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EFFECT OF LEVEL OF SCREENED WHOLE COTTONSEED ON INTAKE, DIGESTIBILITY AND PERFORMANCE OF GROWING LAMBS FED CLOVER HAY-BASED DIETS.

Soliman, N. A. M.

Animal Production Research Institute, Agriculture Research Center, Egypt.

ABSTRACT

Twenty-four Ossimi male lambs (initial BW 22 kg) were used to study the effect of increasing level of screening whole cottonseed (SWCS) on performance, digestibility, rumen fermentation and intake of DM, CP, NDF, ADF, hemicellulose, cellulose, lignin and ether extract. Animals were fed four diets containing either 0, 8, 16 or 24% SWCS. The SWCS replaced corn and soybean meal to maintain calculated TDN and CP concentration at 65 and 14%, respectively. Animals were given *ad libitum* access to feed and water. Results indicated that DMI, ADG decreased (P>0.05) lineary with increasing SWCS level. Diet containing 8% SWCS level had showen better feed efficiency (gain/feed) compared to those either contained 16 or 24 % SWCS levels or nil WCS (control). However, the difference was not statistically significant. Apparent digestibility coefficients of DM, OM, and CP decreased with increasing SWCS level, but without significant effect. Diets containing 16 and 24% SWCS level had higher (P>0.05) increase EE digestibility. While higher (P>0.05) increase in NDF, ADF, ADL, hemicellulose and cellulose digestibility were observed with 16% SWCS level. Diets containing 0 and 16% level of SWCS showed more NI, ND and NR. Calculated MP synthesis was not affected by SWCS level.

It was concluded that incorporation up to 24% SWCS level in the diets was accepted; however, 16% SWCS level could be suggested as a safety level for local lamb diets.

Keywords: Screened Whole Cottonseed, Sheep, Performance, Digestibility, Fermentation in the rumen, N utilization.

INTRODUCTION

In Egypt, the total area cultivated with cotton is about 518319 acres annually, yielding about 421700 tons non ginned cotton and 207.846 tons ginned cotton and 213854 tons oilseed. Only about 40% of the seeds are re-cultivated and the rest (60%) is processed for oil production (Agriculture survey bulletin, 2001).

Protein and fiber as much as energy, are important for maintaining optimal rumen fermentation. So, whole cottonseeds contain 2.22 Mcal NE/Kg DM, 23% CP and 34% ADF, the fiber is contributed in part by hulls as well as lint (10% of the wholeseed weight) which has higher potential digestibility (NRC, 1989 and Chandler, 1992).In the rumen, whole cottonseed is highly degradable rather than the other commonly used protein supplements (Depeters *et al.*, 1985). Whole cottonseed has been widely used in cattle feeding systems (Poore and Rogers, 1995 and Arieli, 1998). Its use for small ruminants, especielly for sheep and goats, has not been fully explored. Whole cottonseed has been primarily used in maintenance diets for adult wethers or rams (Warren *et al.*, 1988 and Karalazos *et al.,* 1992). Ruminants have effective mechanisms to detoxify gossypol in WCS, iron salts and higher dietary cations, calcium and magnesium may also bind gossypol in the digestive tract.

This experiment was conducated to determine the level of screened whole cottonseed that could be included in hay based diets for growing lambs.

MATERIALS AND METHODS

The feeding study was carried out in Al-Azhar University experimental station, Nasr-city, Cairo, while metabolism trails, rumen fermentation study and laboratory analysis were undertaken in the Animal Production Research Institute, Ministry of Agriculture, Dokki, Giza.

Animals and experimental rations:

Tewenty four Ossimi male lambs with an average initial body weight of 22.00 ±0.50 kg were randomly assigned to 4 similar groups. Each group of animals was alloted at random to receive one of the tested rations. Four mixed ration in mash form, based on clover hay were formulated to be isonitrogenous and isocaloric so as to provide 14% CP and 64% TDN according to the NRC 1985 recommedations.

Experimental rations used (Table 1 and Table 2) in this study were mainly different in the level of screened whole cottonseed (0, 8, 16,and 24%). Animals were fed the diets *ad lib* for 121 days and water was available all the time. Animals were weighed and feed consumption were recorded at biweekly intervals; live body weight gain, feed efficiency and feed cost per 1kg live body weight gain were calculated.

Table (1): Diets formulation.

Ingredient	Level of screening whole cottonseed, %			
	0	8	16	24
Clover hay	70	70	70	70
Screened whole cottonseed	-	8	16	24
Yellow corn	17	11	5.5	-
Soybean meal	8.6	6.1	3.7	-
Limestone	1.2	1.3	1.3	1.4
Sodium chloride	1.0	1.0	1.0	1.0
Molasses	2.2	2.6	2.5	3.6
Total	100	100	100	100
Price L.E/Ton	620.92	588.71	561.90	516.36

Metabolism trials:

At the end of the feeding trail, three adult Ossimi rams per each treatment were used in a metabolic trail conducted as described by El-Shazly (1958).

The digestibility trail lasted for three weeks as a preliminary period followed by one week as a collection period.

Feed, feces and urine analyses were carried out according to the methods of A.O.A.C. (1990) and fiber fraction (NDF, ADF, ADL, hemicellulose and cellulose) according to Goering and Van Soest (1970) by using triplicates for each determination.

Whole cottonseed samples were analyzed for total and free gossypol (AOCS, 1985a,b).

Table (2): Chemical composition of mixed diets containing different levels of screening whole cottonseed (%DM basis).

Item	Level of screening whole cottonseed, %			
	0	8	16	24
DM	93.06	92.10	92.41	91.84
OM	90.15	89.80	90.77	89.92
CP	14.51	14.79	15.17	15.00
EE	2.17	3.65	4.90	6.05
CF	22.02	23.26	24.25	25.68
NDF	42.02	44.99	48.02	50.84
ADF	29.93	31.89	33.87	35.72
ADL	2.20	3.20	4.11	4.66
NFE	51.45	48.10	46.45	43.19
Ash	9.85	10.20	9.23	10.08
Total gossypol mg/kg	0	500	1,002	1,503
Free gossypol mg/kg	0	460	941	1,389

Rumen parameters:

1. Ruminal pH value:

Rumen samples were withdrawn before feeding and 3 and 6 hours after feeding; stained through four layers of cheese cloth and assed immediately for pH, using a pH meter (EIL).

2. Ammonia and volatile fatty acids concentrations:

The zero rate of *in vitro* technique (Carrol and Hungate, 1954) was applied for measuring values of ammonia and volatile fatty acids (VFA) production. For incubation, rumen fluid samples were collected from the male lambs using a stomach tube at 0, 3, and 6 hours after feeding in jars, (500 ml) immersed in large beaker containing water at 39 ^{0}C.

Samples were flushed with CO_2 during the collection time, closed with a tightly fitting rubber with an outlet bunsen valve and incubated at 39^{0}C in a thermostatically controlled water bath. Each sample composed of two thirds fibrous material and one third liquid (El-Shazly and Hungate, 1965).

At zero time two sub-samples were poured into another jars containing formalin (1ml/100gm rumen contents) and swirled vigorously to stop metabolic activity. One of these samples was used to estimate concentration of ammonia and VFA, while the other was used to determine the dry matter percentages in the rumen contents.

After one hour of fermentation of the rumen contents, jars were treated with formalin as described before. For estimation of ammonia and VFA production, rumen samples (at 0 and 1 hour after feeding) were strained through cheese cloth. One hundred ml aliquots of rumen liquor were deproteinized using sulfuric acid (100 ml 0.1 N) and volume was completed to 500 ml in a volumetric flask to be filtered. The supernatant was used for determination of ammonia nitrogen using MGO distillation method (Al - Rabbat *et al.,* 1971). VFA's estimations were done by distillation as described by Warner (1964).

3. Ruminal individual VFA's:

The individual VFA's (acetic, propionic and butyric acids) were determined by Kanaur Higher performance liquid chromatography (HPLC, pump 64,U.V. detector, Germany, Kanaur Instrument).

4. Microbial protein:

Microbial-N synthesized in the rumen was calculated by multiplying the truly digested organic matter (DOM) by 19.3 according to Czerkawski (1986). True DOM was calculated assuming that 0.65 of the apparently DOM was fermented in the rumen (ARC, 1984).

Statistical analyses:

Statistical analysis was carried out using SAS program (SAS 1988). Multiple range tests were used to compare the effect of different treatments in the study (Duncan 1955.) Analysis of variance of repeated measurements and least square means were used to test the effect of time on ruminal fluid parameters.

RESULTS AND DISCUSSION

Diets and voluntary intake

Concentration of CP in the diets was slightly higher when higher level of whole cottonseed (SWCS) was included (Table 2). Neutral detergent fiber (NDF) concentration of the diets increased as greater proportion of WCS replaced soybean meal and yellow corn. This increase was due to NDF concentration of SWCS being much higher than that in soybean meal and ground corn. Addition of SWCS increased dietary ether extract.

Dry matter intake (DMI) decreased linearly with increasing SWCS level in the diet (17.81 % with 24 % SWCS) (Table 3). There was a sharp numerical increase in NDF intake at the 16% WCS level followed by other diets. The same trend was observed for intake of ADF, hemicellulose and cellulose. This may be due to a decrease in the digestibility of NDF with an increase in EE concentration of the diet (Table 4).

The decrease in DMI observed in this study is in agreement with the results of Moore *et al.*, (1994), who fed 0,7,14, and 21.7% WCS to ewe lambs (31 kg BW). Similar results were shown by Coppock *et al.* (1985) who pointed out a significant linear depression in DMI per unit of body weight and unit of metabolic body size as WCS increased from 0 to 30% of the diet. The depression in percentage in DMI was 10.7% as WCS increased from 0 to 30%. But the results of Karalazos *et al.* (1992), was in contrast to the results of the present study, since they reported similar DMI when feeding rams (60 kg

BW) 0, 17.5, 35.5, and 53.0% WCS. However, a part from the animal class, forage type and dietary fiber level may influence DMI.

Table (3): Feed intake of mixed diets containing different levels of whole cottonseed.

Item	0	8	16	24
Feed intake, (g DM/h/d)	$1020.6^{a}\pm43.09$	$939.4^{b}\pm19.17$	$993.1^{a}\pm24.13$	$838.8^{c}\pm34.50$
NDF intake, (g/h/d)	$428.8^{b}\pm14.79$	$422.7^{b}\pm4.04$	$476.9^{a}\pm11.59$	$426.5^{b}\pm14.32$
ADF intake, (g/h/d)	$305.5^{b}\pm10.53$	$299.6^{b}\pm4.99$	$336.4^{a}\pm8.17$	$299.6^{b}\pm10.06$
ADL intake, (g/h/d)	$22.45^{c}\pm0.78$	$30.06^{b}\pm0.50$	$40.81^{a}\pm0.99$	$39.09^{a}\pm1.31$
Hemicellulose intake (g/h/d)	$123.4^{b}\pm4.25$	$123.1^{b}\pm2.05$	$140.5^{a}\pm3.42$	$126.8^{b}\pm4.29$
Cellulose intake (g/h/d)	$283.0^{ab}\pm9.76$	$269.5^{bc}\pm4.49$	$295.5^{a}\pm7.18$	$260.5^{c}\pm8.75$
*TDN intake (g/h/d)	$688.8^{a}\pm46.98$	$614.9^{ab}\pm6.30$	$688.6^{ab}\pm15.70$	$568.9^{b}\pm18.71$
*DCP intake (g/h/d)	$109.4^{a}\pm6.91$	$102.2^{ab}1.95\pm$	$111.6^{ab}\pm2.84$	$88.26^{b}\pm2.45$
Free gossypol intake Mg/kg BW^{-1} d^{-1}	0.00	$19.64^{C}\pm0.21$	$42.48^{B}\pm1.03$	$52.95^{A}\pm1.44$

*** See table (4).**

a,b,c&d: Means in the same row with different superscripts are significantly different (P> 0.05).

A,B &C: Means in the same row with different superscripts are significantly different (P> 0.01).

The decrease in intake with increase in SWCS content and the consequent increase in their EE contents, agree with the results of Hawkins *et al.* (1985), Coppock *et al.* (1985). This may be due to a decrease in the digestibility of NDF with an increase in EE concentration of the diets.

Free gossypol intake, calculated from free gossypol analysis of SWCS, increased ($P<0.01$) and exceed the upper safe limit of 30 mg-kg $BW^{-1}.d^{-1}$, as reported by Calhoun *et al.* (1990), at the 16 and 24% SWCS level.

Diets digestibility:

Apparent digestibility coefficients of DM, OM, and CP decreased with increasing SWCS level, but without significant effect (Table 4).

These results are in agreement with those obtained by Coppock *et al.* (1985), who found a small decline in digestibility of DM with increasing SWCS in the diet. They referred the decline in DM digestibility to an erratic and incomplete recovery of chromic oxide associated with the limited cottonseed.

Higher ($P<0.05$) increase in NFE, ADF, ADL, hemicellulose and cellulose digestibility were observed with 16% SWCS level. Cellulose digestibility increased up to 16% SWCS level followed by a sharp decrease at 24%SWCS by about 9.77 % this could reflect the less digestion of NFE in the same diets. Increasing the proportion of SWCS had only effect on lignin at 24% SWCS level. Similar results were reported for lambs by Moore *et al.* (1994). Apparent digestibility of ether extract was low ($P<0.01$) for the control diet. Addition of SWC resulted in higher increase ($P<0.01$), most likely because of the increase in fatty acids as a proportion of total dietary ether extract. Coppock *et al.* (1985) speculated that increased ether extract digestibility was due to dilution of metabolic fecal fat with the high true digestibility of fat from SWCS.

Table (4): Digestibility coefficients and nutritive values of diets containing different levels of screening whole cottonseed.

Item	Level of screening whole cottonseed, %			
	0	8	16	24
DM	69.20±1.93	66.28±0.48	70.15±2.95	66.84±1:02
OM	72.69±2.05	70.20±1.02	71.05±1.53	68.61±0.96
CP	73.72±1.62	73.57±1.96	74.20±2.18	70.25±1.48
CF	68.56^{a}±1.76	66.50^{a}±1.03	65.30^{ab}±2.45	58.86^{b}±1.80
EE	67.14^{C}±1.61	74.53^{B}±0.68	80.13^{A}±1.41	81.72^{A}±1.71
NFE	77.44^{a}±0.26	70.47^{b}±1.65	71.06^{b}±0.21	71.99^{b}±0.91
NDF	67.04^{a}±1.81	65.87^{ab}±0.97	70.67^{a}±2.16	61.52^{b}±1.23
ADF	71.30^{b}±0.34	70.11^{b}±0.23	73.50^{a}±1.62	63.81^{c}±0.60
ADL	49.18^{b}±2.10	44.74^{b}±2.02	54.17^{a}±3.34	48.34^{b}±2.12
Hemi-cellulose	57.86^{b}±0.31	58.94^{b}±0.16	63.90^{a}±3.45	62.43^{a}±1.12
Cellulose	73.30^{b}±0.27	73.01^{b}±0.09	76.17^{a}±1.45	66.14^{c}±0.37
DCP%	10.70±0.45	10.88±0.39	11.26±0.33	10.54±0.49
TDN%	67.35^{b}±2.12	66.52^{b}±1.95	72.70^{a}±1.82	67.87^{b}±2.25

a,b&c: Means in the same row with different superscripts are significantly different (P> 0.05).
A,B&C: Means in the same row with different superscripts are significantly different (P> 0.01).

The increased digestibility of EE (19.3 and 21.8%) with 16 and 24%SWCS can be attributed to dilution of the metabolic fecal fat with a dietary fat of high true digestibility.

Responses in most nutrients digestibility coefficients in this results were comparable to those observed in Boergset by Liginnbuhl *et al.* (2000); in castrated rams by Nitas and Karalazos (1997); in ewe lambs by Moore *et al.* (1994) and in crossbred rams by Nitas *et al.* (1997) when using different proportions of SWCS in the diet.

Decreased ruminal fiber digestion was observed in this study; however, this was evidenced by lower acetate: propionate ratio (Table 6). This was confirmed also by Zervas *et al.* (1990) and Arieli (1992). Devendra and Lewis (1974) have described a possible mechanism whereby fat inclusion at high levels depressed the attachment of ruminal microorganisms to fiber, and thus decreased fiber digestion by creating a hydrophobic barrier on the fibrous feedstuffs. Later, Palmquist (1995) demonstrated that extraction of ether extract enhanced digestibility of cotton lint fiber by removing a hydrophobic layer present in lint surface, thus allowing water to hydrate the cell wall more rapidly for cellulolysis. Contrast results were reported by Smith *et al.* (1981) who pointed out no depression in fiber digestibility with up to 25% SWCS in 50% alfalfa hay diet which would be equivalent to approximately 5% added fat.

Nitrogen utilization and rumen function:

Diets containing 0 and 16% level of SWCS showed more nitrogen intake (NI), digested nitrogen (ND) and nitrogen balance (NB) (Table 5).

This may have allowed for better development of rumen flora and the fermentation process. Addition of SWCS up to 24%SWCS level, resulted in less ($P<0.05$) utilization of dietary nitrogen. This is expected as less N available N from less DMI. However, nitrogen utilization (NB/NI or NB/ND) was higher ($P<0.05$) for both the control diet and that contained 16% SWCS. This can be explained by the higher ($P<0.05$) rumen ammonia-nitrogen and VFA concentrations for the control diet (Table 6), but not for that contained 16 % SWCS. Less NH_3-N and VFA were observed for SWCS containing diets. More acetic, less ($P<0.05$) propionic and high ($P<0.05$) acetic to propionic ratio were also observed. Similar results were reported by Zinn and Plascenia (1993), who found that VFA profiles were not affected ($P<0.01$) by SWCS.

Table (5): Nitrogen utilization of fed mixed diets containing different levels of screening whole cottonseed, fed to sheep.

Item	Level of screening whole cottonseed%			
	0	8	16	24
Nitrogen intake (NI) (g/h/d)	$23.69^{a}\pm0.99$	$22.23^{b}\pm0.45$	$24.11^{a}\pm0.59$	$20.13^{c}\pm0.83$
Fecal-N (FN) (g/h/d)	6.20 ± 0.14	5.88 ± 0.34	6.24 ± 0.79	6.01 ± 0.52
N digested (ND) (g/h/d)	$17.50^{a}\pm1.10$	$16.34^{ab}\pm0.32$	$17.87^{a}\pm0.45$	$14.13^{c}\pm0.39$
Urinary nitrogen (g/h/d)	7.49 ± 0.78	7.700.37±	7.76 ± 0.39	7.38 ± 0.69
Nitrogen balance (g/h/d)	$10.01^{ab}\pm0.35$	$8.47^{b}\pm0.52$	$10.11^{a}\pm0.73$	$6.75^{c}\pm0.31$
NR/NI, %	$42.28^{ab}\pm0.74$	$38.83^{c}\pm1.57$	$41.97^{bc}\pm3.15$	$33.71^{d}\pm2.74$
NR/ND, %	$57.43^{a}\pm1.79$	$52.84^{a}\pm2.59$	$56.35^{a}\pm2.67$	$47.95^{b}\pm3.56$

a,b,c &d : Means in the same row with different superscripts are significantly different ($P>0.05$).

Table (6): Effect of feeding diets containing different levels of screening whole cottonseed on fermentation in the rumen.

Item	Level of screening whole cottonseed %			
	0	8	16	24
pH	6.69 ± 0.21	6.80 ± 0.19	6.67 ± 0.04	6.66 ± 0.15
NH_3-N,mg/100ml	$13.97^{a}\pm0.61$	$12.74^{a}\pm1.07$	$10.11^{b}\pm0.53$	$10.10^{b}\pm0.76$
Total VFA,s, m equ./100 ml	$17.80^{a}\pm0.94$	$13.60^{b}\pm0.82$	$13.38^{b}\pm1.16$	$13.96^{b}\pm1.29$
Acetic (AC.)	44.07 ± 2.19	42.22 ± 1.19	40.74 ± 1.87	40.07 ± 1.96
Propionic (Prop.)	$42.29^{b}\pm1.65$	$43.63^{ab}\pm1.59$	$43.94^{ab}\pm1.94$	$45.14^{a}\pm1.59$
Butyric	35.33 ± 1.63	35.46 ± 2.26	32.81 ± 1.32	34.64 ± 1.02
AC./Prop. ratio	$1.05^{a}\pm0.96$	$0.97^{a}\pm0.04$	$0.93^{b}\pm0.03$	$0.89^{b}\pm0.61$

a& b : Means in the same row with different superscripts are significantly different ($P>0.05$).

Contrast results were reported by Horner *et al.* (1988) who reported that SWCS increased acetate and decreased propionate. The later acetic/propionic ratio (Table 6) was evidence for the more CF digestibility of the control diet, followed by that which had lower level of SWCS (8%) compared to those containing higher level of SWCS (Table 4).

Microbial protein synthesis, weight gain and feed efficiency:

The calculated microbial protein synthesis (MP) indicated that as the level of SWCS proportion increased MP synthesis decline (Table 7).

Table (7): Calculated MP synthesis as affected by level of screening whole cottonseed.

Diets	Microbial protein production (g/h/d)
0 %	$52.55^{a} \pm 3.59$
8 %	$46.41^{b} \pm 0.51$
16 %	$46.02^{b} \pm 1.15$
24 %	$40.54^{c} \pm 1.23$

a,b & c: Means in the same row with different superscripts are significantly different (P> 0.05).

Table (8): Performance of Ossimi lambs fed diets containing different levels of screening whole cottonseed (means±SD).

Item	Level of screening whole cottonseed %			
	0	8	16	24
Initial body weight (Kg)	22.88±1.92	22.67±1.83	22.93±2.05	22.77±1.89
Final body weight (Kg)	43.622.98±	42.25±2.52	42.15±2.59	39.88±2.52
Total body gain (Kg)	$20.74^{a}\pm1.11$	$19.58^{a}\pm0.82$	$19.22^{ab}\pm0.67$	$17.11^{b}\pm0.57$
Daily gain (Kg/h/d)	$0.171^{a}\pm0.01$	$0.162^{a}\pm0.01$	$0.159^{ab}\pm0.01$	$0.141^{b}\pm0.01$
Feed consumption (Kg DM/h/d)	$1.021^{a}\pm0.04$	$0.939^{ab}\pm0.02$	$0.993^{ab}\pm0.02$	$0.839^{b}\pm0.03$
Feed efficiency:				
(Kg DM/Kg gain)	5.97±0.25	5.80 ±0.12	6.25 ±0.15	5.95 ±0.22
(Kg DCP/Kg gain)	0.639±0.04	0.630±0.12	0.701±0.02	0.626±0.02
(Kg TDN/Kg gain)	4.03±0.33	3.80±0.04	4.33±0.10	4.03±0.13
Cost of Kg DM feed (L.E)	0.621	0.589	0.562	0.516
Economic efficiency (Cost of DM/Kg gain)	3.71	3.41	3.51	3.07

a & b : Means in the same row with different superscripts are significantly different (P> 0.05).

This may be due to less efficient capture of ruminal ammonia as a result of a decrease of ruminaly degradable carbohydrates such as starch, which reflect MP synthesis, or due to reduced microbial growth resulting from toxic effects of polyunsaturated fatty acids on ruminal flora (Zinn and Plascencia, 1993).

It was noticed that as the level of SWCS increased in the diet, ADG decreased and reached lower (P<0.05) value for 24%SWCS level (Table8). This finding was in agreement with that of Moore *et al.* (1994), who reported even lower ADG in ewe lambs fed four diets containing either 0,7,14,or 21% SWCS. On the other hand, Bird *et al.* (1987) indicated that addition of SWCS to oaten chaff diets fed to sheep resulted in a low production response.

In the same manner, Luginbuhl *et al.* (2000) reported lower ADG of goats as a results of addition of SWCS in the diets i.e. 99.2, 88.0, 82.8 and 67.3 (g/h/d) for 0, 8, 16 and 24% SWCS levels respectively, not only but it was even lower compared to ADG from similar weanling grazing alfalfa (168 g/d) or triticale (145g/d) as the sole source of feed. However, lambs fed diet containing 8 SWCS level had shown better (P<0.05) feed efficiency (gain/feed) compared to those either contained 16 or 24% SWCS level or nil SWCS (control). However, the difference was not statistically significant. From the economic point of view, it was also the economically most efficient one.

Conclusion:

From the previous results, it could be noted that incorporation of SWCS in lambs diets up to 16% improved NFE, ADF, ADL, hemicellulose and cellulose, reflecting higher (P<0.05) N intake, digested and utilization, comparable feed consumption and feed efficiency ratio, and without significant (P<0.05) hazard effects in comparison with the control groups. From the economic point of view, incorporation up to 24% SWCS level in the diets was accepted; however, 16% SWCS level could be suggested as a safety level for local lamb diets.

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تأثير استخدام مستويات مختلفة من نواتج غربلة بذور القطن على معدلات تناول الغذاء والهضم وأداء الحملان المغذاه على علائق تعتمد على الدريس كمكون رئيسي.

ناصر عطية مهدي سليمان
معهد بحوث الانتاج الحيواني – مركز البحوث الزراعية– وزارة الزراعة.

الهدف الرئيسي من هذه الدراسة هو تحديد النسبة المثلى من نواتج غربلة بذور القطن والتي يمكن احلالها محل كسب فول الصويا والذرة في علائق الحملان النامية.

حيث استخدم في هذه الدراسة ٢٤ من ذكور الحملان الاوسيمي بمتوسط وزن ٢٢ كجم وعمر اربعة أشهر –قسمت عشوائيا الى اربعة مجاميع غذائية– متساوية في محتواها من البروتين والطاقة (١٤% بروتين خام و ٦٤% مركبات كلية مهضومة) طبقا لمقررات NRC ١٩٨٥ .

اعتمدت العلائق في تركيبها الاساسي على دريس البرسيم كمادة اساسية– وان اختلفت فيما بينها في نسبة بذور القطن الناتجة من الغربلة . حيث اشتملت على ٠ ، ٨ ، ١٦ . ٢٤ بدلا من كسب فول الصويا والذرة. وقدمت العلائق المراد اختبارها للحيوانات لتتغذى عليها تغذية حرة في تجربة استمرت لمدة ١٢١ يوما تبعها تجربة تقييم غذائي.

وقد أظهرت النتائج ما يلي:

أدى زيادة مستوى نواتج غربلة بذور الطن في العليقة الى انخفاض معدلات الاكل والنمو. كما اظهرت العليقة المحتوية على ٢٤ % بذور قطن أحسن كفاءة اقتصادية.

أظهرت النتائج ان زيادة مستوى بذور القطن فى العليقة ادى الى انخفاض معاملات هضم المادة الجافة والمادة العضوية والبروتين الخام وبدون اختلافات معنوية. بينما اظهرت النتائج زيادة معنوية عند مستوى (٠,٥ %) في معامل هضم مستخلص الاثير وكان اعلى معامل هضم في العليقة المحتوية على ١٦% و ٢٤% بذور القطن مقارنة بباقي العلائق.

وقد استخلص من هذه الدراسة ان المستوى ١٦% من بذور القطن هو المستوى الآمن عند تغذية الحملان المحلية عليها.