



Effects of Tarragon Powders' Different Levels (*Artemisia Dracunculus*) on Performance and Carcasses 'Characteristics male Broiler chickens

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ABSTRACT

This study was designed to investigate the effects of different levels of Tarragon powder on performance and carcass' characteristics of broiler chickens. 200 one-day-old Ross 308 male broiler chickens in a completely randomized design with 4 treatments and 5 replicates per treatment and 10 birds in each replicate were used. Experimental diets were set on the basis of corn-soy-wheat and Ross 308 broiler chickens nutritional requirements tables by the use of *UFFDA* ration formulation software for each of the (1-21 days) and (22-42 days) period. Treatments were: base diet (control), base diet + 0.125% of Tarragon powder, base diet + 0.25% of Tarragon powder, base diet + 0.5% of Tarragon powder. The results of experiment showed that experimental dietaries caused no significant difference between the Feed Intake of different treatments statistically ($P > 0.05$). The consumption of experimental rations increased body weight in control treatment and 0.125% Tarragon treatment when compared with powder 0.5% Tarragon powder treatments in 1-21 days old ($P < 0.01$). It also decreased the body weight in 0.5% Tarragon powder treatment when compared with control treatment significantly in 1-42 days old ($P < 0.05$). The consumption of experimental rations caused significant increasing of 0.5% Tarragon powder treatment's Feed conversion ratio when compared with control treatment and 0.125% Tarragon powder treatment in 1-21 days old ($P < 0.05$) as well as in 1-42 days old ($P < 0.01$). The consumption of experimental rations caused significant decrease of 0.5% Tarragon powder treatments' production efficiency index when compared with control treatment and 0.125% Tarragon powder in 1-42 days old ($P < 0.01$). The consumption of experimental rations caused significant increase of 0.5% Tarragon powder treatment Mortality rate when compared with control treatment and 0.125% Tarragon powder in 1-42 days old ($P < 0.01$). The consumption of experimental rations had no significant effect on the relative weight of breast, thigh, cookable carcasses and abdominal fat of different treatments in the whole process of husbandry in 1-42 days old ($p > 0.05$). It seems that adding *Artemisia dracunculus* (Tarragon) powder 0.5% level to the broiler chicken's rations can decrease the body weight when compared with the body

weight of other treatments; accordingly this can lead to significant increase of this treatment's feed ratio conversion when compared with other treatments.

Key words: Carcasses characteristics, Male broiler chicken, Performance, Tarragon powder

INTRODUCTION

Limitations in the utilization of antibiotics as a growth stimulus in feeding the birds made researchers look for other feed additives to improve animal's health and performance; accordingly poultry growth can be economized. So, this has been led to the use of enzymes, probiotics, prebiotics, organic acids, plants, and their extracts as supplements to flavor the food (Rizzo et al., 2008). In Arabic language, Tarragon or Estragon is called "Tarkhon", and its scientific name is *Artemisia dracunculus L*, which belongs to *Asteraeaceae* family. Tarragon is a species of perennial herb that grows to around 0.3 to 1 feet in height. It has long, narrow green leaves. Today, there are two varieties of this plant: *Russian* and *French*. French Tarragon's leaves are more lanceolate and bitter than Russian one (Obolskiy et al., 2011). Ayoughi et al., (2011), Sayyah et al., (2004) in their studies identified the quantities of Iranian tarragons' volatile oils as following ones: Anethole (51.72 %), Cis-Beta-Ocimene (8.32 %), methyleugenol (8.06 %), Limonene (4.94 %), Linalool (4.41 %). *Anethole* and *Estragole* are the most significant compounds found in the anise seed and fennel and tarragon that is focused mainly in their oil extracts (Romila, 2001; Soltan et al., 2008). Volatile extracts found in Tarragone have lots of merits, such as antifungal, antitumor (Meepagala et al., 2002). It also increases blood circulation, eases our digestion, increases blood flow in intestinal mucosa, distributes nutrients, oxygen, enzymes, and hormones to all parts of the body (Obolskiy et al., 2011). It used to be used as a medication for promoting appetite in the past (Ribnichy et al., 2004). According to the researchers, Tarragon's liquid extract can increase secretion of gastric juice; this mechanism is not created by means of covers or antacid effects, but through preparing the ground for the formation of protective factors such as mucin secretion, bicarbonate production, contraction property, or the gastric ant-helicobacter ability. Ethanol extract of *Artemisia dracunculus* can effectively inhibit peptic ulcer due to fenilbutazon in mice (Obolskiy et al., 2011). Dried Tarragone leaves can act as blood cleanser, and have ant headache /ant dizziness property (Yazdanprast et al., 1999). In most of the studies, researchers have focused on the common intake forms of tarragon including liquid extract, alcoholic extract and essence forms in their studies which have been done in lab, and Few studies does not exist on the use of this herb in powder form on broilers chickens. Regarding the effects of tarragon as an plant useful, the investigation of the current resources made it necessary to investigate the effects of different levels of tarragons' powdered form as well as choosing desired intake level of this plant on Performance and carcasses characteristics and carcass abdominal fat of broilers chickens.

MATERIALS AND MTHODS

200 one-day-old Ross 308 male broiler chickens in a completely randomized design with 4 treatments and 5 replicates per treatment and 10 birds in each replicate were used. Experimental diets were set on the basis of corn-soy-wheat and Ross 308 broiler chickens nutritional requirements tables by the use of

UFFDA ration formulation software for each of the (1-21 days) and (22-42 days) period. Treatments were: base diet (control), base diet + 0.125% of Tarragon powder, base diet + 0.25% of Tarragon powder, base diet + 0.5% of Tarragon powder (Table 1).

Preparation method of tarragon powder:

To prepare the experimental rations, tarragon plant was purchased on October from vegetable market in Khoy. After cleaning and removing mud and weeds and also non usable parts of the plant, it was placed on the clean cloth, and dried under proper room temperature, shade. The dried samples were powdered at the mill powders, and were added to the experimental rations.

Composition of the experimental diets (Table 1)

Feeds Ingredients (% of the diet)	(22-42 days)	(1-21 days)
corn	40.1	42/28
Soybean meal	28.24	37/30
Wheat	24.5	14
Dicalcium Phosphate	1.97	1/96
Limestone	0.95	1/0
L-Lysine	0.27	0/16
DL-Methionine	0.07	0/3
Mineral and Vitamin Premix *	0.5	0/5
Salt	0.3	0/3
Soybean oil	3.1	2/2
Sum	100	100
Nutritional composition (% of the diet)		
ME, KCal/kg	3000	2870
Crude protein	18.00	21/16
Crude fiber	3.45	3/88
Ca	0.88	0/92
P	0/41	0/43
NaCl	0/14	0/14
CLA	2/58	2/2
Lysine	1/14	1/28
Methionine	0/35	0/61
Methionine+ Cystine	0/68	0/97
*Vitamin and Mineral Premix supplied per 1 kg: vitamin A, 1500 IU;cholecalciferol,10 IU; vitamin E, 1 IU;vitamin B1, 1.5 mg ; vitamin B2, 4 mg; ; vitamin k3,1 mg ; vitamin B3, 5mg; vitamin B5, 20mg : vitamin B6, 2 mg : vitamin B9,0/5 mg : vitaminB12, 0.01 5mg; biotin,0 .065 mg.Mn, 80 mg; Cu, 4 mg; Se, 0.1mg; cholinchlorideride 20 mg: I,0/5mg: co,0/1mg:se, 0/1 mg: ca ,1520 mg : antioxidant.100 mg.		
**To prepare the experimental diets, the amount of 0/125, 0/25 and 0 /5 Percentage		

1-Factors and method to measure them

1- Feed intake & utilization:

To determine feed consumption, specific amounts of birdseed were weighed and given to the birds for every pan at the beginning of week. Then at the end of week the rest of the birdseed from every pan were weighed and deducted from the original birdseed, so weekly oral dose can be yielded. Feed intake in 1-22 days old, 22-24 days old and entire feed intake in 1-42 days intervals old was calculated.

1- Weekly weight gain:

At the beginning of the chicks' arrival to salon, all of them were weighed, and ten chicks were randomly placed in pans, and then their weight was measured in every pan. There was no significant among them, and the primary average weight of chicks in different pans was the same. At the end of each week, every pan's chicks were weighed, and deduced from their first week's weight. Therefore, weekly weight gain can be measured. In case there was mortality in pans in any case, perished chicks' weight was measured and considered in the final week's weight. The same method was applied to measure weight gain in the periods from 1-22 days old, 22-24 days of age, and also the whole period intervals. Then the obtained figures were evaluated.

1- Feed conversion ratio:

After measuring feed intake and gain weight over a week, the following equation used to determine feed conversion ratio: Feed intake over a week divided by (week's beginning weight-week's ending weight) Conversion ratio analysis was calculated in 1-21 days old, 22-42 days old, and also the whole period intervals.

1- Productivity efficiency index:

Productivity efficiency index was calculated at the end of 42 days old by following equation: Viability percentage multiplied by average weight in 42 days age (gr) divided by (the number of growth days multiplied by feed conversion ratio) multiplied by 0.1.

1- Mortality rate:

During the raising period from 1 to 42 days age, after collecting perished chickens from every pan, they were weighed and recorded. The following equation was applied to calculate them, and they were calculated by statistical analysis: (The number of mortalities divided by all number of chicks) multiplied by 100.

2- Carcasses properties:

At the end of period (42 days old) five broilers, which were close in weight to the average weight of each pen, were selected from every treatment (one broiler from every replication). After marking and noting that specified treatment and replication's properties, they were weighted and then slaughtered. After slaughtering, cookable carcass, chest, and thighs were weighted and their

relative weight in comparison with their live body (body weight divided by live body weight multiplied by 100) calculated, and the data related to their relative weight were analyzed statistically after conversion ($\sqrt{x+0.5}$). analyzed based on completely randomized design using GLM procedure of SAS Statistical analysis Analysis of variance and Tukey multiple range tests were used to compare results in different groups. Differences were considered to be significant at ($p<0.05$).

RESULTS AND DISCUSSION

1- The effect of experimental rations on performance

2- feed Intake

The results of experiment showed that experimental dietaries caused no significant difference between the Feed Intake of different treatments statistically ($P>0.05$). The effects of using herbal medicines and their derivations on performance properties and other parameters, depending on the kind of derivations, part of used plant and also the used additives amount as well as the way of using these additives (herb powder in feed, extract in feed, extract in drinking water or brewed in drinking water) can be different (Cross et al., 2007). The difference in the efficiency of extract oils on animal's performance depend on composition of base diet (reduced digestibility), feed intake amount, environmental as well as sanitary standards' condition, harvest time, plant's maturity, plant's extraction methods, method and duration of storage, and possibly the impact of synergistic or antagonistic bioactive compounds(Brenes et al.,2010).Table2

Table2: Effect of dietary Tarragon Powder supplementation on feed consumption (g) parameters of broiler chickens in different experimental groups.

Groups	Control	0/125%	0/25%	0/5%	SEM	P-value
(1-22) days old	699.87	697.59	725.72	800.18	27.59	0.553
(22-42) days old	3389.0	3253.4	3264.20	3687.3	71.72	0.102
(1-42) days old	4088.9	3951.00	3989.9	4487.4	86.08	0.09

1- weight gain

The consumption of experimental dietaries caused significant increase of body weight in control treatment and Tarragon's 0.125 % treatment compared with powder Tarragon's 0.5 % treatments in (1-21 days age) ($p<0.01$), but it caused significant decrease of body weight in powder Tarragon's 0.5 % treatment compared with control treatment (1-42 days old)($P<0.05$). Study on broiler chicks showed that adding *anise* extract at 100 and 200 mg/ kg had no significant difference in performance parameters compared with control treatment, while the same extract at 400 mg/ kg

diet improved average daily weight gain significantly (Ciftci et al.,2005). Soltan et al., (2008) found out the positive effect of adding *anise* seed to Arbor Acre broiler chicks' diet at 0.5 and 0.75 % on average body weight and average daily weight gain, while diet supplementation with anise seed at one percent had significant decrease in these parameters. This performance reduction can be assigned to the creation of digestive system effects. Kong and et al., (2006) reported that the impact difference between herbal powder and extract oil can be attributed to the shortage of some effective plant combinations in extract oil and possibly relatively high level of extract oils, which toxic effect of *Polygon* (one component of Tarragon extract oil) can be accomplished through its conversion into mentoforan and other toxic metabolites in the liver, and this property is reported at higher doses of Tarragon extract oil consumption.

Cross et al., (2007) evaluated the positive effect of (*Achillea millefolium*) herb on broiler chicks' performance, while yarrow extract had no significant effect on performance. The difference between *Achillea millefolium* herb and extraction can be due to the *chemzolin terpen Sysco* structures that are found in herb but can't be found in extract. Moreover, perhaps terpenes trapped in plant glands and can't apply their beneficial effects in increasing the permeability of bacteria cells membrane in poultry's digestive system; this can be true particularly in the poultry that has high-flow-rate of digestive material (Dorman et al., 2000). In this experiment increasing Tarragon's powder level has made significant negative effect about body weight gain at the beginning period and all raising period. Plants' useful combinations can be destroyed in the drying procedure and accordingly lose their effectiveness .Table3

Table3:Effect of dietary Tarragon Powder supplementation on weight gain(g) of broiler chickens in different experimental groups.

Groups	Control	0/125%	0/25%	0/5%	SEM	P-value
(1-21) days	551.27 ^a	557.21 ^a	468.88 ^{ab}	424.20 ^b	16/30	0/001*
(22-42) days	1608.84	1517.18 ^a	1609.60	1622.86 ^a	30/09	0/62
(1-42) days	2030.40 ^a	1894.3 ^{ab}	^{ab} 1710/9	^b 1569	60/28	0/021**

**Mean values with different letters at the same differ significantly at (p<0.01).

*Mean values with different letters at the same differ significantly at (p<0.05).

1- feed conversion ratio

the consumption of experimental rations caused significant increase in conversion ratio of powder Tarragon 0.5% treatment when compared with control treatment and powder Tarragon's 0.125% treatment from 1-21 days old(P<0.05) and also 1-42 days old (P<0.01). In some of the studies, adding different levels of herbal additives to diet has had responses based on dosage, so applying not suitable levels can be as a reason in reducing treatment's performance. While, in some others, adding the same additives can result in opposite effects (Kassie et al., 2008). Because the extent of

additives effect varies according to animal age, duration of use, incidence of stress, management programs, and environmental condition (Zakia et al., 2008; Kabir et al., 2004). Soltan et al., (2008) studied the effect of *anise* seed's different levels (0.25, 0.5, 0.75, 1, 1.25, and 1.5 % dices) on broiler chicken's performance and reported no statistically significant difference of conversion ratio between different levels of *Anise* seed in diet ($P > 0.05$). In this study broiler chickens fed with higher levels of Tarragon powder when compared with other groups had less weight gain, and the weight loss resulted in feed conversion ratio increase. It can be concluded from the results that Tarragon powder at 0.5 % has worsen the feed conversion ratio. Table 4

Table 4: Effect of dietary Tarragon powder supplementation on feed conversion ratio parameters of broiler chickens in different experimental groups.

Groups	Control	0/125%	0/25%	0/5%	SEM	P-value
(1-21) days	1.26 ^b	^b 1.24	1.58 ^{ab}	^a 1.92	0.10	* 0.023
(22-42) days	2.10	2.14	2.01	2.28	0.04	0.139
(1-42) days	2.024 ^b	2.092 ^b	2.37 ^{ab}	2.89 ^a	0.11	** 0.006

** Mean values with different letters at the same differ significantly at ($p < 0.01$).

* Mean values with different letters at the same differ significantly at ($p < 0.05$).

1- Mortality rate

the consumption of experimental ration caused significant increase of Tarragon powder 0.5% treatment mortality rate when compared with control treatment and Tarragon powder 0.125 % treatment (1-42 days old) ($P < 0.01$). In this research maximum mortality rate was in two/ three first raising week and basically because of skeleton problems. During this period chickens could not have any access to water and feed because of not being able to move around, so the mortality rate went up. There is also the possibility that unsuitable conditions of drying the plant can destroy plant's useful combinations (Vienna, 2005), accordingly lose its effectiveness. Table 5

Table 5: Mortality rate (1-42 days old)

Groups	Control	0/125%	0/25%	0/5%	SEM	P-value
Mortality rate	12.00 ^b	12.00 ^b	24.00 ^{ab}	34.00 ^a	2.76	0.002

* Mean values with different letters at the same differ significantly at ($p < 0.01$).

1- Production efficiency index:

The consumption of experimental dietaries caused significant decrease in production efficiency index of tarragon powder 0.5 % treatment when compared with control treatment and tarragon powder 0.125 % treatment in 1 to 42 days age (P<0.01).Table6

Table 6 :Production efficiency index(1-42 days old)

Groups	Control	0/125%	0/25%	0/5%	SEM	P-value
Production index	281.4 ^a	221.008 _{ab}	182.00 ^{bc}	137.4 ^c	17.13	0.0094

*Mean values with different letters at the same differ significantly at (p<0.01).

2- Carcass characteristics:

The consumption of experimental rations had no significant effect on the relative weight of chest, thigh, cookable carcasses and abdominal fat of different treatments in the whole process of breeding (1-42 days old) (p>0.05). tarragon powder’s intake at 0.5, 0.25, .0125 % dietary caused non-significant decrease (P>0.05) of the percentage of abdominal fat when compared with control group that Tarragon powder at 0.5 % dietary more than other levels can decrease abdominal fat. Tarragon powder intake at 0.25 level % dietary caused non-significant increase (P>0.05) of cookable carcass and thigh when compared with other groups. Active components of herbal extracts can cause positive effects on digestive enzymes, in a way that using these dietary supplementations can increase carcass’s growth and efficiency (Cross et al., 2007). Soltan et al., (2008) reported that the effect of different levels of *anise* seed(0.25, 0.5, 0.75, 1, 1.25. and 1.5 %)in ration on carcass’s characteristics was not significant statistically (P>0.05).

Table 7: Effect of dietary Tarragon Powder supplementation on some carcass traits of broiler chickens in different experimental groups. (Percentage of body weight1-42dayold).

Groups	abdominal fat	Carcass	thigh	breast
Control	1.66	71.83	21.52	24.69
0/125%	1.58	70.33	21.84	24.98
0/25%	1.46	72.32	22.19	24.58
0/5%	1.39	71.53	21.66	24.98
SEM	0.09	0.39	0.26	0.44
P-value	0.79	0.34	0.84	0.98

CONCLUSION

It can be concluded that Tarragon powder at 0.5 level percent ration compared with other treatments has negative effects on the performance of broiler chicks significantly, and also with regard to the positive non-significant effects of 0.25 percent level powder Tarragon on carcass weight and thigh, it is recommended to powder Tarragon's level lower than 0.5 percent in ration. It is also better to do some more comprehensive research regarding the use of powder Tarragon in the form of sinbiotic with other herbal supplementation in poultry.

REFERENCES

- Ayoughi ,F., Sahari,M. A., Naghdibadi, H. (2011). Chemical compositions of Essential oils of *Artemisia dracunculus L.* and an Evaluation of their Antioxidative Effects . *Agricultural. Sci.Tech.* 13:79-88.
- Brenes, A. & Roura, E.(2010). A review: Essential oils in poultry nutrition: Main effects and modes of action. *Animal Feed Science and Technology.* 158:1-14.
- Ciftci, M., Güler,T., Dalkiliç,B and Ertas, N.(2005). The effect of anise oil (*Pimpinella anisum L.*) on broiler performance. *Int. Journal of poultry scinse.* 4: 851-855.
- Cross, D.E., Mcdevitt, R.M., Hillman, K. and Acamovic, T.(2007). The effect of herbs and their associated essential oils on performance, dietary digestibility and gut microflora in chickens from 7 to 28 days of age. *Br. poultry scinse.* 48: 496-506.
- Dorman, H. J.D., Deans, S. G.(2000). Antimicrobial agents from plants:Antibacterial activity of plant volatile oils. *J. Appl. Microbiol.* 88:308–316.
- Kassie, G. A. M.(2008). The effect of anise and rosemary on broiler performance. *Int. Journal of Poult. Sci.* 7: 243-245.
- Meepagala, K.M., Sturtz, G and Wedge, D.A.(2002). Antifungal constituent of the essential oil fraction of *Artemisia dracunculus L.* Var. *dracunculus.* *Journal of Agricultural and food chemistry*,50:6989-6992.
- Oblskiy,D ., Pischel, I ., Feistel, B., Glotov, N., Heinrich,M. (2011). A Critical Review of Its Traditional Use, Chemical Composition, Pharmacology, and Safety. *Journal of Agricultural and food chemistry*,17:45.
- Ribnichy, D.M., Poulev, A., ONeal,Y.,Wnorowski,G., Malek, D.E., Jager,R and Raskin,I. (2004).Toxicological evaluation of the ethanolic extract of *Artemisia dracunculus L.*for use as a dietary supplement and in functional foods. *Food and Chemical Toxicology*,42:585-598.
- Rizzo, P.V., Menten, J. F. M., Racanicci, A. M. C and santarosa, j.(2008). Foundation and erspectives of the use of plant extract as performance enhancers in broilers.*Brazilian Journal poultry scinse.*10(4):194-2.
- Romila, R.M.A.(2001). Hacked By SOSO H. H Iraqi-Cracker. M.Sci. Thesis, Dept. of Biochemistry,*University of Cairo Egypt.*
- Sayyah, m., Nadjafnia,l and Kamalineia, M.(2004). Anticonvulsant activity and chemical composition of *Artemisia dracunculus L.*essential oil. *Journal of Ethnopharmacology .*94:283-287.

- Soltan , M. A., Shewita, R. S and El-Katcha, M. I.(2008). Effect of dietary aniseseeds supplementation on growth performance, immune response, carcass traits and some blood parameters of broiler chickens. *Int. J. Poult. Sci.* 7: 1078-1088.
- Vienna , Ch. F and coworkers. (2005). Assessment of plants/herbs, plant /herbextracts and their naturally or synthetically produced components as “additives” for use in animal production . *CFT/EFSA/FEEDAP*.
- Yazdanprast, Rand Sae , A.(1999). Effect of aqueous tarragon , *A. dracunculus*, extract on lipid and coagulatory parameters in rat. *Biomedical letters* . 59:137-141.
- Kong, X. F., Hu, Y. L., Yin,Y. L., Wu, G. Y., Rui, R., Wang, D. Y and Yang, C. B.(2006). Chinese herbal ingredients are effective immune stimulators for chickens infected with the Newcastle disease virus. *poultry scinse.* 85: 2169-2175.
- Zakia, A., Ahmed, M & Zahra, a. H., El - Ghamdi. (2008). Multiple environmental stresses and broiler internal organs somatic indices under controlled environment. *Int. Journal of poultry scinse.* 7:1089-1094.
- Kabir, S.M.L., Rahman, M.B., Rahman, M.M., Ahmed, S.U. (2004). The *dynamics of probiotics* on growth performance and immune response in broilers. *Int. Journal of poultry scinse.* 3:361-364.