a percentage of live body weight is shown in Table (5). Its clear that there was a nonsignificant increase in liver relative weight for birds of YU treatment omparing to YU-AL and CO group. On the other hand, both treatments of CO and YU-AL had recorded the same value (1.81%) for liver relative weight. Generally, there were no significant

differences in liver relative weight between all experimental treatments except YU and AL treatments the difference between them was significant ($P \leq 0.05$). However, Balog *et al.* (1994) stated that liver weights, as a percentage of body weight were significantly increased by adding 125 and 250 ppm urease inhibitor (Yucca) / kg in broiler diets.

As far as we know, there is enough literature concerning the effect of antiammonia compounds on reproductive traits in poultry cocks.

The present study suggest that using Yucca schidigera or $AlCl_3$ or both compounds together for Silver Montazah cocks resulted in reducing atmospheric NH_3 and improving the productive, reproductive and physiological performance. In addition to the effect of Yucca as a growth promoter. Generally, the results were obtained by using Yucca and $AlCl_3$ together.

Table (1): Effect of Yucca schidigera and aluminum chloride on atmospheric ammonia (ppm) of Silver Montazah cocks.

Treatments	2 nd wk	4 th wk	6 th wk	8 th wk	10 th wk	12 th wk
2 cm above the litter						
Control (CO)	18.96 ^{a}	20.24 ^{a}	20.25 ^{a}	17.07 ^{a}	23.00 ^{a}	23.00 ^{a}
Yucca (YU)	15.99 ^{b}	16.85 ^{b}	17.49 ^{b}	17.17 ^{a}	20.24 ^{b}	20.88 ^{b}
Aluminum chloride (AL)	13.87 ^{b}	15.16 ^{b}	17.06 ^{b}	17.06 ^{a}	19.81 ^{b}	20.67 ^{b}
Yucca+Aluminum chloride (YU-AL)	14.92 ^{b}	15.15 ^{b}	16.00 ^{b}	16.00 ^{a}	17.69 ^{b}	19.82 ^{b}
S . E	± 0.334	± 0.343	± 0.366	± 0.588	± 0.386	± 0.286
At the level of bird						
Control (CO)	18.70 ^{a}	18.71 ^{a}	19.29 ^{a}	19.49 ^{a}	21.44 ^{a}	21.83 ^{a}
Yucca (YU)	16.16 ^{b}	16.36 ^{ab}	17.14 ^{b}	17.54 ^{ab}	19.88 ^{a}	20.07 ^{ab}
Aluminum chloride (AL)	14.21 ^{b}	14.80 ^{b}	16.55 ^{b}	16.56 ^{b}	19.49 ^{a}	19.68 ^{ab}
Yucca+Aluminum chloride (YU-AL)	14.19 ^{b}	14.79 ^{b}	15.57 ^{b}	15.59 ^{b}	18.51 ^{a}	18.70 ^{b}
S . E	± 0.354	± 0.368	± 0.304	± 0.357	± 0.435	± 0.395

a.b,...., Means in the same column with different superscripts differ significant by ($P \leq 0.05$).

Table (2): Effect of Yucca schidigera and aluminum chloride on body weight, body weight gain and feed intake of Silver Montazah cocks.

Treatments	Control (CO)	Yucca (YU)	Aluminum chloride (AL)	Yucca + Aluminum chloride (YU-AL)	S . E
Initial body weight (IBW)	1989.7 [a]	1991.5 [a]	1988.5 [a]	1991.0 [a]	± 2.42
Final body weight (FBW)	2282.9 [b]	2350.2 [ab]	2405.1 [a]	2405.0 [a]	± 22.53
Body weight gain (BWG)	293.2 [c]	358.7 [b]	416.6 [a]	414.0 [a]	± 3.178
Feed intake (FI) (g/bird/ day)	128.4 [a]	126.8 [a]	128.6 [a]	130.4 [a]	± 1.223

a,b,... Means in the same row with different superscripts differ significantly ($P \leq 0.05$).

Table (3): Effect of Yucca schidigera and aluminum chloride on some semen characteristics, fertility and hatchability of Silver Montazah cocks.

Treatments	Semen physical examination			Semen microscopic examination				Fertility (%)	Hatchability (%)
	Ejaculate volume (ml)	PH	Color	Sperm concentration (10^9/ml)	Motility	Live sperms (%)	Abnormal sperms (%)		
Control (CO)	0.30 ^{c}	8.5 ^{a}	White	2.90 ^{a}	3.50 ^{a}	73.3 ^{b}	26.0 ^{a}	91.66 ^{b}	82.4 ^{b}
Yucca(YU)	0.55 ^{a}	8.2 ^{a}	White	3.33 ^{a}	3.67 ^{a}	92.0 ^{a}	16.6 ^{b}	97.20 ^{a}	86.1 ^{ab}
Aluminum chloride (AL)	0.45 ^{b}	8.4 ^{a}	White	3.25 ^{a}	3.51 ^{a}	88.6 ^{a}	17.0 ^{b}	91.67 ^{b}	88.8 ^{a}
Yucca+Aluminum Chloride (YU-AL)	0.55 ^{a}	8.3 ^{a}	White	3.92 ^{a}	4.0 ^{a}	88.7 ^{a}	17.3 ^{b}	98.90 ^{a}	85.2 ^{ab}
S .E	± 0.059	-----	-----	± 0.212	± 0.117	± 4.191	± 2.263	± 1.875	± 1.319

a,b,..., Means in the same column with different super scripts differ significantly ($P \leq 0.05$)

Table (4): Effect of Yucca schidigera and aluminum chloride on some blood constituents of Silver Montazah cocks.

Treatments	Total protein (g/dl)	PH	Uric acid (g/dl)	Urease (g/dl)	Urea (g/dl)	Triiodo-thyronine T3 (ng/dl)
Control (CO)	4.40 ^{d}	7.70 ^{a}	5.92 ^{b}	7.11 ^{a}	6.23 ^{a}	118.85 ^{b}
Yucca (YU)	5.60 ^{a}	7.56 ^{a}	7.20 ^{a}	4.59 ^{b}	4.12 ^{b}	160.74 ^{a}
Aluminum chloride (AL)	4.70 ^{c}	7.71 ^{a}	5.93 ^{b}	5.77 ^{ab}	4.00 ^{b}	135.02 ^{ab}
Yucca+Aluminum chloride (YU-AL)	4.80 ^{b}	7.05 ^{b}	7.15 ^{a}	4.22 ^{b}	3.80 ^{b}	138.37 ^{ab}
S.E	± 0.006	± 0.155	± 0.294	± 0.616	± 0.352	± 9.742

a , b, .., Means in the same column with different superscript differ significantly ($P \leq 0.05$, $P \leq 0.01$)

Table (5): Effect of Yucca schidigera and aluminum chloride on some internal body organs of Silver Montazah cocks.

Treatments	Testis (%)	Lung (%)	Heart (%)	Liver (%)
Control (CO)	0.73 ^{c}	0.39 ^{c}	0.58 ^{b}	1.81 ^{ab}
Yucca (YU)	1.02 ^{a}	0.46 ^{ab}	0.61 ^{ab}	1.89 ^{a}
Aluminum chloride (AL)	0.81 ^{bc}	0.49 ^{a}	0.58 ^{b}	1.74 ^{b}
Yucca+Aluminum chloride (YU-AL)	1.05 ^{a}	0.45 ^{b}	0.64 ^{a}	1.81 ^{ab}
S.E	± 0.078	± 0.021	± 0.014	± 0.031

a , b, .., Means in the same column with different superscript differ significantly ($P \leq 0.05$, $P \leq 0.01$).

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الملخص العربي

تأثير مستخلص اليوكا و كلوريد الالومنيوم على الامونيا المنبعثه في جوالعنبر والاداء الانتاجي والتناسلي و الفسيولوجي لذكور دجاج المنتزه الفضى

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تم إجراء هذا البحث بمحطة بحوث الدواجن بانشاص التابعه لمعهد بحوث الانتاج الحيوانى و ذلك بهدف خفض مستوى الامونيا في البيئه المحيطة بالطيور باستخدام نوعين من مضادات الامونيا مستخلص نبات اليوكا كمادة طبيعية تضاف للعلف و مركب كلوريد الالومنيوم كمادة كيميائيه تضاف مخلوطه بالفرشه و تأثير هذه المركبات على الاداء الانتاجى و التناسلي و الفسيولوجى لديوك سلالة المنتزه الفضى .

تم توزيع عدد ٢٤٠ ديك عمر ٣٢ اسبوع من سلالة المنتزه الفضى بالتساوى على ٤ معاملات بكل معاملة مكررين بواقع ٣٠ ديك لكل مكرر كما يلي :

- المجموعة الاولى : تم تغذيتها على العليقه الاساسيه و بدون أي معامله للفرشه .
- المجموعة الثانيه : تم تغذيتها على العليقه الاساسيه مضاف اليها ٠.٢ جم مسحوق اليوكا / كجم عليقة و بدون أي معامله للفرشه.
- المجموعة الثالثه : تم تغذيتها على العليقه الاساسيه و تربيتها على فرشه مخلوط بها كلويد الالومنيوم بمعدل ٢٥٠ جم / م^{2}.
- المجموعة الرابعه : تم تغذيتها على العليقه الاساسيه مضاف لها ٠.٢ جم مسحوق اليوكا / كجم عليقه مع تربيتها على فرشه مخلوط بها كلوريد الالومنيوم بمعدل ٢٥٠ جم / م^{2}.

استمرت التجربة لمدة ١٢ اسبوع ابتداء من شهر نوفمبر ٢٠٠٦ و حتى يناير ٢٠٠٧.و في نهاية التجربة عند عمر ٤٤ اسبوع تم جمع السائل المنوي من ٤٨ ديك بواقع ١٢ ديك من كل معاملة (٦ ديوك من كل مكرر) وذلك لدراسة تأثير المعاملات على صفات السائل المنوى. و عند عمر ٤١ اسبوع تم اختيار ٤ ديوك من كل معاملة حيث تم وضعهم مع ٤٠ أنثى من نفس السلالة و التى عوملت بنفس معاملة الديوك حيث تم جمع البيض المخصب و تفريخه لكل معاملة على حدة لدراسة تأثير المعاملات على نسبه كل من الخصب و الفقس .

ويمكن تلخيص النتائج المتحصل عليها كما يلي :

١- سجلت المعاملات التجريبية المستخدمه انخفاضا ملحوظا في تركيز الامونيا المنبعثة في جو العنبر سواء على مستوى ٢ سم أو على مستوى الطائر مقارنه بالكنترول .

٢- سجلت مجموعتى الديوك سواء التى عوملت باليوكا و كلوريد الالومنيوم معا أو التى عوملت بكلوريد الالومنيوم فقط ارتفاعا معنويا في وزن الجسم النهائي بينما ادت المعاملة باليوكا فقط إلي حدوث ارتفاع غير معنوى في وزن الجسم مقارنه بمجموعة الكنترول .

٣- حققت جميع المعاملات التجريبية المستخدمه ارتفاعا معنويا في وزن الجسم المكتسب (هو ما يمثل الفرق بين الوزن في بداية التجربه و الوزن في نهايتها). بينما لم تتأثر معنويا كميه الغذاء المستهلك مقارنة بالكنترول .

٤- جميع المعاملات التجريبية المستخدمه ادت إلي حدوث ارتفاع معنوى في حجم القذفه للسائل المنوى مقارنه بمجموعة الكنترول بينما لم يتأثر معنويا كل من درجة الـpH ، ولون السائل المنوى و تركيز الاسبرمات و معدل الحركة .

٥- جميع المعاملات التجريبية المستخدمه ادت إلي ارتفاع معنوي في نسبة الحيوانات المنويه الحيه بينما انخفضت معنويا نسبه الحيونات المنويه المشوهه مقارنه بالكنترول .

٦- ارتفعت نسبه الخصب معنويا لمعاملتى اليوكا و اليوكا مع كلوريد الالومنيوم بينما لم تظهر معاملة كلوريد الالومنيوم أى تغير معنوى عن مجموعة الكنترول .

٧- أظهرت معاملة كلوريد الالومنيوم ارتفاعا معنويا في نسبة الفقس بينما كان هذا الارتفاع غير معنوى لمعاملتى اليوكا و اليوكا مع كلوريد الالومنيوم.

٨- أظهرت جميع المعاملات التجريبية المستخدمه ارتفاعا معنويا في مستوى البروتينات الكليه بينما انخفض معنويا مستوى كل من اليوريز و اليوريا.

٩- اظهرت معاملتى اليوكا و اليوكا مع كلوريد الالومنيوم ارتفاعا معنويا في مستوى حامض اليوريك مقارنه بمعاملتى الكنترول و كلوريد الالومنيوم

١٠-ارتفع معنويا تركيز هرمون T3 بالبلازما بمعامله اليوكا بينما كان هذا الارتفاع غير معنويا لبقيه المعاملات

١١-ادت معاملة اليوكا و كلوريد الالومنيوم معا إلي حدوث انخفاض معنوى في pH الدم بينما لم يكن لبقية المعاملات أى تأثير .

١٢-اظهرت كل من معاملتي اليوكا و اليوكا مع كلوريد الالومنيوم ارتفاعا منعويا في الوزن النسبي للخصيتين بينما ازداد الوزن النسبي للرئتين معنويا بجميع المعاملات مقارنة بالكنترول .

١٣-ازداد الوزن النسبي للقلب معنويا بمعاملة اليوكا و كلوريد الالومنيوم بينما كانت هذه النسبه غير معنويه بالنسبه لبقية المعاملات في حين لم يتأثر الوزن النسبي للكبد معنويا بأي من المعاملات المستخدمه.

من هذه الدراسة يتضح أن معاملة الديوك البالغة من سلالة المنتزه الفضى باضافه مسحوق اليوكا في العليقه أو كلوريد الالومنيوم في الفرشه أو بالمركبين معا قد اديا إلي حدوث إنخفاض في تركيز الامونيا في الجو حول الطيور مع حدوث تحسن في الاداء لانتاجى و الفسيولوجى وصفات السائل المنوى و كذلك صفات الخصب والتفريخ وكانت افضل النتائج المتحصل عليها لمعاملة اضافه اليوكا إلي العليقه وخلط الفرشه بكلوريد الالومنيوم معا.