

\*

450 .

150 .

50 .

( ) :

450 / 600 .

( ) ( )

( )

4 .

(0.05 > )

( )

(0.05 > )

( )

600 /

.1

.(1979 )

.*Glycyrrhiza glabra*

1960-1955

glycyrrhizic acid

)  
(Newall et al.,

Newall

.(1996

1996)

2004/12/13

(1)  
(4\*3\*2)  
.2006/2/7

\*

) .(2003  
 (2003  
 / 450

/ 300 150 E - (PGE)

/ 450 )  
 / 600 ( Licuraside Licochalcone Saponins  
 Liquirazide Liquiritigenin Liqcoumarin Licuroside

.2

.(Tyler et al., 1988)  
 (Trease and Evans, 1992)

.  
 . 450

2800 %23)  
 ( /  
 3000 %21)  
 ( /

150 .

) : 50 :  
 ( : :  
 : / 450 :  
 / 600 ) 2003  
 (2003

Back Neck Wings Spray dryer Powder

.(1989 ) (1) (

( ( 6 6) (

.(1989 ) (

4

(Complete Randomized Design)

.(Steel and Torrie, 1980)

(SAS, 1996)

.3

(1)

> ) (0.05

) (

/ 450 / 600

(1)

(0.05 > )

(

/ 600

(4 3 2)

(0.05 > )

:(1)

% 23	
% 16.5	
% 5.3	
% 0.66	
% 3.0	
% 12.9	
% 5.1	
% 4.0	
% 29.5	
/ 513	
/ 366	
/ 1246	
/ 241	
/ 5	
/ 0.53	
/ 533	
/ 33.9	
/ 6.1	
/ 2.1	

\*

Thigh Breast

Drumstick ( )

(Sturkie, 1986) 600 .  
(2003 ) / 450 /

(3 )  
(4 3 2)  
(0.05 > )

(2000 2002 ) / 600  
(2003 ) . / 450

(2001) Quaschnig / 450 300 150  
(2003

anti-infective properties 450 /

isoflavonoid class  
(Quaschnig et al., antiviral effect

.2001)

(Groeve, 1995)  
(Kumagi et al., 1957) Kumagi  
Glycyrrhizin

Glycyrrhetic acid

) (Steroid-like action)  
(2003

anabolic hormones

(2003 )

(Wood et al., 1972) Wood

(2003 )

Metabolites

:(2)

600	450		600	450		600	450		
A 1525.5 ± 68.93	B 1494.4 ± 67.33	C 1415.0 ± 68.12	A 1563.4 ± 71.12	B 1530.1 ± 66.20	C 1437.0 ± 67.43	A 1481.6 ± 66.38	B 1458.7 ± 69.19	C 1393.0 ± 70.16	( )
C 2.44 ± 0.23	B 2.62 ± 0.09	A 2.87 ± 0.1	C 2.39 ± 0.18	B 2.51 ± 0.09	A 2.78 ± 0.11	C 2.50 ± 0.01	B 2.73 ± 0.03	A 2.96 ± 0.08	) / (
A 1139.0 ± 69.0	B 1099.7 ± 50.8	C 1017.1 ± 88.0	A 1172.0 ± 69.0	B 1130.5 ± 77.3	C 1035.5 ± 80.2	A 1106.7 ± 71.0	B 1068.9 ± 66.9	C 998.7 ± 83.11	( )
A 25.04 ± 0.93	B 24.70 ± 0.88	C 23.36 ± 0.36	A 25.16 ± 0.74	B 24.88 ± 0.93	C 23.45 ± 0.87	A 24.91 ± 0.89	B 24.51 ± 0.77	C 23.26 ± 0.68	
A 15.78 ± 0.38	B 15.47 ± 0.47	C 15.12 ± 0.41	A 15.98 ± 0.37	B 15.67 ± 0.39	C 15.26 ± 0.44	A 15.57 ± 0.33	B 15.26 ± 0.35	C 14.97 ± 0.42	

A 15.04 ± 0.30	B 14.72 ± 0.27	C 14.34 ± 0.34	A 14.99 ± 0.40	B 14.68 ± 0.33	C 14.27 ± 0.29	A 15.08 ± 0.32	B 14.76 ± 0.36	C 14.41 ± 0.40	
C 4.07 ± 0.08	B 4.39 ± 0.09	A 5.05 ± 0.08	C 4.01 ± 0.10	B 4.32 ± 0.06	A 4.89 ± 0.09	C 4.12 ± 0.05	B 4.46 ± 0.07	A 5.20 ± 0.09	
B 28.55 ± 0.82	B 28.73 ± 0.76	A 29.31 ± 1.02	B 28.63 ± 0.69	B 28.80 ± 0.84	A 29.43 ± 0.78	B 28.47 ± 0.91	B 28.65 ± 0.88	A 29.19 ± 0.87	
C 11.54 ± 0.30	B 12.01 ± 0.24	A 12.84 ± 0.27	C 11.23 ± 0.30	B 11.65 ± 0.23	A 12.70 ± 0.27	C 11.85 ± 0.27	B 12.36 ± 0.21	A 12.97 ± 0.22	

(0.05 > )

\*

:(3)

600	450		600	450		600	450		
A 63.78 ± 1.69	B 63.41 ± 1.87	C 62.75 ± 1.77	A 63.93 ± 1.63	B 63.58 ± 1.52	C 62.91 ± 1.64	A 63.63 ± 1.73	B 63.24 ± 1.82	C 62.58 ± 1.67	
C 17.96 ± 0.43	B 18.52 ± 0.39	A 19.45 ± 0.41	C 17.80 ± 0.44	B 18.27 ± 0.44	A 19.18 ± 0.37	C 18.11 ± 0.32	B 18.77 ± 0.45	A 19.72 ± 0.4	
C 12.55 ± 0.28	B 12.90 ± 0.30	A 13.49 ± 0.28	C 12.63 ± 0.25	B 12.96 ± 0.30	A 13.61 ± 0.29	C 12.47 ± 0.25	B 12.84 ± 0.27	A 13.37 ± 0.31	
A 5.72 ± 0.45	B 5.17 ± 0.13	C 4.32 ± 0.14	A 5.64 ± 0.16	B 5.19 ± 0.15	C 4.30 ± 0.19	A 5.79 ± 0.18	B 5.15 ± 0.14	C 4.33 ± 0.11	

(0.05 > )

:(4)

600	450		600	450		600	450		
A	B	C	A	B	C	A	B	C	
59.02	58.15	57.81	59.16	58.29	57.64	58.87	58.0	57.37	
±	±	±	±	±	±	±	±	±	
1.29	1.34	1.69	1.38	1.26	1.33	1.39	1.50	1.47	
C	B	A	C	B	A	C	B	A	
17.65	18.03	18.78	17.52	17.92	18.66	17.78	18.14	18.89	
±	±	±	±	±	±	±	±	±	
0.58	0.41	0.66	0.63	0.49	0.55	0.53	0.47	0.52	
C	B	A	C	B	A	C	B	A	
16.35	16.82	17.36	16.43	16.95	17.40	16.27	16.69	17.31	
±	±	±	±	±	±	±	±	±	
0.39	0.47	0.32	0.50	0.38	0.49	0.43	0.37	0.35	
A	A	B	A	A	B	A	A	B	
6.99	7.01	6.37	6.89	6.84	6.30	7.08	7.17	6.43	
±	±	±	±	±	±	±	±	±	
0.14	0.15	0.13	0.11	0.20	0.15	0.17	0.13	0.17	

(0.05 > )

:(5)

600	450		600	450		600	450		
A	B	C	A	B	C	A	B	C	
58.64	58.20	57.30	58.76	58.29	57.44	58.52	58.11	57.16	
±	±	±	±	±	±	±	±	±	
1.47	1.29	1.38	1.30	1.48	1.35	1.44	1.50	1.63	
C	B	A	C	B	A	C	B	A	
30.98	31.53	32.79	30.92	31.43	32.71	31.03	31.62	32.87	
±	±	±	±	±	±	±	±	±	
0.92	1.03	0.88	0.87	1.01	1.93	1.07	1.11	0.95	
C	B	A	C	B	A	C	B	A	
8.16	8.39	8.69	8.15	8.36	8.76	8.17	8.41	8.61	
±	±	±	±	±	±	±	±	±	
0.28	0.31	0.24	0.26	0.29	0.23	0.30	0.25	0.33	
A	B	C	A	B	C	A	B	C	
2.23	1.89	1.23	2.17	1.92	1.09	2.28	1.86	1.36	
±	±	±	±	±	±	±	±	±	
0.12	0.10	0.09	0.11	0.04	0.06	0.04	0.05	0.08	

(0.05 > )

- .198-193 :(5) 34 .
- 2002
- 2003
- .(*Glycyrrhiza glabra*)
- 1979
- Grieve, M. 1995. Licorice. Botanical Com. A. Modern Herba Home Page, Electric Net. 1996
- Kumagi, A., Yano, M., Otomo M. and Takenchi, K. 1957. Study on the Corticoid – like Action of Glycyrrhizin and Mechanism of its Action. *Endocrinol. Kpn.*, 4: 17-27.
- Newall, C.A., Anderson, L.A. and Phillipson, J.D. 1996. *Herbal Medicines*. First Published. The Pharmaceutical Press, London. 2003
- Quashing, T., Ruschitzka, F., Shaw, S. and Luscher, T.F. 2001. Aldosterone Receptor Antagonism Normalizes Vascular Function in Licorice – induced Hypertension. *Hypertension*, 37: 801-803. -197 :(4) 34 . .206
- 2003
- Quaschnig, T., Ruschitzka, F., Niggli, B., Lunt, C.M.B. Shaw S., Christ, M. Wehling, M. and Luscher, T. 2001. Influence of Aldosterone vs Endothelin Receptor Antagonism on Renovascular Function In Licorice – induced Hypertension. *Nephrol Dial Transplant*, 16: 2146-2151. .208-199 :(5) 34
- 2003
- SAS. 1996. *SAS User's Guide: Statistics Version*, 6<sup>th</sup> edition. .198-187 :(6) 34 . SAS. Institute Inc., Cary, NC.
- Steel, R.F.P. and Torrie, J.H. 1980. *Principles and Procedures of Statistics*. 2<sup>nd</sup>. Edn. McGraw-Hill International Books Com. Inc. New York 2003
- Sturkie, P.D. 1986. *Avian Physiology*. 4<sup>th</sup>. Edn. Springer Verlag, New York. .208-199 :(6) 34 . 2000
- Trease, W. and Evans, C. 1992. *Pharmacognosy*. 13<sup>th</sup> edn. ELBS with Tindall, UK.
- Tyler, V.E., Brady, L.R. and Riobbers, J.K. 1988. 1989 *Pharmacognosy*. 9<sup>th</sup> edn. Lea and Febiger, Philadelphia.
- Wood, A.S., Reinhart, B.S., Rajaratham G. and Summers, J.D. 1971. A Comparison of the Blood Constituents of Dwarf Versus Nondwarf Birds. *Poultry Sci*. 50: 804-807. 2003

---

## **Influence of the Use of Different Levels of Liquorice Extract in Ameliorating Carcass Traits of Broiler Chickens**

*Hazem J. Al-Daraji, Imad-Eddin A. Al-Ani, Jassim K. Menati, and Sadeq A. Taha \**

### **ABSTRACT**

This study was conducted as a trial for using liquorice extract in ameliorating carcass traits of broiler chickens. A total of 450 Fawbro broilers, one day of age were used. The chicks were randomly allocated to 3 treatments of 3 replicates per treatment; each replicate constitutes 50 chicks (150 chicks per treatment). Treatments included in this study were: Treatment 1: Control group (liquorice extract was not supplemented to their drinking water), treatment 2: liquorice extract was supplemented to their drinking water at the level of 450 mg / liter and treatment 3: liquorice extract was supplemented to their drinking water at the level of 600 mg / liter. However, this study included the evaluation of the following carcass traits: relative weight of major cuts (breast, thigh and drumstick) and minor cuts (neck, back and wings), besides the determination of relative weight of meat, bone, skin and deposit fat in major cuts (breast, thigh and drumstick). Besides, these traits were recorded for male and female groups alone and then for the mixture of male and female groups. Males and females were separated at the 4<sup>th</sup> week of age.

Results indicated that liquorice extract drinking water supplementation resulted in significant ( $P < 0.05$ ) increase in relative weight of major cuts (breast, thigh and drum stick) and relative weight of meat and deposit fat in these major cuts in each of male groups, female groups and the mixture of male and female groups. Furthermore, liquorice treatment resulted in a significant decrease ( $P < 0.05$ ) in the percentage of minor cuts (neck, back and wings) and the percentages of bone and skin for cuts of breast, thigh and drumstick in each of females, males and mixture of females and males. However, the level of 600 mg liquorice extract / liter of drinking water recorded the best results regarding carcass characteristics included in the present study.

---

\* Dept. of Animal Res. College of Agric. Univ. of Baghdad, Baghdad, Iraq(1); State Board for Agric. Res., Ministry of Agric.(2,3,4). Received on 13/12/2004 and Accepted for Publication on 7/2/2006.