



EFFECT OF *FERULA ASAFOETIDA* TO DRINK WATER OR DIET ON PRODUCTION PERFORMANCE IN BROILER

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Abstract

The study was conducted in the poultry farm belong to the animal production department, college of Agriculture –University of Kufa during the period 9/10/2018 to 13/11/2018 to investigate the effect of *Ferula asafoetida* to the drinking water or diet on the production traits of broiler. 300 one day age chicks (308-Ross) were used and distributed randomly on 5 treatments within 15 pens, each treatment was contained 60 chicks divided in to 3 replicates and each replicate contained 20 chicks, the treatment were:

T₀ : standard diet or control treatment, T₁: contained *Ferula asafoetida* gum 2 gm / liter of water, T₂: contained *Ferula asafoetida* gum 4 gm / liter of water, T₃: contained *Ferula asafoetida* powder 4 gm / kg of diet and the T₄: contained *Ferula asafoetida* powder 8gm / kg of diet. Results showed a significant increase (P<0.05) of average live body weight and total body gain in all treatments compared with the control. No significant effects were recorded in total feed consumption while a significant enhancement (P<0.05) in total feed conversion coefficient in both T₂ and T₄ compared with T₁.

Key words : *Ferula asafoetida*, production performance, broiler.

Introduction

The using of antibiotics numerously and directly for diseases treatment in poultry lead to produce a new generations of bacteria characterized with a high resistance of treatment which supplemented to patient human, this serious problem make the poultry breeders thinking how to unhand of this antibiotics and using instead of it the natural alternatives to safeguard the consumer health for a long time (Miles *et al.*, 2006). One of these natural alternatives is the medical herbal plants which used in poultry diets to increase the production and reduce the difficulties that faced poultry industry (Celikbilek *et al.*, 2014). The using of medical plants in poultry diets help for a significant enhancement in many important traits such as production performance and immunity or diseases resistance (Rahmatnegad *et al.*, 2009). *Ferula asafoetida* is one of these plant which tested and used in poultry diets because it contain of many active compound with medical effects and reflected directly on human health, the plant extract contains a considerable amounts of antibiotics, antioxidants as well as it contains many antimicrobial compounds, reduce of blood pressure,

enhance the respiratory and digestive systems functions (Fatehi, 2004). Because of few or absence the past studies in this field, the major aim of this study is to determine the effect of *Ferula assafoetida* addition to poultry water drinking and diet to improve the birds performance under farming conditions.

Materials and Methods

Chick management

Chicks were reared in pens and dust wood was used with 5-3 cm of thickness and sugar solution was supplemented for all chicks in the first hour of the chicks arrival to the farm. 23 continuous hours of light per day and one hour of darkness to adaptation. Plastic dishes with 38 cm of diameter were used and then altered by hanging circular feeders. Free water supplemented with converse waters 5 liters of volume. Farm temperature was about 34 C⁰ in the first day and gas heaters was used then reduce the heat weekly with average of 2C⁰ until 23C⁰.

Diets and feeding: Starter diets was supplemented to chicks from the first day to 21 day of age while the finisher was from 22 to 35 day of age and the diets were

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mixed and perpetrated in AL-Ghadir private factory located near the farm. The diet can be summarized in table 1 below:

Table 1: Feed components and chemical structures of starter and finisher diets.

Feed stuff	Starter (%)	Finisher (%)
Grinding yellow corn	44.9	49.72
Soy bean meal (47% P)	38.0	31.7
Grinding wheat	10.0	10.0
Premex	2.5	2.50
Corn oil	3.0	4.80
Di calcium phosphate	1.2	1.20
Lysine	0.10
Methionine	0.30	0.08
Total	100	100

Chemical components were calculated according to Ross company recommendation and can be summarized in the table 2 below:

Table 2: Calculated chemical components.

Crude substance %	Starter	Finisher
Metabolic energy Kcal/kg	3021.0	3204.5
Crude protein %	23.92	20.94
Total calcium	1.0	1.0
Available phosphorus	0.64	0.53
Crude fibers	3.67
Lysine	1.43	1.09
Energy : protein ratio	126.29	153.03

Statistical analyses

Data were analyzed by Statistical Analyses System (SAS, 2012) computer program and completely randomized design (CRD) was used in the experiment under the linear model:

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

Where:

μ : is an overall mean

T_i : effect of treatments (control – 5th treatment)

e_{ij} : effect of a random error.

Duncan multiple range test (Duncan, 1955) was used to determine the significant differences among means.

Results and Discussion

Results represented in table 3 showed a significant effect ($P < 0.05$) of *Ferula asafoetida* addition on average live body weight from 1st to 5th week of age, the highest body weight was noticed in chicks that fed on *Ferula asafoetida* gum 2 gm / liter of water during 1st and 2nd week namely 165.4 and 450.1 gm respectively. Chicks

that fed on *Ferula asafoetida* gum 4 gm / liter of water were the highest body weight in 3rd, 4th and 5th week of age namely, 901.7, 1473.0 and 2177.0 respectively.

Results showed that a significant differences of all *Ferula asafoetida* treatment compared with the control in the end of experiment (5th week of age).

Results showed a significant differences ($P < 0.05$) the treatments in body weight gain (Table 4), the highest body weight gain was recorded in chicks that fed on *Ferula asafoetida* gum 2 gm / liter of water during 1st, 2nd and 4th week of age namely, 128.4, 284.7 and 589.4 gm respectively while the highest body weight gain was recorded in birds that fed on *Ferula asafoetida* gum 4 gm / liter of water during the 3rd and 5th week of age namely 476.2 and 739.5 gm respectively.

Total body weight affected significantly by addition, the highest body weight was noticed in birds that fed on *Ferula asafoetida* (2175.3 gm) compared with the lowest total body weight that noticed control (1999.5 gm). In 4th and 5th week of age, all the *Ferula asafoetida* treatments were differed significantly with the control. Body weight gain is a good indicator to predict of the average birds growth therefore, the poultry breeders are interest with these traits and try to improve it continuously.

Results represented in table 5 referred that the addition affected significantly ($P < 0.05$) on feed consumption rate in 2nd, 4th and 5th week. Birds that fed on *Ferula asafoetida* powder 4 gm / kg of diet were the highest feed consumption rate namely, 368, 846.6 and 1050 respectively while the highest feed consumption rate during the 1st and 3rd week of age was recorded in control group namely, 165.9 and 586.4 respectively. Total feed consumption did not differed significantly among treatments.

Results of current study proved that the addition of in broiler diets or drinking water effected significantly on feed conversion coefficient during the 1st week of age, the highest was in control treatment (1.48) compared with not effected significantly on feed conversion coefficient from 2nd to 5th week of age while a significant effects ($P < 0.05$) of *Ferula asafoetida* on accumulative feed conversion, the highest value was noticed in control (1.47) while the lowest was in birds that fed on *Ferula asafoetida* gum 4 gm / liter of water (1.35).

Through the results of this study, we can see a significant increase of production traits related with *Ferula asafoetida* gum addition for diet or drinking water because the gum contain a good amounts of many compounds such flavonoids, alkaloids and fenoles which effect on tissues formation and stimulate for proteins

Table 3: Effect of *Ferula asafoetida* gum on live body weight from 1st to 5th week of age.

Treatment	Means ± S.E				
	1	2	3	4	5
T ₀	148.9±5.13	429.7±5.23	871.6±8.28	1430±4.51	2036.6±4.17
T ₁	165.4±4.87	450.1±6.19	855.5±9.15	1445±3.98	2101.6±5.08
T ₂	158.2±5.11	425.5±6.60	901.7±13.68	1473±4.29	2177±6.22
T ₃	158±6.09	444.6±4.99	896.1±10.30	1446±4.40	2130±5.39
T ₄	157.5±7.33	427.6±5.29	829.5±8.81	1411±3.17	2093.1±4.99

Values within each subclass with different superscripts differ significantly (P<0.05). T₀: control, T₁ and T₂: contained *Ferula asafoetida* gum 2 and 4 gm / liter of water respectively, T₃ and T₄: contained *Ferula asafoetida* powder 4 and 8 gm / kg of diet.

Table 4: Effect of *Ferula asafoetida* gum on weekly body weight gain from 1st to 5th week.

Treatment	Means ± S.E				
	1	2	3	4	5
T ₀	111.9±4.12	280.8±7.10	441.9±6.19	558.3±4.29	606.6±5.09
T ₁	128.4±4.78	284.7±5.28	405.4±5.88	589.4±4.33	656.6±7.12
T ₂	121.1±5.55	267.3±5.20	476.2±14.10	571.2±5.20	739.5±6.10
T ₃	121±6.40	286.6±5.14	451.5±8.90	549.8±5.00	684±5.20
T ₄	120.5±5.00	270.1±4.98	401.8±5.27	581.4±3.99	682.1±5.11

Values within each subclass with different superscripts differ significantly (P<0.05). T₀: control, T₁ and T₂: contained *Ferula asafoetida* gum 2 and 4 gm / liter of water respectively, T₃ and T₄: contained *Ferula asafoetida* powder 4 and 8 gm / kg of diet.

Table 5: Effect of *Ferula asafoetida* gum on feed consumption rate from 1st to 5th week.

Treatment	Means ± S.E				
	1	2	3	4	5
T ₀	165.9±7.08	334.9±4.39	586.4±6.79	834.5±3.1	1030.5±4.1
T ₁	157.7±6.11	332.7±5.17	576.1±8.31	841±3.30	1034.9±3.9
T ₂	155.4±7.22	358.5±4.72	561.3±7.18	844.6±3.15	1033.5±3.91
T ₃	152±4.72	368±5.21	584.1±9.89	846.6±3.19	1050±3.07
T ₄	151.1±5.3	345.5±5.09	551.3±9.03	828.7±3.09	992.9±3.22

Values within each subclass with different superscripts differ significantly (P<0.05). T₀: control, T₁ and T₂: contained *Ferula asafoetida* gum 2 and 4 gm / liter of water respectively, T₃ and T₄: contained *Ferula asafoetida* powder 4 and 8 gm / kg of diet.

synthesis in addition to the effects of these compounds for stimulating the immune system against microbial pathogens (Bahatnger, 2015). The results were accordance with the many of past studies, Mahendra and Bisht (2012) and Bagheri *et al.*, (2014) reported that the using of *Ferula asafoetida* in poultry diets lead to enhance the production performance because of the high content of important minerals such as calcium, phosphorus, potassium and ferrate. Bagheri and Dashti (2015) reported that the increase of body weight with *Ferula asafoetida* feeding resulted from the sugar compound which consider a n important source for lipids digestion or the high content of volatile fatty acid, esters

and coumarin acid derivatives which act as a digestive enhancers or a appeasements contribute for reducing the energy loss. Other studies reported that the *Ferula asafoetida* feeding lead to enhance the poultry performance because of the crucial role to reduce the activity of pathogen bacteria inside the digestive system of birds (Fatehi *et al.*, 2004; Mahendra and Bisht, 2012) .the results were also supported by the results of Kamel (2001), Alcicek *et al.*, (2004) and Garca *et al.*, (2007) who they insisted of the important role of *Ferula asafoetida* to stimulate the digestive system excretions while Roy (2014) reported that the using of *Ferula asafoetida* in poultry diets lead to increase the digestive enzymes production which reflected positively on feed conversion coefficient.

In conclusion, the using of *Ferula asafoetida* in poultry diets lead to improve the production performance and enhance the health status of birds and through the results of current study we can avouch that this medical plant is an efficient alternative of antibiotic which used in poultry feeding and combined with side effects.

References

- Alcicek, A., M. Bozkurt and M. Cabuk (2003). The effect of an essential oil combination derived from selected herbs growing wild in Turkey on broiler performance. *South African Journal of Animal Science*, **33**: 89-94.
- Bagheri, S.M., M.H. Dashti-R and A. Morshedi (2014). Antinociceptive effect of *Ferula asafoetida* oleo-gum-resin in mice. *Research in Pharmaceutical Sciences*, **9(3)**: 207-12.
- Bagheri, S.M. and R.M.H. Dashti (2015). Influence of Asafetida on prevention and treatment of memory impairment including by D-galactose and NaNO₂ in Mice. *Am. Alzheimer's Dis. other Derman*, **30**: 607-612.
- Bhatanger, R., R. Rani and A.S. Dang (2015). Antibacterial activity of *Ferula asafetida* : A comparison of red and white type. *J. of Appl. Biol. & Biotech.*, **3(2)**: 18-21.
- Celikbilek, A., D. Gulay, O. Abdulkadir, G. Hidir and C. Kara (2014). Effects of a combination of dietary organic acid blend and oregano essential oil (lunacompadidherbex dry) on the performance and *clostridium perfringens*

- proliferation in the ileum of broiler chickens. *J. Biol. Environ. Sci.*, **8(22)**: 61-69.
- Fatehi, M., F. Farifteh and H.Z. Fatehi (2004). Antispasmodic and hypotensive effects of *Ferula asafoetida* gum extract. *J. Ethnopharmacol.*, **91(2-3)**: 321-324.
- Garcia, V., P. Catala-Gregori, F. Hernandez, M.D. Megias and J. Madrid (2007). Effect of formic acid and plant extracts on growth, nutrient digestibility, intestine mucosa morphology, and meat yield of broilers. *Journal of Applied Poultry Research*, **16**: 555-562.
- Kamel, C. (2001). Tracing modes of action and the roles of plant extracts in non-ruminants. In P.C. Garnsworthy and J. Wiseman (Ed.), *Recent advances in animal nutrition*. (135-150) Garnsworthy, Nottingham University Press.
- Mahendra, P. and S. Bisht (2012). *Ferula asafoetida* : traditional uses and pharmacological activity. *Pharmacogen Review*, **6**: 141-146.
- Miles, R.D., G.D. Butcher, P.R. Henry and R.C. Littel (2006). Effect of antibiotic growth promoters on broiler performance, intestinal growth parameters, and quantitative morphology 5. *J. Poult. Sci.*, 910216-2.
- Rahmatnejad, E.H., Roshanfekar, O. Ashayerizadeh, M. Mamooee and A. Ashayerizad (2009). Evaluation the effect of several non-antibiotic additives on growth performance of broiler chickens. *J. Anim. Vet. Adv.*, **8**: 1670-1673.
- Roy, S., S.K. Metya, N. Rahaman, S. Sannigrahi and F. Ahmed (2014). Ferulic acid in the treatment of post-diabetes testicular damage: Relevance to the down regulation of apoptosis correlates with antioxidant status via modulation of TGF- β 1, IL-1 β and Akt signaling. *Cell Biochem. Funct.*, **32**: 115-124.