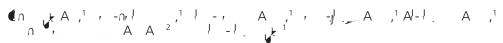
ORIGINAL ARTICLE

Effect of expanded cottonseed meal on laying performance, egg quality, concentrations of free gossypol in tissue, serum and egg of laying hens



¹Feed Scie´ce I´s i e, C llege f A´i al Scie´ce, Zhejia´g U´ire si , Ha´g h , Chi´a; a´d ²Fac l , f Ag ic l e, P l , P d c i´De a e´, Ma´s a U´ire si , Ma´s a, Eg

ABSTRACT

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1. 18 n . A

1.24 0.40 / . n l

1.24 0.40 / . n l

1.24 0.05) n

1.24 0.05) n

6% (1) (P<0.05) n

6% (1) (P<0.05) n

6% (1) (P<0.05) n

10 (P
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Key words: egg ali, ex a'ded c 'seed eal, g ss, l, la i'g he's, la i'g e f a'ce.

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 Table 1
 Ingredients and nutrient composition of experimental diets†

(%)	С	6% C	6% EC	8% EC	10% EC
		65.75	66.30	66.30	66.50	66.75
	(44.2% C)	20.89	12.84	12.84	10.02	7.19
(60.2	2% C)	2.70	4.20	4.20	4.80	5.40
			6.00			
				6.00	8.00	10.00
		8.66	8.66	8.66	8.68	8.66
		0.30	0.26	0.26	0.25	0.23
:	5	0.72	0.50	0.50	0.42	0.37
		0.14	0.13	0.13	0.12	0.12
		0.34	0.61	0.61	0.71	0.78
		0.50	0.50	0.50	0.50	0.50
E (/ g)		2,690	2,680	2,680	2,678	2,676
,		16.01	16.03	16.03	16.05	16.04
,		3.62	3.52	3.55	3.49	3.58
	,	0.67	0.71	0.68	0.73	0.76
		0.83	0.81	0.81	0.81	0.80
		0.41	0.41	0.41	0.40	0.41
+ C		0.65	0.65	0.65	0.65	0.65
5				. 60	g C 60, 80	100 g EC
. С,	; E,	g;,	; ,	; C , ; C		EC ,
5 g ; l 16 g ;	B ₂ , 4 g ; B		.02 g ; , 30			g; B ₁

F D

C (2009).

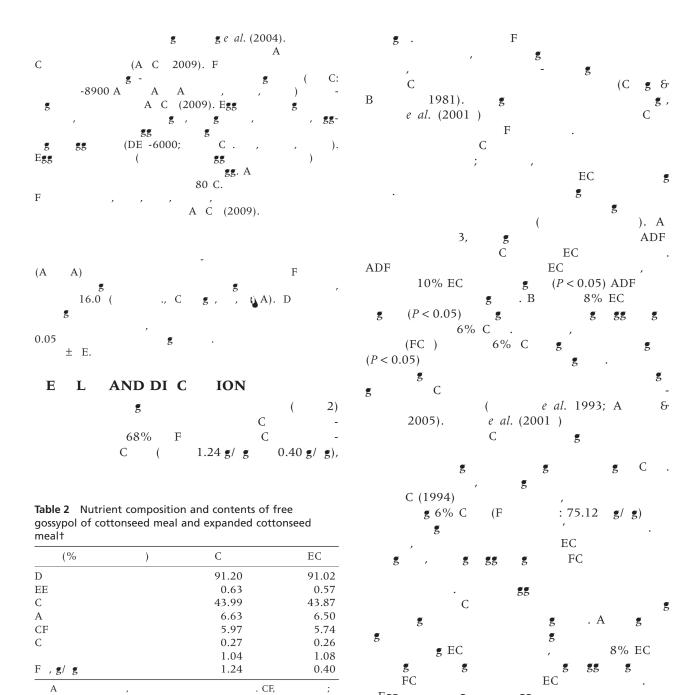


Table 3 Average feed intake, laying rate, average egg weight and feed conversion of laying henst

; EC ,

; D

; F

	C	6% C	6% EC	8% EC	10% EC
ADF (g)	119.72 ± 1.78	123.57 ± 1.26	122.00 ± 2.20	123.81 ± 0.52	124.95 ± 1.06
g (%)	95.71 ± 1.08	92.96 ± 1.08	94.03 ± 0.60	96.47 ± 0.36	95.52 ± 1.23
A g gg g (g)	57.92 ± 0.89	54.91 ± 0.97	56.53 ± 0.46	57.74 ± 0.36	57.17 ± 0.88
FC (g : g)	2.07 ± 0.06	2.25 ± 0.06	2.16 ± 0.04	2.14 ± 0.02	2.19 ± 0.05
		g (P < 0	0.05). D	1	8 g
/ . ADF . •	: C	. : EC		: FC .	

Egg

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; C

; EE,

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 Table 4
 Egg quality of laying henst

		С	6% C	6% EC	8% EC	10% EC
1	g ()	6.66 ± 0.54	5.40 ± 0.8			5.42 ± 0.86
g		83.05 ± 1.75	73.42 ± 1.7			74.09 ± 2.36
	Ž.	5.90 ± 0.43	7.19 ± 0.19			6.89 ± 0.35
55	$g \qquad (g / 2)$	3.98 ± 0.28	3.50 ± 0.8			4.24 ± 0.30
38	()	0.372 ± 0.012	0.388 ± 0.0	31 $0.393 \pm 0.$	0.385 \pm 0.043	0.406 ± 0.034
,	; EC ,		g (P ; g, g	(< 0.05). D		55 / .
	9				. 5 ,	
,		55		55		
	•				5	(F^{+3})
			9		(e a	ıl. 1966).
P > 0.05)	5	g	5 55	e al. (2007)	55	
g	55	(4).	g		g (+)	- g
Ü	g	,	5			
55			J	A	5, 6% C	5
<i>ъъ</i> 5% С	10% EC		(P < 0.05)	5	F ,	D
. 70			(1 < 0.05)	5		
% 8%	g g % EC .		,	-	g F	EC
) 70 0 7		,		\$		
	15% 60%	6 C		(D 0 05)		F (P. 0.05)
	5	-		(P < 0.05).	<u>g</u>	(P > 0.05)
g	5	(D	e al. 2002;		F	C
e al	<i>!</i> . 2007).		5	EC g	· g	F
		,	(2001) -		5 5	
	g		9	,		(e al
	g .			2001;	e al. 2005).	6% C
	g		5 55	g $(P < 0.$	05)	F
	C			,	EC	, F
	5 5				,	
С	8 8		g -	(P < 0)		
(D	e al. 2002).		8	EC	,	g
(12	c ui. 2002).			EC	· F	5
				60	% C 10% EC	~
	·				/0 C 10 /0 EC	5
g	5	,	,	(P < 0.05) F		
	5		g -			. A
	g -			F		
		g	,	e al. (1996)		al. (1995) g
			g -		e al. (2001)	e al. (2005)
		09). A	4 ,	. D	6%	C
	% С	55		g	(P < 0.05) F	
P < 0.05)		(2004)		. F		
				10% EC	§ • §	(P < 0.05)
	g				EC g	
0% C	g			6% C		(P < 0.05) F
	0	(D e a	al. 2002).		•	
		_ _		g	g F	•
g ,				8	5 ·	F
	_		(-		5	•
al 1000.		1001\	(g	,		
al. 1989;	g &	1991).				, ·
	g	9	-	·		
,				(E 1996).	. ,	
		g (D	e al. 2002).			-
55				F	55 ·	
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Table 5 (Concentrations of FG in	volk	. albumen.	liver.	kidnev.	. muscle and	serum of la	aving henst
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	6% C	6% EC	8% EC	10% EC
(g/ g)	0.200 ± 0.012	0.068 ± 0.012	0.093 ± 0.010	0.155 ± 0.018
A (g/ g)	0.103 ± 0.005	0.033 ± 0.007	0.055 ± 0.010	0.075 ± 0.006
(g / g)	0.442 ± 0.020	0.182 ± 0.019	0.258 ± 0.014	0.350 ± 0.012
(g / g)	0.385 ± 0.011	0.160 ± 0.006	0.195 ± 0.006	0.297 ± 0.013
(g / g)	0.250 ± 0.028	0.039 ± 0.002	0.089 ± 0.002	0.142 ± 0.010
(µg/)	1.931 ± 0.009	0.523 ± 0.030	0.715 ± 0.029	0.892 ± 0.006
			F (g/g)	
D				
6% C	0.276 ± 0.033		0.129 ± 0.017	
6% EC	0.096 ± 0.017	A	0.067 ± 0.008	
8% EC	0.138 ± 0.021		0.308 ± 0.030	
10% EC	0.204 ± 0.028		0.259 ± 0.027	
			0.130 ± 0.024	
A		P-		
D	3		0.000	
	4		0.000	
D ×	12		0.000	
•		g (P < 0.05).		
g $(P < 0.05)$. D		/	gg / . C ,	; EC ,

, F C68% EC 10% EC 9

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