EFFECT OF USING DIFFERENT LEVELS OF MUSHROOM CULTIVATION SPENT IN AWASSI LAMBS RATIONS ON SOME PRODUCTIVE TRAITS

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ABSTRACT

This study was conducted to investigate the ability of using mushroom cultivation spent (MCS) in different levels instead of barley in Awassi lambs ration and their effects on productivity characteristics. Multi reproductive cycle of *Pleurotus ostreatus* mushroom spent quantities were collected from Agriculture College /Tikrit's university mushroom farm before dried and mixed with rations. Thirty five locally Awassi male lambs aged 5.5/6.5 months with initial weight of 30±0.39 kg were allocated for five treatments with seven lambs each treatment and distributed to individual cages, treatments was as follow: treatment one T1 (control treatment), treatment two T2 (5% of MCS), treatment three T3 (10% of MCS), treatment four T4 (15% of MCS) and treatment five T5 (20% of MCS). Percentage use of barley was minimized for each treatment rations in order to maintain a fixed percentage of protein (14%). Wheat straw was provided *ad libitum* as a roughage diet for each treatment lambs for the whole study period while concentrate diet was provided for each treatment lambs by 3% of live body weight for the whole study period also which was seventy days. During and after finishing the study, several measurements were taken. The results show significant reduction ($p \leq 0.05$) in each final weight, daily and weekly average weight gain, feed conversion ratio, hot carcass weight and dressing percentage for treatments T4 and T5 while no effect was record for MCS treatments on each average feed consumption, external and internal offal's percentage weight. As a result we can conclude that it is able to use mushroom cultivating spent (MCS) instead of barley in Awassi lambs ration within 15% without any negative effects.

Keywords:Mushroom Cultivation Spent, productive traits, Awassi lambs.

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تأثير استخدام مخلفات زراعة الفطر الغذائي بمستويات مختلفة مع العليقة في الصفات الانتاجية للحملان العواسي

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المستخلص

اجري البحث لمعرفة امكانية استخدام مخلفات زراعة الفطر الغذائي في علائق الحملان العواسي بمستويات مختلفة كاحلال بدل الشعير وتأثيرها في الصفات الانتاجية. تم جمع مخلفات زراعة الفطر المحاري *Pleurotus ostreatus* من مزرعة الفطر التابعة لكلية الزراعة/ جامعة تكريت ولعدة دورات زراعية ثم جففت وخلطت مع علائق التجربة. استخدم في البحث 35 حمل عواسي محلي بعمر 6.5/5.5 شهر وبمعدل وزن ابتدائي 30±0.39 كغم قسمت الى 5 معاملات بواقع 7 حملان لكل معاملة وزعت على اقفاص فردية وكانت المعاملات كالاتي: المعاملة الاولى T1 معاملة السيطرة بدون احلال، المعاملة الثانية T2 احلال 5% مخلفات، المعاملة الثالثة T3 احلال 10% مخلفات، المعاملة الرابعة T4 احلال 15% مخلفات والمعاملة الخامسة T5 احلال 20% مخلفات. تم خفض نسبة استخدام الشعير في علائق الاحلال وتعديل نسب استخدام باقي المكونات للمحافظة على نسبة بروتين 14% لكافة العلائق. قدم تبن الحنطة بصورة حرة للحملان فيما قدمت العلائق المركزة بنسبة 3% من وزن الجسم ولطيلة فترة البحث البالغة 70 يوما. خلال فترة البحث وبعد الانتهاء منه تم اخذ عدة قياسات لمعرفة تأثير المعاملات. اظهرت النتائج حصول انخفاض معنوي ($P \leq 0.05$) لمعاملات الاحلال T4 و T5 لصفات الوزن النهائي ومعدل الزيادة الوزنية اليومية والكلية وكفاءة التحويل الغذائي ووزن الذبيحة الحار ونسبة التصافي فيما لم يكن لمعاملات الاحلال تاثير معنوي في معدل استهلاك العلف والاوزان النسبية لمخلفات الذبح الخارجية والداخلية. يمكننا استنتاج امكانية احلال مخلفات مزرعة الفطر الغذائي في علائق الحملان العواسي بنسبة 15% فما دون بدل الشعير من دون تأثيرات سلبية.

الكلمات المفتاحية: مخلفات زراعة الفطر، صفات انتاجية، حملان عواسي.

INTRODUCTION

Large quantities of grain cultivation remnants like straw is producing in Iraq due to vast areas of lands that cultivate with cereal crops such as wheat and barley which constitute the major crops country food security depends on. Wheat straw is one of the important roughage types which consider the main feed in ruminant nutrition because of its bulky nature and either because of ruminant's ability of benefit this type of food due to the presence of microorganisms in rumen which help those animals to get on their needs by breaking down roughages by microorganisms enzymes. Because of low nutritional value as a result of highproportion of lignocellulose complexes in thathay, so microorganism (such as bacteria, protozoa and fungi) enzymes is insufficient to break down all that complexes effectively (1). In order to break down lignocellulose complexes and release cellulose to enhance hay's nutritional value as a ruminant feed, many methods has been followed such as solid-state fermentation (2) and other biological treatments(3) as well as physical and chemical treatments (4). Hay is using after mixing with poultry waste and each calcium and nitrogen sources as a mushroom cultivation media whichspread in the past several decades in various countries (5). This media must get rid of it after several reaping of mushroom and replace with another new media which leads to the accumulation of large amount of that media as a waste. Oei(6) refer that each one ton of mushroom product leaves two tons of waste which is used as a fertilizer or be burned leading to increase production costs as a result of the accumulation of such waste. On the other hand, using of hay as a cultivation media enhance its nutritional value, where Fazaeli and Shafeyi (7) noticed that each crude protein percentage improved and crude fiber percentage go down for the cultivation media spent comparing with raw hay that use to made that media. This different may be a result of adding nitrogen sources and fungal residues (8)or a resultof microorganisms enzymes (9) which make cultivation media spent one of the good and cheap by products materials that can used as a proper alternative feed in ruminants nutrition. These points encouraged us to makethis study which investigates the ability of using mushroom cultivating spent (MCS) in different levels instead of barley in Awassi lambs ration and their effects on productivity characteristics.

MATERIALA AND METHODS

Mushroom cultivation spent (MCS) (*Pleurotusostreatus*) were collected from Agriculture College /Tikrit's university mushroom farm after Multi reproductive cycle mushroom reap,then dried under sun rays and crushed with straw crusher then a sample for chemical analysis taken before kept the whole dried MCS in nylon bags until used it with rations. Thirty five locally Awassi male lambs aged 5.5-6.5 months with initial weight of 30±0.39 kg were allocated for five treatments with seven lambs each treatment which was as follow: treatment one T1 control treatment (without MCS), treatment two T2 (5% of MCS), treatment three T3 (10% of MCS), treatment four T4 (15% of MCS)and treatment five T5 (20% of MCS). Percentage use of barley was minimized for each treatment rations in order to maintain a fixed percentage of protein (14%) (Table 1), Mixture of salts, vitamins and minerals were added by 1% to each treatment ration without introducing them into the ration formation percentages.

Table 1. Treatment ratios content and percentages used and replacement

Feed stuff	Crude protein* (CP) %	Control treatment T1		5% MCS treatment T2		10% MCS treatment T3		15% MCS treatment T4		20% MCS treatment T5	
		Use	CP	Use	CP	Use	CP	Use	CP	Use	CP
		%		%		%		%		%	
Crushed barley	11	52	5.72	44	4.84	37	4.07	29	3.19	20	2.21
Crushed yellow corn	9	25	2.25	25	2.25	23	2.07	21	1.89	21	1.89
Soybeans	44	8	3.52	8	3.52	8	3.52	8	3.52	8	3.52
Wheat bran	17	15	2.55	18	3.06	22	3.74	27	4.59	31	5.27
MCS**	5.6	0	0	5	0.28	10	0.56	15	0.84	20	1.12
Total		100	14	100	14	100	14	100	14	100	14

*** Based on dry matter** Mushroom cultivation spent**

Treatment lambs were distributed to individual cages 1.75×1.25m each cage contain two portable plastic feeders for each concentrate and roughage feed, it also contain portable water pail and mineral salts block. Each lambwere subjected to introductory period for two weeks before start the study to accustom the lambs to the cages and feed providing style.Routinely veterinary treatments table were followed in this period for all of the lambs. At the end of this period, weight of each lamb was taken by small ruminant electronic scale.That weight was the primary weight, and then the lambs were individual to cages and treatments by the weight. Wheat straw was provided *ad libitum* as a roughage diet for each treatment lambs for the whole study period while concentrate diet was provided for each treatment lambs by 3% of weekly live body weight for the whole study period also which was seventy days. Feed intake was taken at eight AM daily by previous feed residual quantities measurement At the end of the study lambs final weight were taken, then the lambs were slaughteredand each hot carcassesweight, external and internal offal weights were recorded. Statistical analysis was conducted to investigate treatments effect on different measurements by statistical analysis program (SAS) (10) with completely randomized design (CRD) then differences between the averages were compared by Duncan polynomial test(11).

RESULTS AND DISCUSSIONS

Table (2) shows the effect of different treatments on initial, final weight and average weight gain. We can notice no significant differences between the control treatment T1and MCS treatments T2 and T3 of each final weight, average daily and totally weight gain, while those measurements were decline significantly (P≤0.05) with MCS treatments T4 and T5 when compare with each control treatment and MCS treatments T2 and T3 except in final weight.

Table 2. Effect of different treatments on initial, final weight and average weight gain (Mean±SE) in Awassi lambs

Treatments	Parameters			
	Initial weight (kg)	Final weight (kg)	Average daily weight gain (gm)	Total weight gain (kg)
Control T1	31.13± 2.04	45.37 ± 2.05a	0.20± 0.01a	14.24 ± 0.98a
5% MCS T2	29.69± 0 .72	42.0 ± 1.35ab	0.18± 0.02a	12.31 ± 1.22a
10% MCS T3	29.76 ± 1.94	42.57 ± 1.40ab	0.18± 0.01a	12.81 ± 0.96a
15% MCS T4	30.74 ± 1.56	38.30 ± 0.77b	0.11± 0.01b	7.56± 0.67b
20% MCS T5	30.73± 1.42	39.53 ± 1.58b	0.12 ± 0.02b	8.80± 1.21b

Different letters within column refer to significant differences (P≤0.05) between means.

Table (3) shows the effect of different treatments on daily and total average concentratefeed intake, feed conversion ratio, hot carcass weight and dressing percentage. We can notice no significant effect for different treatments on each daily and totally feed intake while their effects on the other measurements were similar to the previous table, as the control treatment T1 was outperformed significantly (P≤0.05) the MCS treatments T4 and T5, in the same time there were no significant differences between the control treatment T1 and other MCS treatments T2 and T3. Tables (4) and (5) show the effect of different treatments on external and internal offal percentage weight. Results revealed that there were no significant differences between control treatment T1 and treatments T2, T3, T4 andT5 for all weights.

Table 3. Effect of different treatments on daily and total average concentrate feed intake, feed conversion ratio, hot carcass weight and dressing percentage (Mean±SE) in Awassi lambs

Treatments	Parameters				
	Average daily concentrate feed intake (kg)	Average total concentrate feed intake (kg)	feed conversion ratio (kg feed/kg weight gain)	Hot carcass weight (kg)	Dressing percentage based on slaughtering weight (%)
Control T1	1.03± 0.06	71.84 ± 4.44	5.05± 0.55c	22.64 ± 1.09a	48.72 ± 0.58a
5% MCS T2	0.99± 0.05	69.11± 3.67	5.61 ± 0.71bc	20.40 ± 0.86ab	47.35± 0.72a
10% MCS T3	1.02 ±0.05	71.56 ± 3.39	5.77 ± 0.86bc	20.59± 0.65ab	47.91 ± 0.58a
15% MCS T4	1.04± 0.03	72.73± 1.93	9.62 ± 1.05a	18.08 ± 0.45bc	45.32 ± 0.55b
20% MCS T5	1.05± 0.04	73.77± 2.72	8.89 ± 1.46ab	17.21± 1.02c	43.49 ± 0.70c

Different letters within column refer to significant differences (P≤0.05) between means

Table 4. Effect of different treatments on external offal percentage weight (Mean±SE) in Awassi lambs

Treatments	Parameters		
	Head (%)	Legs (%)	Wool (%)
Control T1	6.26 ± 0.06	2.22 ± 0.09	9.82 ± 0.24
5% MCS T2	6.79 ± 0.18	2.27 ± 0.06	9.12±0.17
10% MCS T3	6.51±0.19	2.40 ± 0.11	10.20± 0.42
15% MCS T4	7.05± 0.15	2.34 ± 0.05	9.83 ± 0.34
20% MCS T5	7.03± 0.19	2.35 ±0.09	9.52± 0.36

Table 5. Effect of different treatments on internal offal percentage weight (Mean±SE) in Awassi lambs

Treatments	Parameters					
	Heart (%)	Liver (%)	Kidneys %)	Spleen (%)	Testes (%)	Rumen (%)
Control T1	0.41± 0.09	3.47± 0.07	0.25 ± 0.005	0.15±0.01	0.70 ± 0.05	5.04 ± 0.25
5% MCS T2	0.40 ± 0.05	3.32 ± 0.04	0.23 ± 0.009	0.20±0.02	0.66 ± 0.06	5.13± 0.17
10% MCS T3	0.39± 0.1	3.21± 0.07	0.22 ± 0.03	0.19± 0.02	0.73 ± 0.08	5.12±0.21
15% MCS T4	0.42 ± 0.08	3.20± 0.08	0.24± 0.006	0.19± 0.04	0.77 ± 0.08	5.65±0.15
20% MCS T5	0.42 ± 0.06	3.04±0.10	0.26 ± 0.02	0.17± 0.02	0.66 ± 0.06	5.72±0.29

These results is agree with the results ofFazaeli and Shafeyi (7) which noticed decrease in each final weight, daily and totally weight gain and feed conversion ratio for Iranian locally lambs when increase mushroom cultivation spent ratio percentage. Researchers illustrated the reasons of this decline by each reduction occur in organic matter percentage and increase in ash percentage in ration with high percentage of spent which all due to microorganisms impact. That results is also agree with the results of Fazaeli et al(12) which illustrate that the reduction occur in organic matter percentage and increase in ash percentage in ration with high percentage of spent may effect on total dry matter intake which effect reproductive characteristics negatively. Also Phan and Sabaratnam (13) were illustrated that the phenol compounds that resultant from lignin degradation by fungal enzymes may have negative effects on digestion process. These results is disagree with the results of Al-Mashhadany (14) which noticed non-significant increase in characteristics above when adding mushroom cultivation spent to fattening lambs ration, that increase may due to the protein percentage increase and lambs spent ration palatability. From the above and in general we can conclude that both reduction in organic matter percentage and increase in ash percentage which due to microorganisms action and fungal enzymes in cultivation media led to decrease in lambs final weight when use high percentage of MCS (T4 and T5 treatments), that decrease was a result of daily and totally weight gain decrease which also related with feed conversion ratio deterioration especially with the lack of significant differences in feed intake between treatments. Low final weight of treatments T4 and T5 have its negative effect on both carcass weight and dressing out percentage, but there is ability to replace MCS instead of barley within 15% in lambs ration due to its cheapen and the absence of negative effects.

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