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EFFECT OF SLIVER NANOPARTICLES WITH *COTULA CINERIA* EXTRACT ON GROWING RABBITS PERFORMANCE, DIGESTIBILITY AND CARCASS QUALITY.

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ABSTRACT

The current study was carried out to investigate the effect of sliver nanoparticles (40 - 50 nm |) with *Cotula cineria* extract (CCE) on growing Rabbits Performance, Digestibility and Carcass quality. Total of 24 growing NewZealand white (NZW) rabbits of both sexes at 5 weeks of age (with average weight 857 ± 80.87g) were at random assigned to four equal groups, each group consists of 6 rabbits, in three replicates. . Rabbits in all experimental groups were fed the same basal diet. Rabbits in the 1st group (control) were fed the basal diet without treatment, while in the 2nd group were fed the basal diet treated with **Extract** at a dose of 250mg/rabbit/day, in the 3rd group were fed the basal diet treated with sliver nanoparticles at a dose of 10 mg/kg body weight (BW) per day, the 4th group were fed the basal diet treated with sliver nanoparticles with *Cotula cineria* extract at a dose of 10mg / kg /day from sliver nanoparticles + 125 mg /rabbit /day from extract. Live body weight (LBW), digestibility coefficients (DC) and carcass traits were determined for up to 13 weeks of age. Results showed that Live body weight had significant effect ($p<0.05$) in 3rd ,5 th week and no significant effect in all experimental weeks. Live body weight gain had no significant effect ($p<0.05$) in all experimental weeks and TG and the best values were in group (CCE). Feed intake weekly had significant effect ($p<0.05$) in all weeks of experiment and TFI, the best values were in group (CCE) (1291.7) in 3rd week. No significant differences ($p<0.05$) were observed in FCR within experimental weeks except FCR5 the best value was in group (CCE) (2.25) in FCR1.About Carcass characteristics there was significant effect on Cecum length, Abdominal fat but differences in Live Body Weight, Cecum weight and Dressing %were not significant.

Apparent digestibility of OM, CP and NFE were significantly ($p<0.05$) and the best values were in group (SNPs) (74.66,73.85,80,03 respectively)may be due to the effect of silver Nano particles on intestinal microbial populations and improve the health and immunological status of the birds This can provide the birds with an opportunity to expend less metabolic effort for immunological control purposes and to use surplus nutrients for other physiological and productive purposes Ferket P; (2011), Furthermore, it is speculated that, as a carrier of available oxygen, silver nanoparticles could also be a potent modifier of metabolism. Silver nanoparticles and it is possible that the oxygen that accumulates in the octahedral holes of silver nanoparticles may increase anabolic activity and subsequently stimulate growth and development.

It is recommended to use sliver nanoparticles *on growing rabbit diets, to improve performance, digestibility and carcass characteristics,* Because of their unique biological properties and strong antimicrobial activity, silver nanoparticles have received considerable attention and been used widely in an increasing number of consumer and medical products.

ملخص البحث

اجريت هذه الدراسة لتوضيح تأثير النانوفضة (٤٠-٥٠نانومتر)وكذلك تأثير النانو فضة مع مستخلص نبات الكوتيولا علي اداء النمو للارانب النامية ؛جودة الذبيحة ؛مقاييس الدم؛ معاملات الهضم ؛الاستجابة المناعية؛الكفاءة الاقتصادية .

استخدم في هذا البحث ٢٤ أرنب نامي عمر ٥ أسابيع ومتوسط وزن ٦٥٤ + ٧,٦٧,جرام, قسمت عشوائياً إلى ٤ مجموعات بكل مجموعة ٦ أرانب من كلا الجنسين وكل مجموعة قسمت إلى ٣ مكررات ووضعت في بطاريات من السلك المجلفن ومجهزة بمصادر مياه نقية ومعالف, تمت التغذية في كل المجموعات علي عليقة اساسية .المجموعة الاولي المقياس تم تغذيتها علي العليقة الاساسية فقط ؛بينما المجموعة الثانية تم تغذيتها علي العليقة الاساسيةالمعاملة بي٢٥٠ ملجم/ارنب/اليوم من مستخلص نبات الكوتيولا,المعاملة الثالثة تم تغذيتها علي العليقة الاساسيةالمعاملة بي ١٠ملجم/ كجم وزن حي في اليوم من النانو فضة؛المجموعة الرابعة تم تغذيتها علي العليقة الاساسيةالمعاملة ب ١٠ملجم/ كجم وزن حي/ اليوم من النانو فضة + ١٢٥ ملجم/ارنب/اليوم من مستخلص نبات الكوتيولا.الوزن الحي ؛معاملات الهضم؛ مقاييس الدم وصفات الذبيحة تم قياسها عند عمر اكبر من ١٣ اسبوع .

النتائج المتحصل عليها أوضحت

- وجود تحسن معنوي في وزن الجسم الحي في الاسبوع الثالث والخامس ولا يوجد تحسن معنوي في باقي اسابيع التجربة.
- لا يوجد تحسن معنوي بالنسبة للزيادة في الوزن في كل اسابيع التجربة وكذلك الزيادة الكلية في الوزن وأفضل زيادة في الوزن موجودة في مجموعةمستخلص الكوتيولا.
- وجود تحسن معنوي في المأكول الاسبوعي في كل اسابيع التجربة وكذلك المأكول الكلي وأفضل مأكول كان في الاسبوع الثالث في مجموعة مستخلص الكوتيولا (١٢٩١,٧).
- عدم وجود تحسن معنوي في معاملات تحويل الغذاء خلال فترة التجربة ما عدا معامل التحويل في الاسبوع الخامس وافضل معامل تحويل كان في الاسبوع الاول في مجموعة مستخلص الكوتيولا (٢,٢٥).
- بالنسبة لخواص الذبيحة تلاحظ وجود تحسن معنوي في طول الاعور وكذلك دهن البطن ولا يوجد تحسن معنوي علي كلا من وزن الجسم ؛وزن الاعور ونسبة التصافي.
- وجود تحسن معنوي في معاملات هضم المادة العضوية ؛البروتين الخام والكربوهيدرات وكانت اعلي معاملات هضم لهم في مجموعة النانو فضة (٧٤,٦٦؛٧٣,٨٥؛٨٠,٠٣ علي التوالي)وذلك ربما نتيجة لتأثير النانو فضة علي علي ميكروبات الامعاء الدقيقة وتحسن صحة الارانب ومناعتها وهذا يعطي الحيوان فرصة لفقد طاقة ممثلة اقل لغرض المناعة واستعمال فائض المركبات الغذائية في اغراض الانتاج الاخري.

وعلي ذلك توصي هذه الدراسة باستخدام ١٠ملجم/ كجم وزن حي في اليوم من النانو فضة في علائق الارانب النامية لتحسين اداء النمو ؛معاملات الهضم وجودة الذبيحة .

INTRODUCTION

In the last two decades, several types of additives have been proposed in pig production as alternatives to the use of antibiotics as growth promoters, such as organic acids, oligosaccharides, plant extracts or probiotics (Cowan, 1999; Naughton et al., 2001; Gardiner et al., 2004; Franco et al., 2005). However, their effect in preventing digestive disorders at weaning and promoting higher productive performances is variable and in most cases below the magnitude previously reached with the use of antibiotics.

Due to the outbreak of the infectious diseases caused by different pathogenic bacteria and the development of antibiotic resistance the pharmaceutical companies and the researchers are searching for new antibacterial agents. Nanoscale materials have emerged up as novel antimicrobial agents owing to their high surface area to volume ratio and the unique chemical and physical properties (Morones et al., 2005; Kim et al., 2007). Nanotechnology is emerging as a rapidly growing field with its application in Science and Technology for the purpose of manufacturing new materials at the nanoscale level (Albrecht et al., 2006). The word "nano" is used to indicate one billionth of a meter or 10−9. The term Nanotechnology was coined by Professor Norio Taniguchi of Tokyo Science University in the year 1974 to describe precision manufacturing of materials at the nanometer level (Taniguchi, 1974). The concept of Nanotechnology was given by physicist Professor Richard P. Feynman in his lecture There's plenty of room at the Bottom(Feynman, 1959). Nanoparticles are clusters of atoms in the size range of 1–100 nm. “Nano” is a Greek word synonymous to dwarf meaning extremely small. The use of nanoparticles is gaining impetus in the present century as they posses defined chemical, optical and mechanical properties. The metallic nanoparticles are most promising as they show good antibacterial properties due to their large surface area to volume ratio, which is coming up as the current interest in the researchers due to the growing microbial resistance against metal ions, antibiotics and the development of resistant strains (Gong et al., 2007). Different types of nanomaterials like copper, zinc, titanium (Retchkiman-Schabes et al., 2006), magnesium, gold (Gu et al., 2003), alginate (Ahmad et al., 2005) and silver have come up but silver nanoparticles have proved to be most effective as it has good antimicrobial efficacy against bacteria, viruses and other eukaryotic micro-organisms (Gong et al., 2007). Silver nanoparticles used as drug disinfectant have some risks as the exposure to silver can cause agyrosis and argyria also; it is toxic to mammalian cells (Gong et al., 2007).

Silver is toxic to microorganisms by poisoning respiratory enzymes and components of the microbial electron transport system, and it also binds to bacterial surface, altering the membrane function(Percival et al., 2005), and to DNA bases, thus inhibiting replication (Wright et al., 1994).

Because of their unique biological properties and strong antimicrobial activity, silver nanoparticles have received considerable attention and are being used widely in an increasing number of consumer and medicinal products(Kim et al.,2007; Varner et al.,2010). In the current study, we investigated the effect of sliver nanoparticles with Cotula Cineria extract on growing Rabbits Performance, Digestibility and Carcass quality.

MATERIALS AND METHODS

The present study was carried out at Rabbit Research Station belonging to Environmental Studies and Research Institute, University of Sadat City, University of Sadat City during the period from September to November, 2017.

This study carried out to investigate the effect of adding three feed additives (Extract, Nano silver, Nano silver + extract,) to the diet of rabbits every day plus Control on performance of New Zealand White rabbits during the growing period. Also, to investigate the effect of these additives on the digestibility coefficient of nutrients, carcass traits, immune response, blood parameters, and economic efficiency.

PREPARATION OF METHANOL EXTRACT

The whole plant was collected from Sadat university farm, carefully, were then washed with distilled water. The whole plant was air dried in the shade at room temperature (27- 29°c) for 10-15 days and then ground into fine powder using an electric blender for 2 min. The dried power(100g) was soaked into (1 L) of methanol for 48 h at room temperature. To avoid light exposure, the flask was left in the dark. The mixtures were first filtered through double layered of whatman No.1 filter paper. The extract was concentrated using a rotary evaporator at 60°c and afterward dried in oven at 50°c for 48 h (E.A. Elsherbiny *et al*(.2016).

The hydrocolloid of Nano silver and Nano silica were obtained from NIS-National Institute for Standards-EGYPT. Nano zinc oxide was obtained from National Laser Institute

ANIMALS:

Twenty-four growing New Zealand white (NZW) rabbits of both sexes at 5 weeks of age (with average weight 654 ± 7.67g) were at random assigned to four equal groups, each group consists of 6 rabbits, in three replicates.

EXPERIMENTAL DIETS:

Three feed additives were added to the commercial rabbits diet Daly expect **control group (T_1) which fed diet without any feed additives.**

Extract Group (T_2) fed 250mg/rabbit/day from extract dissolved in 40 ml distilled water after that distributed to the basal diet from day 1 to 60 of the experiment on growing New Zealand white (NZW) rabbits .

Nano silver Group (T_3). fed 10mg / kg/day from Nano silver dissolved in 40 ml distilled water after that distributed to the basal diet from day 1 to 60 of the experiment on growing New Zealand white (NZW) rabbits.

Nano silver + extract Group.(T_4) fed (10mg/kg/day from Nano silver + 125mg/rabbit /day from extract) mixed them and dissolved in 40 ml distilled water after that distributed to the basal diet from day 1 to 60 of the experiment on growing New Zealand white (NZW) rabbits .
water after that distributed to the basal diet from day 1 to 60 of the experiment on growing New Zealand white (NZW) rabbits .

Group (control). Without any feed additives to the basal diets.

All groups were kept under the same managerial and hygienic conditions. The experimental rabbits were housed in individual cage batteries provided with feeders and drinkers. Diets were offered *ad libitum* in pelleted form and fresh water was available all times from automatic drinkers with nipples. All rabbits were vaccinated against the common diseases. All experimental procedures were carried out according to the Local Experimental Animal Care Committee and approved by the ethics of the institutional committee of Research Institute, University of Sadat City**.**

EXPERIMENTAL DESIGN

Rabbits were divided randomly into four experimental groups of six rabbits. Rabbits were housed individually in double flat galvanized wire batteries (40x30x25 cm) with fodder and automatic nipple drinkers. The batteries were arranged in rows in a windowed house naturally ventilated. Feed and eater were available *ad libitum*. Experiments lasted for 8 weeks. During the experimental period (8weeks), live body weight (LBW) and feed intake (FI) were weekly recorded. Average weight gain (BWG)and feed conversion ratio (FCR) were calculated.

At the end of the experimental period, digestion trials were carried out by using 4 male rabbits (at 13 weeks of age) from each group to determine the digestible coefficients of the experimental diets. The total excreted feces during the collection period were pooled, well mixed, weighed and sampled for analysis.

Representative male and female rabbits (at 15weeks of age) from each treatment were randomly taken for slaughter test and carcass weights were calculated as a percentage of live body weight. Proximate analysis of diets, dried feces and meat were carried out on representative samples according to A.O.A.C(1984).

Data were subjected to analysis of variance using the general linear model (GLM) procedure of SAS (2004). Main effects of differences obtained upon statistical analysis were compared using Duncan's multiple range test (Duncan, 1955), to detect significant differences among means.

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Table 1 : Growth performance of rabbits as affected by Ag Nanoparticles with Cotula cineriea extract (means ± S.E).

Items	Treatments				Sign
	Control (T 1)	T2	T3	T4	
Initial live body weight (g)LBW (g):	80.9٨٧٣,٣±	80.9٩٧٧,٣±	80.9٧٩٠,٣±	80.9٩٠٨,٠±	N.S
LBWK1(g)	77.7٩٦٤,٣ ±	73.7١٠٥٩,٠±	73.7٨٦٧,٣±	73.7١٠١٤,٣±	N.S
LBWK3(g)	1326.7 ^{b} ±86.5	85.1 ±1605.0^{a}	85.1± 1250.7^{b}	85.1 ±1495.0^{ab}	*
LBWK5(g)	1699.0 ^{b} ±90.0	90.0 ±2013.7^{a}	90.0± 1683.7^{b}	90.0± 1909.3^{ab}	*
LBWK7(g)	٢٠٢٦,٧ ±106.7	106.7٢٣٢٥,٠±	106.7١٩٩٥,٠±	106.7٢١٥٤,٢±	N.S
IBWG (g) : IBWG1	35.7٨٤,٧±	35.7٤٦,٠±	35.7٣١,٧±	35.7١٠٦,٣±	N.S
LBWG3	50.5٢١٧,٠±	50.5٣١٣,٠±	50.5٢٥١,٠±	50.5٢٨٠,٧±	N.S
LBWG5	30.7١١٦,٠±	30.7١٤٤,٣±	30.7١٧٧,٣±	30.7١٩٨,٣±	N.S
LBWG7	31.4١٤٦,٣±	31.4١١٩,٠±	31.4١٥٢,٣±	31.4١٨٧,٥±	N.S
TG	108.9١١٥٣,٣±	108.9١٣٤٧,٧±	108.9١٢٠٤,٧±	108.9١٢٤٦,٢±	N.S
FI(g) :					
FI1(g)	308.3^{b}	350.0^{a}	250.0^{c}	350.0^{a}	*
FI3	1015.7^{f}	1291.7^{a}	1084.3^{c}	1162.0^{b}	*
FI5	٧١٠,٣^{f}	٥٦٩,٣^{h}	٨٤١,٣^{b}	٥٧٤,٣^{g}	*
FI7	١٠٤٦,٥^{b}	١٠٨٤,٧^{a}	٩٢٣,٨^{h}	١٠١٢,٣^{c}	*
TFI	٤٤٣٤,٣^{g}	٥٠٣٣,٦^{a}	٤٤٦٥,٣^{f}	٤٦٩٥,٩^{c}	*
FCR (g feed/g gain): FCR1 (g feed/g gain)	3.23± 1.84	2.25±2.38	2.36±2.38	.86±1.84	N.S
FCR3 (g feed/g gain)	7.95±1.8.	4.30±1.80	5.74±1.80	5.55±1.80	N.S
FCR5 (g feed/g gain)	7.19^{ab}± 1.43	4.14^{b}±1.43	5.60^{ab}± 1.43	3.68^{b}±1.43	*
FCR7 (g feed/g gain)	9.46±3.28	11.65±3.28	9.51±3.28	7.03±3.28	N.S
TFC(g feed/g gain)	3.87± 0.36	3.92± 0.36	3.89± 0.36	3.94± 0.36	N.S

a, b, c …….e values within a row with different superscripts significantly different ($p<0.05$).
* = $p < 0.05$ NS = not significant SE= standard error T1 (Control), T2 = Extract ,T3 = Ag Nanoparticles , T4 = Ag Nanoparticles with *Cotula cineriea* extrac

Items	Treatments				Sign
	Control (T1)	T2	T3	T4	
Live Body Weight(g)	١٩٨٤,٠±١١٩,٧	٢٢٢٨,٦±١١٩,٧	١٨٦١,٣±١١٩,٧	٢٠٠٤,٦±١١٩,٧	N.S
Cecum weight (g)	٩,٣±١,٩	١٣,٣±١,٩	١٢,٠±٢,٣	١٤,٠±٢,٣	N.S
Cecum length (cm)	±٠,٧11.7^{abc}	±٠,٧11.7 ^{abc}	±٠,٧10.2^{c}	±٠,٧11.7^{abc}	*
Abdominal fat%	±٧,٦15.3^{ab}	±٧,٦ 37.3^{a}	±٧,٦4.0^{b}	±٧,٦22.7^{ab}	*
Dressing %	٧٣,٧±٢,٥	٧٤,٠±٢,٥	٧٣,٤±٢,٥	٧٤,٠±٢,٥	N.S

Table . 2 Carcass characteristies of experimental rabbits as affected by Ag Nanoparticles with *Cotula cineriea* extract.

a, b, c …….e values within a row with different superscripts significantly different ($p<0.05$).
* = $p < 0.05$ NS = not significant SE= standard error

T1 (Control), T2 = Extract ,T3 = Ag Nanoparticles , T4 = Ag Nanoparticles with

Table.6 Digestibility Coefficients Of experimental rabbits as affected by Ag Nanoparticles with *Cotula cineriea* extract.

Items	For :% Digestibility Coefficients				
	OM	CP	CF	EE	NFE
Control (T1)	**64.86^{ab} ± 3.53**	**66.86^{b} ± 3.02**	**31.39 ± 7.52**	**82.00 ± 9.08**	**72.65^{a} ± 3.14**
T2	**66.22^{ab} ± 3.53**	**75.10^{b} ± 3.02**	**23.36 ± 7.52**	**56.15 ± 9.08**	**73.45^{a} ± 3.14**
T3	**74.66^{a} ± 3.53**	**73.85^{b} ± 3.02**	**39.61 ± 7.52**	**75.94 ± 9.08**	**80.03^{a} ± 3.14**
T4	**64.99^{ab} ± 3.53**	**72.28^{b} ± 3.02**	**19.18 ± 7.52**	**82.09 ± 9.08**	**72.53^{a} ± 3.14**
Sign	*	*	N.S	N.S	*

a, b, c …….e values within a column with different superscripts significantly different ($p<0.05$).
* = $p < 0.05$ NS = not significant SE= standard error
T1 (Control), T2 = Extract ,T3 = Ag Nanoparticles , T4 = Ag Nanoparticles with

RESULTS AND DISCUSSION
GROWTH PERFORMANCE:-
LIVE BODY WEIGHT

Live body weight of experimental rabbits as affected by Ag Nanoparticles with *Cotula cineriea* extract are presented in Table (1) The results showed that Initial live body weight (g) ranged between 977.3 to 790.3 in group extract and group Ag Nanoparticles respectively but these differences were not significant . Also LBWK1(g) had no significant effect, values ranged between 1059.0 to 867.3.While LBWK3(g), LBWK5(g) had significantly ($p<0.05$), the highest value 1605.0 , 2013.7 respectively in group *Cotula Cineriea* extract but the lowest value 1250.7, 1683.7 respectively in group Ag Nanoparticles Fondevila ;(2009) indicated that low doses of metallic silver nanoparticles given as dietary additive could improve intake and growth of weaned piglets. The effect of silver could be mediated through its antimicrobial properties, either by acting against certain bacterial groups or just reducing the microbial load of the small intestine, antimicrobial activity of silver is manifested by blocking the electron transport system, altering the function of the bacterial membrane and inhibiting the DNA replication (Wright et al., 1994; Percival et al., 2005). Although these effects have been demonstrated experimentally against *E. coli* (Zhao and Stevens, 1998; Sondi and Salopek-Sondi, 2004).. LBWK7(g) had no significant effect, values ranged between 2325.0 to 1995.0 in group Cotula Cineriea extract, group Ag Nanoparticles respectively (Demir et al., 2008; Kirkpinar et al., 2011; Brenes and Roura, 2010; Zeng et al., 2015) showed that essential oils or their components had significantly negative effect on Body weight. On the other hand (Al-Kassie, 2010; Zeng et al., 2015; Khattak et al., 2014; Saleh et al., 2014; Hong et al., 2012; Aguilar et al., 2014; Alali et al., 2013; Roofchaee et al., 2011) showed that essential oils or their components had significantly positive effect on Body weight. This result agree with Ognik et al 2016; Pineda,et al 2012; Ahmadi et al ;2013; Ahmadi and Rahimi ;2011;) when found that Nano silver had significantly negative effect on Body weight

LIVE BODY WEIGHT GAIN

No significant effect ($p<0.05$) was found in IBWG1, LBWG3, LBWG5, LBWG7 and TG Table (1) .Group Ag Nanoparticles with *Cotula cineriea* extract have the highest values of Live body weight gain in all weeks except in LBWG3 against that in group *Cotula cineriea* extract which have the lowest values of Live body weight gain in all weeks except in LBWG3 and TG(Brenes and Roura, 2010; Zeng et al., 2015).

FEED INTAKE

Feed intake weekly of experimental rabbits as affected by Ag Nanoparticles with *Cotula cineriea* extract is found in Table (1), which indicated that FI1(g), FI3, FI5, FI7, TFI had significant differences ($p<0.05$) (Saleh et al., 2014; Zeng et al., 2015).The highest values, lowest values every week and TFI were always in group Cotula Cineriea extract, group Ag Nanoparticles respectively, and Feed intake in week three was the highest and the lowest feed intake in week five.

FCR (G FEED/G GAIN)

No significant differences ($p<0.05$) were found in FCR1, FCR3, FCR7 and TFC Table (1).The best value was in group *Cotula cineriea* extract(2.25) in FCR1 although the worst was in group *Cotula cineriea* extract(11.65) in FCR7 (Al-Kassie, 2010; Khattak et al., 2014; Hong et al., 2012; Brenes and Roura, 2010; Alali et al., 2013; Saleh et al., 2014; Roofchaee et al., 2011) on the other hand (Demir et al., 2008; Zeng et al., 2015; Kirkpinar et al., 2011; Mountzouris et al., 2011; Mathlouthi et al., 2012;) Essential oil which found in Cotula Cineriea extract is very important in terms of feed conversion and these compounds also boost the production of digestive enzymes essential oils also act against Gram-negative bacteria (Zengin et al 2013; Alali et al., 2013; Cerisuelo et al., 2014; Nimbarte et al 2014 zengin and Baysal, 2014), essential oils also act strong action against Gram-positive bacteria (Nazzaro et al., 2013; Gopi et al., 2014). **FCR5** had significant differences ($p<0.05$) among treatments ranged between 3.68, 4.14 in group Ag Nanoparticles with Cotula Cineriea extract and group *Cotula cineriea* extract respectively, this may be due to its content of essential oil that have active components which have possess

antimicrobial, antifungal and antioxidant activities; and accordingly could improve the bird utilization of dietary nutrients (Radwan 2003; **Abou Sekken and Abd El-Hakim 2006**). In addition, Abdel - Latif et al. (2002) attributed the improvement in growth and feed conversion of chicks fed thyme leaves to the enhancement in thyroid activity and the biological role of such medicinal plant in the metabolic functions and biosynthesis of hormones.

CARCASS CHARACTERISTIES:

Results of Live Body Weight(g) are presented in (table 2) ranged between 2228.6 to 1861.3 1n group Cotula Cineriea extract and group Ag Nanoparticles respectively, but these differences were not significant Ahmadi and Rahimi . 2011; Pineda,(2012; Ahmadi, F 2012; Ognik et al 2016) showed that Nano silver had significantly negative effect on Body weight, also (Demir et al., 2008; Kirkpinar et al., 2011; Brenes and Roura, 2010; Zeng et al., 2015) showed that essential oils or their components had significantly negative effect on Body weight. On the other hand (Al-Kassie, 2010; Zeng et al., 2015; Khattak et al., 2014; Saleh et al., 2014; Hong et al., 2012; Aguilar et al., 2014; Alali et al., 2013; Roofchaee et al., 2011) showed that essential oils or their components had significantly positive effect on Body weight.

Cecum weight (g) results recorded differences but these differences were not significant and ranged between 14.0 to 12 in group Ag Nanoparticles with *Cotula cineriea* extract and group Ag Nanoparticles respectively.

Cecum length (cm) Results indicated that significant effect of (SNPs)Ag Nanoparticles with *Cotula cineriea* extract ($p<0.05$)and the highest value was11.7 similar in group *Cotula cineriea* extract **Abou Sekken and Abd El-Hakim (2006)** and group Ag Nanoparticles with *Cotula cineriea* extract while the lowest value 10.2 in group Ag Nano.
The observed differences in length and weight of cecum my be attributed to dietary fiber sources (Ismail,2004).

Results of **Abdominal fat%** are presented in (table 2) indicated that significant effect of (SNPs)Ag Nanoparticles with *Cotula cineriea* extract ($p<0.05$)and the highest value 37.3 in group *Cotula cineriea* extract but the lowest value 4.0 in group Ag Nanoparticles with *Cotula cineriea* extract. The significant increase of abdominal fat% may be due to that group *Cotula cineriea* extract is rich in volatile oils, protein, fat, sugars and vitamins (Ansary, 1975), which had beneficial effect for stimulation and activity of digestive system (Ibrahim, 2005; Ahmadi and Rahimi . 2011) .

Dressing %

Results of **Dressing %** showed that ranged between 74 to 73.4 %, in group Ag Nanoparticles with Cotula Cineriea extract and group Ag Nanoparticles respectively, but these differences were not significant.

Ali et al.,2011; Riyazi, (2015; Tabari et al.,2016;Bonsu et al., 2012;) Essential oils or their components were not significantly ($P>0.05$) on Carcass characteristics , on the other hand

(Sharma et al.,2009; Waskar et al.,2011; Oleforuh et al.,2015;Puvaca et al.,2016) essential oils or their components were not significantly (P>0.05) on Carcass characteristics

DIGESTIBILITY:

Effects of Ag Nanoparticles with *Cotula cineriea* extract on Digestibility Coefficients Of experimental rabbits data are presented in Table (3) The results showed that the apparent digestibility of OM, CP and NFE were significantly (p<0.05). Digestibility of CF ranged between 39.61 to 19.18 % in groups supplemented Ag Nanoparticles and Ag Nanoparticles with *Cotula cineriea* extract respectively ,but these differences were not significant. Group supplemented Ag Nanoparticles recorded significantly (p<0.05) the best values of NFE and OM digestion coefficients(80.03 and 74.66 %) compared with the other experimental diets but *group Cotula cineriea* extract recorded significantly (p<0.05) the best values of CP digestion coefficients (75.10%). The diet supplemented Ag Nanoparticles with *Cotula cineriea* extract recorded significantly (p<0.05) the worst value of NFE digestion coefficient (72.53%). Digestibility of EE ranged between 82.09 to 56.15 % in groups supplemented Ag Nanoparticles with *Cotula cineriea* extract and group extract respectively ,but these differences were not significant. The significant in CP digestibility on group extract, may be due to the effect of flavonoids and essential oils which have a positive effect on the digestive system also boost the production of digestive enzymes, resulting in better digestion and absorption of nutrients. Essential oils also help to improve protein digestion by increasing the secretion of hydrochloric acid and pepsin (Gopi et al., 2014; . CHRENKOVÁ1.,2012;). on the other hand **Abou Sekken and Abd El-Hakim (2006)** found that Digestibility of CP, NFE and OM were not significant. The significant in NFE digestibility on group Ag Nanoparticles, may be due to the effect of silver nano particles on intestinal microbial populations and improve the health and immunological status of the birds This can provide the birds with an opportunity to expend less metabolic effort for immunological control purposes and to use surplus nutrients for other physiological and productive purposes Ferket P. (2011).

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