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EVALUATION OF THE PRODUCTIVITY PERFORMANCE OF BROILER'S FED ON FEEDS TREATED WITH POWDER, ALCOHOL EXTRACT, NANOMOLECULES AND SILVER NANOPARTICLES OF SAGE AND CINNAMON PLANTS FOR TREATMENT OF AFB1 TOXICITY

Suha Mohamed Ibrahim[1], Sunbul Jassim Hamodi[2] and Labeeb Ahmed Al-zubaidi[1]

[1]Ministry of Higher Education & Scientific Research & Science and Technology, Directorate of Environment & Water, Iraq

[2]College of Agricultural Engineering Sciences, University of Baghdad, Iraq

E-mail: Suha.suha20@yahoo.com

Abstract

The objective of this study was to investigate the effect of treating the contaminated diet with AFB1 (38 ppb) produced from *Aspergillus flavus* with alcoholic extracts of sage leaves and cinnamon with 10% and 5% respectively as well as SNMs, CNMs, SAgNPs and CAgNPs with concentrations of 5 µg, 5 µg, 208.75 ppm and 252.3 ppm respectively and compared with untreated control group (untreated with AFB1) in broiler. Five hundred and forty one day unsexed old chicks were used followed by laboratory work chicks were randomly distributed into 12 treatments with 3 replicates per each treatment, and each replicate consisted of 15 birds. Birds fed on two balanced diets for energy and protein constituents. Results revealed deterioration of all productive traits of control group and superiority of treated groups on control group in average live body weight and weight gain (for week 1-6)as well as feed conversion ratio and total feed consumption rate for SNMs and SAgNPs groups in comparison with CNMs, CAgNPs and control groups. In conduction it is possible to use of green silver nanoparticles and plant extracts as a good alternatives for fungicides that harmful to the public health due to their inhibitory activity for *Aspergillus flavus* and preventing.

Keywords: Activity, cinnamon and sage, nanoparticles green, aflatoxinB1, poultry feed.

Introduction

Contamination of animal diets with fungal toxins, including poultry feed, is the most important challenge facing the poultry industry in developing countries. Numerous studies have pointed out the negative effects of both high and low exposure levels to these toxins (Lynne *et al*., 1995). Aflatoxins are highly harmful mycotoxins that cause many cancers such as liver, lung, stomach and intestines etc. Aflatoxins are compounds that produce secondary metabolites during metabolism. Some fungi of Aspergillus genus such as *Aspergillus flavus, Penicillium puberulum* and *A. parasiticus,* can be found in legumes, nuts (walnuts, almonds, cashews, pistachios), peanuts, soybeans, grains such as corn, rice, and barley when conditions are appropriate for their growth, especially in tropical and subtropical regions. In the herd and the lack of expected performance of birds as well as the increase in the proportion of birds isolated when marketing, because of the impact of AFB1 in the destruction of liver cells, and induce immunosuppression inhibited negatively on the immunity of birds (Denli *et al*., 2004).The effect of AFB1 poisoning depends on several factors including its concentration, duration of exposure, type, sex, age and health status of birds (Jewers, 1990 and CAST, 2003). The European Union has set maximum limits for AFB1 in animal feed, ranging from 5 to 20 mg / kg depending not only on the type of product but also on the type of animal fed (European Commission, 2007). To control the growth of isolates secreting mycotoxins through using of different methods such as physical, chemical and biological methods, where the biosynthesis of AFB1 can be inhibited by a number of natural compounds found in most medicinal plants such as cinnamon, sage leaves, etc. Fungi and aflatoxin production (Mahamoud, 1994).It is also known that there are many techniques have a role in the treatment of the effects of food contaminants such as aflatoxin, including the latest nanotechnology (nanoparticle technology or nanotechnology) and this technique is measured in nanometers, and is part of the millionths of a millimeter, it should be noted that this technique is used in the present study aimed to evaluate the effectiveness of alcoholic extract, particles and silver nanoparticles of cinnamon powder and sage leaves in inhibiting the growth of *A. flavus* and AFB1 by adding them to poultry feed.

Materials and Methods

Preparation of *Aspergillus flavus*

The isolation of aflatoxin-producing *Aspergillus flavus* (B1) (diagnostic isolation) was obtained from the mycotoxic laboratory Plant Protection Department/College of Agricultural Engineering sciences/ University of Baghdad isolated from Iraqi rice on the dietary medium potato Dextrose Agar (PDA) and incubated at 25 °C for 10 Days and then kept the farms under cooling until use.

Effectiveness of alcoholic extracts, nanoparticles and silver green nanoparticles of cinnamon and sage leaves in contaminated feed

The diets were mixed (Table 1) in a local factory and the feed was contaminated at the Poultry field of the College of Agricultural Engineering sciences / University of Baghdad. By adding fungal isolate of *A. flavus* producing - AFB1 to the feed and incubated for four weeks, the feed contaminated with AFB1 was treated with alcoholic extracts of cinnamon and sage leaves at concentrations (5 and 10% respectively) and SNMs, CNMs, SAgNPs and CagNPs (5 µg, 5 µg, 208.75 ppm, 252.3 ppm respectively) individually, The treatments were as follows: T1 (negative control diet free of any addition), T2 (positive control diet fed contaminated with AFB1 at a concentration of 38 ppb), T3 (add 10% alcoholic

extract of sage leaves for contaminated feed), T4 (add 5% of alcoholic extract cinnamon for contaminated feed), T5 (contaminated feed treated with nanoparticles of sage leaves at concentration 5 µg), T6 (contaminated feed treated with nanoparticles of cinnamon at concentration 5 µg), T7 (Contaminated feed treated with silver nanoparticles for sage leaves at a concentration of 208.75 ppm), T8 (feed contaminated treated with silver nanoparticles for cinnamon of 252.3 ppm) T9 (add 15% sage leaves powder to the feed is not contaminated), T10 (add 15% cinnamon powder to the feed is not contaminated), T11 (add 10% alcohol extract of sage leaves to the feed is not contaminated), T12 (Add 5% alcoholic extract of cinnamon to the feed is not contaminated).

Table 1 : Components and chemical composition of the feed used for feeding broilers for 1-42 days.

Final Feed (22-42) days	starter Feed (1-21) days	Ingredients
66.5	**62**	yellow corn
10	**10**	Protein Center *
20.5	**26**	Soybean
0.7	**0.7**	Limestone
2	**1**	Sunflower oil
0.3	0.3	Salt
100	**100**	Total
		Calculated chemical composition **
20.19	**22.11**	Raw protein (%)
3089	**2973**	Represented energy (kg / kg feed)
153	**134**	Energy to protein ratio C / P ratio
0.98	**1.09**	Lysine (%)
0.38	**0.40**	Sixty%
0.44	**0.48**	Methionine%
0.82	**0.88**	Methionine + cysteine (%)
1.06	**1.11**	Ca (%)
0.54	**0.55**	P Available (%)

*Animal protein Golden/ Jordan contains 50% crude protein, 2200 kilocalories of energy, 6% fat, 3.5% crude fiber, 8 calcium, 3% phosphorus available, 2.75 lysine, 1.8 methaionine, 2.3 methaionine + cysteine.
** By chemical composition according to analysis of feedstuffs reported in US National Research Council reports (NRC, 1994)

Characteristics

Body weight and weight gain : The average live body weight of the birds were measured for each treatment at the end of each week and for weeks (1-6) and the weight gain using the following calculations:

Average live weight (g / bird)

$$= \frac{\text{Total live weight of refined birds at the end of the week (g)}}{\text{Number of birds for the weekend}}$$

The weekly weight gain rate (g / bis) = week end live body weight (g) - the average live body weight at the beginning of the week (g).

Total and weekly feed intake : According to the average weekly feed intake for single birds and for weeks (1-6) by the weight of the feed introduced during the week minus the weight of the remaining feed at the end.

Food conversion ratio : It was calculated according to the following equation (Al-Fayad and Naji, 1989).

$$\text{Rate of weekly food conversion efficiency (GM feed/GM weight gain)} = \frac{\text{Average feed intake (gm) during the week}}{\text{Average weight gain (gm) during a week}}$$

Statistical analysis

SAS (2012) was used to analyze the data to study the effect of different coefficients on the studied characteristics according to a complete random design (CRD).

Mathematical model: $Yij = \mu + Ti + eij$

µ: Mean, Ti **:**The effect of the transaction, eij: Standard error

Results and Discussion

Effectiveness of plants, their extracts and their green nanoparticles in field experiments.

(1) Productive characteristics of broiler meat.

Body weight (g) : Table (2) showed highly significant ($P < 0.01$) superiority for the different treatments on live weight from 1 to 6 weeks during the experiment period. The superiority in the first week was for treatments T_3, T_5, T_6, T_7, T_8, T_9, T_{10}, T_{11}, T_{12} over the T_2 treatment (contaminated feed AFB1) and T_4, while didn't differ with the control T_1 group (unpolluted feed). while The second week morally highly significant superiority was for treatment T_5 ، T_{12} over the treatment of T_2 and T_4. The treatment also showed T_{11} moral superiority in body weight compared to the rest of the trial transactions in the third week and did not differ with T_1, T_3, T_5, T_6, T_8, T_9, T_{10}, T_{12}. Moral superiority in the fourth week for T_5 compared with the other treatments of experiment , fifth and sixth week were T_5 and T_7 highly significant compared to T_1 control and, and record of the weight of a living body for treatment T_2 contaminated with AFB1 and non-treatment in any of the methods used in the experiment.

Weight gain : Table (3) shows the presence of high moral significance ($P < 0.01$) for all treatments on the positive control treatment T2 and T4 in the first week. The sixth week and cumulative weight gain continued to the improvement for the T5 and T7 as noted in the week The sixth outperformed T1, T2, T3, T4, T8, T11, and T12 and did not disagree with T6, T9, T10 as well as other treatments outperformed the T2 treatment. Cumulative weight gain

outperformed all treatments and the transaction T2 recorded the lowest rate of weight gain.

Consumer Feed intake : Table (4) noticed the effect of the studied treatments in the experiment on the amount of feed intake weekly by birds from 1-6 weeks of age. It is clear that superiority (P <0.01) of all treatments on T2 and T4 treatments in the first week, and continued until the sixth week of T5 and T7 on T1, T2, T3, T4, T8, T11 and T12, while the cumulative feed consumption is highly significant for T5 over T1, T2, T8, T9. They did not differ with T3,T4,T6, T7, T10,T11, T12 and in turn also significant the treatments (T1, T8, T9, T10) over T2.

Food conversion Ratio : Table (5) revealed the effect of the studied treatments on the food conversion ratio for weeks 1-6 as well as the cumulative food conversion ratio. During the first, second and third weeks, all treatments were significantly higher than T2, while the sixth week also showed higher (P<0.05) for T5 and T7 treatments over all experimental treatments and all treatments exceeded T2 treatment. The cumulative food conversion ratio was observed to be highly significant (P <0.01). All treatments were treated with T2, and T5 and T7 were superior to all treatments except T8.

The significant decreased in all productive traits for treatment T2 (control of contaminated feed in the name of AFB1 at 38 ppb) could be due to the negative effect of AFB1 on the broiler productive performance. These results are consistent with Al-Saadi et al (2013) The results of his study showed the using of AFB1 at a concentration of 0.2 ppm led to a decrease in the average body weight and weight gain of Turkish broiler chickens in addition to a decrease in feed intake and thus increased the value of the rate of dietary conversion, This finding was consistent with the above Al-Warshane *et al*. (2010). The decrease in body weight and weight gain is due to the effect of toxins in the formation of digestive enzymes as a result of inhibition of protein construction (Johar *et al*., 2008). These toxins also lead to analytical anemia as a result of inhibiting the process of blood formation and decreasing the production of liver and pancreatic enzymes and thus, decreased appetite in general (Bailey *et al*., 2006; Shi *et al*., 2006).

Table 2 : Effect of powder, alcoholic extracts, nanoparticles and silver nanoparticles of sage leaves and cinnamon on vivo average weight (gm) of broiler chickens for 1 to 6 weeks of age

Average ± standard error						Treatments (1)
Six week	Fifth week	Fourth week	Third week	Second week	First week	
2587.73 ±49.21 bc	1943.93 ± 28.07 cbd	1338.33 ± 7.43 abc	825.95±30.89 bc	401.78±11.45 ab	165.99 ± 3.46 a	T1
1586.29 ± 34.14 d	1112.59 ± 35.15 f	720.08±22.27 d	388.61±2.35 d	218.58±34.37 d	122.69 ± 3.57 c	T2
2563.66 ±65.47 bc	1883.70 ±18.71 bcd	1308.39±37.52 bc	856.99±35.61 abc	400.65±8.44 b	163.57 ± 9.55 a	T3
2502.01 ± 35.68 c	1879.77 ± 65.50 bcd	1292.99±10.96 c	788.66±23.07 c	350.25 ± 6.16 c	142.71±1.71 b	T4
2908.20 ± 47.46 a	2079.35 ± 10.85 a	1419.36±25.53 a	871.03±14.76 abc	427.69 ± 24.92 a	175.16 ±5.80 a	T5
2561.59 ± 47.95 bc	1817.63 ± 47.93 cd	1289.87±16.05 c	869.84±1.63 abc	402.26±9.43 ab	170.95±1.01 a	T6
2910.05 ± 67.11 a	2072.25 ± 38.93 a	1401.81±20.92 ab	810.61±34.35 bc	419.18±27.02 ab	170.03±3.70 a	T7
2569.69 ± 62.86 c	1868.20 ± 12.38 bcd	1319.16±22.13 b	837.61±47.85 abc	397.95±20.46 ab	168.52±4.37 a	T8
2584.67 ±89.23b c	1851.02 ± 54.57 cd	1290.55± 60.14 c	841.49±41.05 abc	380.12±3.77 bc	161.83± 0.75 a	T9
2543.67 ±39.45 bc	1805.76 ± 35.71 d	1296.48± 61.77 c	836.85±9.30 abc	407.30±2.46 ab	160.68 ± 6.28 a	T10
2697.35 ±52.29b bc	1940.32 ± 76.91 bc	1352.62±12.36 bc	912.80±16.81 a	410.22±1.12 ab	166.33 ± 3.27 a	T11
2678.86 ± 33.56 bc	1985.41 ± 30.24 ab	1341.48± 22.22 bc	890.63±30.224 ab	432.56±8.11 a	167.14 ± 9.08 a	T12
**	**	**	**	**	**	Probability

** (P<0.001), (1)The treatments T1: (control diet free of any addition), T2: (positive control fed contaminated with AFB1 of 38 ppb), T3: (10% alcoholic extract of sage leaves /Kg contaminated feed), T4: (5% of alcoholic extract cinnamon /kg contaminated feed), T5: (5 µg of SNMs/kg contaminated feed), T6 (5 µg of (CNMs)/kg contaminated feed), T7 (208.75 ppm of SagNPs/ kg Contaminated feed), T8 (252.3 ppm of CAgPNs / kg contaminated feed) T9 (15 gm sage leaves powder/kg feed is not contaminated), T10 (15 gm cinnamon powder/kg feed not contaminated), T11 (10% alcohol extract of sage leaves/kg feed not contaminated), T12 (5% alcoholic extract of cinnamon/kg feed not contaminated).

Table 3 : Effect of powder, alcoholic extracts, nanoparticles and silver nanoparticles of sage leaves and cinnamon on vivo average Weight gain (gm) of broiler chickens for 1 to 6 weeks of age

Average ± standard error								Treatments (1)
Cumulative		Six week	Fifth week	Fourth week	Third week	Second week	First week	
424.17 ± 25.82ab		512.38 ± 1.45 ab	605.60 ± 29.48ab	643.80 ±42.97b	2548.90 ± 18.55 bc	235.79 ±12.14 bc	127.16±4.08 a	T1
170.03 ± 7.32 c		331.47 ± 19.91 c	392.51 ± 13.38 c	473.70 ±5.76 c	1547.33± 27.58 d	95.89 ± 4.76 d	83.73 ±3.77c	T2
456.34 ± 27.80 ab		451.39 ± 38.37 bc	575.31 ± 70.86 ab	679.96±20.19b	2524.23 ±17.94 bc	237.08 ± 5.67 bc	124.14 ±9.32a	T3
438.41 ± 25.76ab		504.33 ± 20.75 ab	586.78 ± 31.98 ab	622.24 ±8.39 b	2461.94 ±68.65 c	207.53 ± 48.26 c	102.65 ±0.67 b	T4
443.34 ± 25.20 ab		548.33 ±26.95 ab	660.00 ± 22.81 a	828.85 ±54.008 a	2869.43 ±79.94a	252.53 ± 17.92 a	136.40 ±5.47 a	T5
467.58 ± 7.83ab		420.03 ± 40.28 bc	527.76 ± 39.42ab	743.96 ±11.65 ab	2522.53 ±84.31bc	231.31 ± 8.31 bc	131.89±1.01 a	T6
391.43 ± 11.99ab		591.20 ± 21.90 a	670.44 ± 61.35 a	837.80 ±37.85 a	2872.08± 99.83 a	249.14 ± 27.22 ab	132.07±3.61a	T7
439.66 ± 35.70ab		481.55 ± 31.32 ab	549.04 ± 20.45 ab	701.49 ±47.30 b	2530.93± 37.44 bc	229.43±18.09bc	129.76 ±3.91 a	T8
461.37 ± 38.28ab		449.06 ± 41.87 bc	560.47 ± 14.66 ab	733.74 ±19.66 ab	2545.79± 62.37 bc	218.29 ± 3.15 c	122.86±0.80 a	T9
429.55 ± 11.58ab		459.63 ± 53.50 bc	509.28 ± 49.98 bc	737.91 ±44.50 ab	2504.47± 21.26 c	246.62 ± 4.14 ab	121.48±6.18 a	T10
502.58 ± 56.73a	439.82 ±19.369 bc	587.70 ± 70.60 ab	667.03 ±18.86 b	2568.40±34.58 bc	243.88 ±16.86ab	127.37±3.37 a	T11	
458.07 ± 26.91ab	450.85 ± 12.72 bc	643.93 ± 13.09 ab	693.45 ±38.15 b	2639.99± 9.79 b	265.42 ± 16.01 a	128.27±9.58 a	T12	
**	**	**	**	**	**	**	Probability	

** (P<0. 01), (1)The treatments T1: (control diet free of any addition), T2: (positive control fed contaminated with AFB1 of 38 ppb), T3: (10% alcoholic extract of sage leaves /Kg contaminated feed), T4: (5% of alcoholic extract cinnamon /kg contaminated feed), T5: (5 µg of SNMs/kg contaminated feed), T6 (5 µg of (CNMs)/kg contaminated feed), T7 (208.75 ppm of SagNPs/ kg Contaminated feed), T8 (252.3 ppm of CAgPNs /kg contaminated feed) T9 (15 gm sage leaves powder/kg feed is not contaminated), T10 (15 gm cinnamon powder/kg feed not contaminated), T11 (10% alcohol extract of sage leaves/kg feed not contaminated), T12 (5% alcoholic extract of cinnamon/kg feed not contaminated).

Table 4 : Effect of powder, alcoholic extracts, nanoparticles and silver nanoparticles of sage leaves and cinnamon on vivo average Consumer Feed (g) of broiler chickens for 1 to 6 weeks of age

Average ± standard error							Treatments (1)
Cumulative	Six week	Fifth week	Fourth week	Third week	Second week	First week	
136.830± 1.136 a	313.10 ± 8.25 d	605.01 ± 8.04 abcd	811.55 ± 21.46 a	1073.94 ± 0.20 bc	1278.17 ±4.12 de	4218.59± 88.39 bc	T1
109.357 ± 2.90 b	247.90 ± 5.77 e	370.00 ± 28.86 e	630.70 ± 33.09 d	884.37 ± 57.72 d	1017.71 ±11.17 f	3260.46± 27.58 d	T2
136.987 ± 8.32 a	332.00 ± 17.32 cd	666.60 ± 0.57 ab	802.04 ± 26.46 a	1146.54 ± 16.80 ab	1318.89 ±15.49 cd	4403.15±57.59 ab	T3
119.357 ±0.42 b	333.36 ± 14.32 cd	637.07 ±30.81 abc	781.72 ± 11.16 ab	1155.18 ± 33.65 ab	1225.58 ±13.27 e	4252.27 ± 75.62 abc	T4
137.047 ± 4.40 a	355.35 ± 12.44 abc	565.39 ± 2.86 bcd	795.43 ±15.67 ab	1163.4 ± 2.48 ab	1409.29±32.04 ab	4425.91 ± 47.57 a	T5
131.007 ± 2.45 a	351.94 ± 5.29 abc	586.07± 0.83 abcd	744.42 ± 2.77 bc	1110.23 ± 55.16 ab	1378.47 ±32.16 abc	4302.14 ± 79.82 abc	T6
137.470 ± 3.61 a	318.25 ± 4.33 d	537.25± 3.70 cd	792.48 ± 19.62 ab	1189.57 ± 23.69 a	1441.95 ±3.44 a	4416.97± 42.92 ab	T7
136.547 ± 1.91 a	312.37 ± 3.33 d	522.97± 64.08 d	713.56 ± 5.78 c	999.15 ± 1.85 c	1307.89 ±4.78 cde	3992.49± 73.89 d	T8
134.817± 0.85 a	328.20 ± 6.53 cd	569.57± 8.88 bcd	708.46 ± 8.33 c	1077.80 ± 26.36 abc	1383.76 ± 39.34abc	4202.61± 22.24 c	T9
131.683± 3.01 a	354.95± 16.66 abc	617.16 ± 63.26abcd	726.04 ± 15.24 c	1087.86 ± 38.81 abc	1389.00 ±45.07abc	4306.69± 125.87 abc	T10
135.370± 0.62 a	362.14 ± 4.57 ab	637.01 ± 51.31 abc	759.18 ± 14.51 abc	1162.17 ± 32.19 ab	1301.17 ±47.09cde	4357.04± 63.68 abc	T11
131.580± 0.49 a	372.66 ± 6.08 a	676.14± 17.34 a	710.05 ± 6.98 c	1154.64 ± 13.90 ab	1339.94 ±19.89bcd	4385.01± 35.03 abc	T12
**	**	**	**	**	**	**	Probability

** (P<0.001), (1)The treatments T1: (control diet free of any addition), T2: (positive control fed contaminated with AFB1 of 38 ppb), T3: (10% alcoholic extract of sage leaves /Kg contaminated feed), T4: (5% of alcoholic extract cinnamon /kg contaminated feed), T5: (5 µg of SNMs/kg contaminated feed), T6 (5 µg of (CNMs)/kg contaminated feed), T7 (208.75 ppm of SagNPs/ kg Contaminated feed), T8 (252.3 ppm of CAgPNs / kg contaminated feed) T9 (15 gm sage leaves powder/kg feed is not contaminated), T10 (15 gm cinnamon powder/kg feed not contaminated), T11 (10% alcohol extract of sage leaves/kg feed not contaminated), T12 (5% alcoholic extract of cinnamon/kg feed not contaminated).

Table 5 : Effect of powder, alcoholic extracts, nanoparticles and silver nanoparticles of sage leaves and cinnamon on vivo average Consumer Feed (g) of broiler chickens for 1 to 6 weeks of age

Average ± standard error							Treatments (1)
Cumulative	Six week	Fifth week	Fourth week	Third week	Second week	First week	
1.07± 0.03 bc	1.33± 0.07 bc	1.42± 0.06b	1.58± 0.04 bcd	1.77± 0.08 b	1.98 ± 0.14 abc	1.52± 0.02 bc	T1
1.31 ± 0.07 a	2.59± 0.15 a	2.17 ± 0.23 a	1.90± 0.05 a	2.25 ± 0.18 a	2.14 ± 0.03a	2.06 ± 0.03 a	T2
1.10 ± 0.20 bc	1.40± 0.10 bc	1.46± 0.08 b	1.78± 0.09 ab	1.99± 0.11 ab	1.93± 0.05abcd	1.61± 0.02 b	T3
1.16 ±0.01 b	1.60± 0.02 bc	1.45± 0.14 b	1.55± 0.08 bcd	1.96± 0.06ab	1.96± 0.04abcd	1.61± 0.04 b	T4
1.00 ± 0.02 c	1.41± 0.05 bc	1.28 ± 0.06 b	1.45 ± 0.04 d	1.76 ± 0.05 b	1.70 ± 0.09d	1.43 ± 0.006 d	T5
0.99± 0.03 c	1.52± 0.07 bc	1.25 ± 0.01 b	1.77 ± 0.17 ab	2.10 ± 0.32 ab	1.85 ± 0.06bcd	1.58 ± 0.06 b	T6
1.04 ± 0.01 c	1.27± 0.13c	1.37 ± 0.03 b	1.34 ± 0.07 d	1.77 ± 0.09 b	1.72 ± 0.07 cd	1.42 ± 0.04 d	T7
1.05± 0.02 bc	1.36± 0.11 bc	1.19 ± 0.13 b	1.48± 0.10 cd	1.82± 0.11 b	1.86± 0.11 bcd	1.46± 0.03 cd	T8
1.09 ± 0.00 bc	1.50± 0.02 bc	1.23 ± 0.10 b	1.57 ± 0.18 cd	1.92 ± 0.008 ab	1.88 ± 0.02 bcd	1.53 ± 0.03 bc	T9
1.08 ± 0.03 bc	1.43± 0.08 bc	1.43 ± 017 b	1.58 ± 0.13 bcd	2.13 ± 0.20 ab	1.88 ±0.05 cd	1.56 ± 0.04 bc	T10
1.06 ± 0.02 bc	1.48± 0.07 bc	1.26 ± 0.07 b	1.72 ± 0.09 bcd	1.97 ± 0.11 ab	1.94 ± 0.01 ab	1.59 ± 0.01 b	T11
1.03 ± 0.07 c	1.41± 0.07 bc	1.47 ± 0.10 b	1.57 ± 0.13 bcd	1.79 ± 0.02 b	1.93± 0.08 abcd	1.53 ± 0.01 bc	T12
**	*	*	*	**	**	**	Probability

** (P<0.001), (1)The treatments T1: (control diet free of any addition), T2: (positive control fed contaminated with AFB1 of 38 ppb), T3: (10% alcoholic extract of sage leaves /Kg contaminated feed), T4: (5% of alcoholic extract cinnamon /kg contaminated feed), T5: (5 µg of SNMs/kg contaminated feed), T6 (5 µg of (CNMs)/kg contaminated feed), T7 (208.75 ppm of SagNPs/ kg Contaminated feed), T8 (252.3 ppm of CAgPNs / kg contaminated feed) T9 (15 gm sage leaves powder/kg feed is not contaminated), T10 (15 gm cinnamon powder/kg feed not contaminated), T11 (10% alcohol extract of sage leaves/kg feed not contaminated), T12 (5% alcoholic extract of cinnamon/kg feed not contaminated).

The improvement of the most traits of broiler chickens, represented by the productive characteristics of treatments contaminated with AFB1 with alcoholic extracts, nanoparticles and silver nanoparticles of sage leaves, cinnamon, may be due to the effective compounds such as alkaloids, phenols, claycides and Inhibiting the growth of many pathogenic microorganisms, including bacteria and fungi, Many studies have revealed the strong activity of sage leaves extract as an antioxidant by increasing the stability of edible oils (Jaswir *et al*., 2005), as well as accelerating the oxidation of methyl linolite, through the ability to dismantle 2,2-diphenyl-1-(DPPH). 2,2'-azino-bis 3-ethylbenzothiazoline-6-sulphoric acid (ABTS), preventing the formation of free radicals (Shan *et al*., 2005), and sage leaves have proven to be the most common powerful natural antioxidants (Placha *et al.*, 2013), Antioxidant activity of sage leaves may be due to the high content of phenolic compounds because it reduces oxidative stress by indirect antioxidant action. Antioxidant, thus, inhibiting the oxidative stress process (Falleh *et al*., 2008). While cinnamon activity is due to the presence of cinnamaldehyde, an aromatic aldehyde that inhibits the activity of the amino acid

decarboxylase (Wendakoon and Sakaguchi, 1995), it has been shown to be effective against many pathogenic bacteria (Suresh *et al*., 1992),These negatively charged compounds interfere with biological processes involving electron transport and interact with nitrogen-containing components, for example proteins and nucleic acids, thereby inhibiting the growth of microorganisms (Ramos-Nino *et al*., 1996; Taback *et al*., 1999).

Cinnamon oil contains benzoic acid, benzaldehyde and cinnamic acid, which have antimicrobial properties. These compounds play a major role in blood purification and aid in digestion by increasing gastrointestinal motility as well as increased secretions of gastrointestinal enzymes. Characterized by cinnamon, Cinnamaldehyde (Eugenol) and Cinnamaldehyde (Eugenol) active substances in cinnamon, resulting in more efficient use of feed and thus promote growth. These results are consistent with who found that adding cinnamon to broiler diets improved production performance (Lee *et al*., 2004)

Langhout (2000) also showed that cinnamon oil extracts can stimulate digestion in poultry, improve liver function and increase digestive enzymes. High nanoparticle and nanoparticle treatments, particularly nanoparticle and silver nanoparticle treatments, are due to the use of silver nanoparticles. Plants are considered as protective additives for animal feed (Ahmadi and Kurdestani, 2010). Studies indicate that there is often a positive effect of nanosilver silver on beneficial bacteria in the digestive system of poultry as well as their ability to prevent the development of pathogenic bacteria, as well as their effect on immune response and lipid oxidation in chicken blood (Ahmadi, 2012; Bhanja *et al*., 2015), This may be due to the many properties of nanoparticles, in particular their antibacterial activity without any toxicity to animal cells (Elshawy *et al*., 2016). In addition, biomolecules in plant extracts such as protein, phenol and flavonoids play an important role in minimizing metal ions and covering nanoparticles and thus reducing their toxicity (Krishnaraj *et al*., 2010).

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