

## Effect of treatment of wheat straw with *Pleurotus florida* on feed intake, digestibility and body condition score in ewes

M. M. Sharifi Hosseini\*, O. Dayani and R. Tahmasbi

Department of Animal Science, Faculty of Agriculture, Shahid Bahonar University of Kerman, Kerman, Iran.

\* Corresponding author, E-mail address: mmsharifih@gmail.com

**Abstract** This experiment was carried out to compare the effects of treated and untreated wheat straw with *Pleurotus florida* on ewe feed intake, nutrient digestibility, and ewe body condition score (BCS) after parturition. Thirty Kermani ewes with an average weight of  $48 \pm 3.05$  kg and about four years old were used in this experiment. Synchronization of estrus in sheep has been achieved with the use of intravaginal sponges containing synthetic progestagens. Sixty days before parturition, ewes were randomly assigned to three diets: 1) control (50% untreated wheat straw), 2) 50% treated wheat straw before harvesting the fungi, 3) 50% treated wheat straw after harvesting the fungi. The energy and CP content of the experimental diets were 2.1 Mcal and 11.0%, respectively, and Ca:P ratio was 1.8. Dry matter intake (DMI) and organic matter intake (OMI) were affected by the experimental diets ( $P < 0.05$ ). These values were higher for diets containing treated wheat straw before and after harvesting fungi than the control diet. Coefficients of DM and OM digestibility were higher ( $P < 0.05$ ) in diets containing treated wheat straw before and after harvesting fungi. However, CP, NDF and ADF digestibility were not affected by the diet ( $P > 0.05$ ). The ewe body weight and body condition score (BCS) postpartum were not affected by experimental diets. At the beginning of experiment, there was a negative correlation between lamb birth weight and ewe body weight and BCS  $> 4$  had lighter lambs ( $P < 0.05$ ). In this experiment it is showed that moderate BCS of ewe had positive effect on lamb body weight (BW) which indicated that there was a positive effect of moderate BCS on lambs BW. Treated wheat straw with *Pleurotus florida* increased digestibility coefficients of DM and OM; however, the increase in digestibility was not large enough to affect the ewe BW and BCS, and the birth weight of lambs.

**Keywords:** wheat straw; ewe; fungi; *Pleurotus florida*

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### Introduction

Several physical and chemical treatments have been proposed to improve the degradability of wheat straw and subsequent feed intake by cattle and sheep. However, safety concerns, cost, and potentially negative environmental impacts limit their application (Raghuwanshi et al., 2014). The use of white-rot fungi has received much attention in improving the nutritive value of straw (Samsudin et al., 2013). The ruminal fungi produce laccase, cellulase, xylanase and glucosidase enzymes to degrade lignocellulosic compounds and utilize the released sugars (Anderson et al., 1998; Taniguchi et al., 2005; Fazaeli, 2007).

During the second half of pregnancy the weight of conceptus increases linearly. At 8, 4 and 2 weeks before parturition, fetal weight increases up to 25, 50 and 85% of the lamb birth weight (Robinson, 1990). In addition, 80% of the fetal growth occurs during the last 2 months

of pregnancy, leading to a significant increase in nutrient requirements of the ewes (Bell, 1995). Therefore, proper feeding during the second half of pregnancy has an important role in udder development, and adequate nutrient retention in the body which are essential for production of milk to support lamb growth and wellbeing after parturition. The practice of feeding ewes adequately during late pregnancy and lactation to ensure that fetal and neonatal growth is not seriously compromised will help to optimize lamb performance. Increasing the birth weight of lambs by nutritional supplementation of ewes during mid or late pregnancy reduced lamb mortality (Lynch et al, 1990; Kelly et al, 1992), and increased colostrum and milk production (Murphy et al., 1996; Banchemo et al., 2004).

Wheat straw may consist up to 40-50% of the pregnant ewe diet. Therefore, any improvement in the nutri-

tional value of wheat straw has potential effect on ewe BCS and lamb BW (Barber et al., 1990; Odenyo et al., 1991). The aim of this study was to compare the effect of feeding treated wheat straw with *Pleurotus florida* fungi, obtained before or after harvesting of the fungi, on feed intake, digestibility, and ewe body condition score after parturition.

**Materials and Methods**

*Treating wheat straw with Pleurotus florida*

The wheat grain spawn of *Pleurotus florida* fungi was used to inoculate the wheat straw at the rate of 3.5 kg spawn per 100 kg straw (fresh weight basis). The inoculated straw was packed in polyethylene bags (70-cm long and 40-cm diameter, and 100 gauge thickness). The bags were tightened up and transferred to a fermentation room, where the temperature was adjusted to 22±5°C and the relative humidity of 70±5% maintained by means of air condition and water sprinkling. During the first week of incubation, when the mycelial running started, all sides of the bags were crashed, to provide an aeration that was necessary for aerobic fermentation. After 17 days of incubation, half of the bags were removed from the fermentation room, and the other bags were collected after several weeks of incubation when the mushrooms were harvested (Foroughi, 1996; Fazaeli, 2007).

*Nutrient digestibility and chemical composition*

Nutrients digestibility and chemical composition of diets were determined according to the method of Rymer (2000) and AOAC (1990), respectively.

*Ewes and experimental diets*

The estrous cycles of thirty Kermani ewes, about four years of age (average weight of 48.00±3.05 kg) were synchronized by using intravaginal progesterone sponges (Chronogest, 40 mg, Intervet, Holland). Body weight (BW) and body condition score (BCS) were recorded until two months before the expected parturition time. Ewes were monitored closely during lambing, and lambs were removed immediately after parturition. Lamb birth weight was recorded, and ewe BW and BCS were measured immediately after parturition. Body condition was assessed by palpating the back bone in the near the loin behind the last rib (Russel, 1991).

Sheep were kept in individual pens and had free access to drinking water. The animals were randomly assigned into three experimental diets: 1) control (50% untreated wheat straw (50%UW), 2) 50% treated wheat straw before harvesting fungi (50%TBS), 3) 50% treat-

ed wheat straw after harvesting fungi (50%TAS). Diets (Table 1) were isonitrogenous (11% CP) and isocaloric (2.1 Mcal ME/kg DM), and Ca:P ratio was 1.8 (NRC, 1985). The diets were fed as total mixed ration (TMR) twice daily for *ad-libitum* intake. Feed and residual weights were recorded and samples were kept in air tight containers for chemical analysis.

*Statistical analysis*

The data were analyzed as a completely randomized design using PROC GLM (SAS, 2005) according to the following model:

$$y_{ij} = \mu + T_i + \beta_j + e_{ijk} \tag{11}$$

where  $y_{ij}$  = observation related to  $j^{\text{th}}$  block,  $\mu$  = overall mean;  $T_i$  = the effect of the  $i^{\text{th}}$  treatment;  $\beta_j$  = the effect of  $j^{\text{th}}$  block;  $e_{ij}$  = the experimental error.

Differences between means were determined using the Duncan's multiple-range test at 5% probability level.

**Results and discussion**

*Chemical composition*

Chemical composition of untreated and treated wheat straw with *Pleurotus florida* is shown in Table 2. Fungal treatment decreased ( $P < 0.05$ ) the NDF and ADF levels but increased the CP content of the straw. The increase in CP contents may be due to secretion of certain extracellular proteineous enzymes into the waste during their breakdown and its subsequent metabolism (Akinfemi et al., 2009). It may also be due to the capture of excess nitrogen during fermentation (Sallam et al., 2007), sug-

**Table 1.** Ingredients and chemical composition of experimental diets (dry matter basis)

Ingredients (%)	50%UW <sup>1</sup>	50%TBS <sup>2</sup>	50%TAS <sup>3</sup>
Wheat straw	49	49	49
Barley grain	30	30	30
Soybean meal	10	9	9
Cottonseed meal	4	5	5
Wheat bran	5	5	5
Limestone	1	1	1
Mineral and vitamin premix	0.75	0.75	0.75
Salt	0.25	0.25	0.25
<b>Diet composition</b>			
Energy (Mcal ME/kg DM)	2.1	2.1	2.1
CP (%)	11.0	11.3	11.3
Ca (g)	5.33	5.33	5.33
P (g)	2.97	2.95	2.97
Ca:P	1.79	1.80	1.79

<sup>1</sup>Diet containing 50% untreated wheat straw, <sup>2</sup>Diet containing 50% treated wheat straw before harvesting fungi, <sup>3</sup>Diet containing 50% treated wheat straw after harvesting fungi.

**Table 2.** Chemical composition of fungus-treated wheat straw

Composition (%)	UW <sup>1</sup>	TBS <sup>2</sup>	TAS <sup>3</sup>
CP	1.42 <sup>b</sup>	2.40 <sup>a</sup>	2.00 <sup>a</sup>
EE	2.18	1.94	2.06
NDF	83.50 <sup>a</sup>	60.27 <sup>b</sup>	59.63 <sup>b</sup>
ADF	64.30 <sup>a</sup>	56.25 <sup>b</sup>	56.37 <sup>b</sup>

<sup>a, b, c</sup>Means within a row with common superscript (s) do not differ ( $P > 0.05$ ). <sup>1</sup>Untreated wheat straw, <sup>2</sup>treated wheat straw before harvesting fungi, <sup>3</sup>treated wheat straw after harvesting fungi.

gesting that the treated substrates are good source of protein for livestock. This agrees with the findings of Belewu and Okhawere (1998) and Iyayi and Ade-rolu (2004).

The NDF content of wheat straw decreased by fungal treatment. This was due to the natural habitats of the white-rot fungi that largely depend on organic carbon (for their energy requirement) including carbon in the form of structural materials such as lignocellulosic (Jennings and Lysek, 1996). The losses of NDF from the straw suggested that these fungi solubilizes and utilized the cell wall as carbon source and thus changed the ratio of insoluble to soluble carbohydrates in the straw (Fazaeli et al., 2004). The decrease in NDF contents of the treated straw is in agreement with other reports (Foroughi, 1996; Fazaeli et al., 2004; Fazaeli, 2007).

*Ewe weight and BCS at the start of the experiment*

At the start of experiment (60 days before parturition), there were no significant differences in the ewe weight and BCS between treatments (Table 3,  $P > 0.05$ ).

**Table 3.** Ewe weight and body condition score (BCS) 60 days before parturition as affected by feeding fungus-treated wheat straw

	50%UW <sup>1</sup>	50%TB S <sup>2</sup>	50%TAS <sup>3</sup>	SEM	P
Weight	48.95	48.50	48.95	3.18	0.946
BCS <sup>4</sup>	3.83	3.74	3.82	0.38	0.866

<sup>1</sup>Diet containing 50% untreated wheat straw; <sup>2</sup>Diet containing 50% treated wheat straw before harvesting fungi; <sup>3</sup>Diet containing 50% treated wheat straw after harvesting fungi; <sup>4</sup>Mean of BCS recorded by three persons.

**Table 4.** Dry matter (DMI) and organic matter (OMI) intake (kg) in ewes as affected by feeding fungus-treated wheat straw

	50%UW <sup>1</sup>	50%TBS <sup>2</sup>	50%TAS <sup>3</sup>	SEM	P		
					diets	Untreated v. treated	Before harvest v. after harvest
Total DMI	61.02 <sup>b</sup>	77.75 <sup>a</sup>	71.87 <sup>ab</sup>	11.75	0.013	0.006	0.286
Total OMI	55.34 <sup>b</sup>	70.14 <sup>a</sup>	65.56 <sup>a</sup>	10.67	0.014	0.006	0.359
Average DMI	1.24 <sup>b</sup>	1.40 <sup>a</sup>	1.39 <sup>a</sup>	0.13	0.014	0.004	0.979
Average OMI	1.12 <sup>b</sup>	1.26 <sup>a</sup>	1.26 <sup>a</sup>	0.11	0.012	0.003	0.985

<sup>a, b, c</sup>Means within a row with common superscript (s) do not differ ( $P > 0.05$ ).

<sup>1</sup>Diet containing 50% untreated wheat straw; <sup>2</sup>Diet containing 50% treated wheat straw before harvesting fungi; <sup>3</sup>Diet containing 50% treated wheat straw after harvesting fungi.

*DMI and OMI*

The effect of experimental diets on total and mean of DMI and OMI (kg) is shown in Table 4. Total and mean DMI and OMI (kg) in treatments with 50% TBS and 50% TAS were higher than 50% UW diet. Higher DMI of ewes fed diets containing treated straw might be due to particle size reduction during processing of wheat straw. However, in this experiment the particle size of wheat straw was similar in all treatments, but separation of straw mass by hand might have reduced the particle size and therefore increased wheat straw DMI (Teimouri Yansari et al., 2007).

*Diet digestibility*

Digestibility coefficients are presented in Table 5. Digestibility coefficient of DM was higher in 50% TBS and 50% TAS diets than 50% UW diet ( $P < 0.04$ ). Fazaeli et al. (2004) reported that wheat straw inoculated with two species of *Pleurotus* fungi (H-77 and H-82), compared with the untreated straw had higher digestibility at the stage of mycelia running because of reduced NDF, ADF and ADL. However, the digestibility of straw was significantly decreased after harvesting mushrooms. Also treatment of rice straw improved OM digestibility at the stage of mycelia running with different edible mushrooms (Akinfemi and Ogunwole, 2012) but there were differences between fungi *Pleurotus* species on *in vitro* and *in vivo* digestibility (Fazaeli et al., 2004; Fazaeli, 2007). In the current experiment, the NDF and ADF values were reduced in treated wheat straw before and after harvesting the fungi, Therefore,

**Table 5.** Digestibility coefficient of the experimental diets as affected by feeding fungus-treated wheat straw

Coefficient of digestibility	50%UW <sup>1</sup>	50%TBS <sup>2</sup>	50%TAS <sup>3</sup>	SEM	P		
					diets	Untreated v. treated	Before harvest v. after harvest
DM	0.44 <sup>b</sup>	0.51 <sup>a</sup>	0.50 <sup>a</sup>	0.02	0.05	0.020	0.786
OM	0.43 <sup>b</sup>	0.55 <sup>a</sup>	0.50 <sup>ab</sup>	0.04	0.102	0.060	0.250
NDF	0.48	0.53	0.52	0.02	0.166	0.079	0.807
ADF	0.50	0.56	0.51	0.02	0.175	0.101	0.365

<sup>a, b, c</sup>Means within a row with common superscript (s) do not differ ( $P > 0.05$ ).

<sup>1</sup>Diet containing 50% untreated wheat straw; <sup>2</sup>Diet containing 50% treated wheat straw before harvesting fungi; <sup>3</sup>Diet containing 50% treated wheat straw after harvesting fungi.

**Table 6.** Ewe body weight (kg) and BCS after parturition and lambs birth weight (kg) as affected by feeding fungus-treated wheat straw to ewes

	50%UW <sup>1</sup>	50%TBS <sup>2</sup>	50%TAS <sup>3</sup>	SEM	P		
					diets	Untreated v. treated	Before harvest v. after harvest
Ewe weight	47.35	47.74	48.47	4.01	0.744	0.576	0.590
Ewe BCS <sup>4</sup>	3.46	3.61	3.76	0.40	0.252	0.149	0.413
Lamb birth weight	4.52	3.95	4.02	0.80	0.292	0.124	0.856

<sup>1</sup>Diet containing 50% untreated wheat straw, <sup>2</sup>Diet containing 50% treated wheat straw before harvesting fungi <sup>3</sup>Diet containing 50% treated wheat straw after harvesting fungi.

<sup>4</sup>Mean of BCS recorded by three persons.

the *in vitro* digestibility was increased in both treatments. Improvement of the digestibility of the treated straw could be due to solubilization of the structural polymers by fungi, which made it more accessible to the rumen microorganisms (Fazaeli et al., 2004).

*Ewe weight and BCS after parturition and lambs birth weight*

Body weight and BCS of the ewes, and lamb BW after birth were not affected by the experimental diets (Table 6). The effect of supplementary feeding during pregnancy was determined from one month after mating until parturition by Jahanbakhsh (2004). He showed that treatments had no significant effect on ewe weight although lamb weigh at three ( $P < 0.01$ ) and six months ( $P < 0.05$ ) after birth were significantly different.

*Correlations*

The correlations between ewe’s feed intake, BW, BCS and lamb’s BW are presented in Table 7. Correlation between ewe body weights and BCS was positive at the

start of the experiment ( $r = 0.44$ ,  $P < 0.05$ ). In their experiment, Caldeira and Portugal (2007) reported that this correlation was highly positive and significantly different in non-pregnant non-lactating ewes ( $r = 0.89$ ,  $P < 0.05$ ). Correlation between ewe BCS at the beginning of the experiment and lamb birth weight was negative ( $r = -0.50$ ,  $P < 0.01$ ) indicating that fat ewes produced lighter lambs. Thomas et al. (1988) used Targhee breed ewes with an average weight of 73 kg and divided them to two BCS group (3.5 and 2.5). They reported that lamb higher birth weights were achieved when the ewes had higher BCS. Aliyari et al. (2012) also reported that ewes with BCS of 3 produced heavier lambs than those with BCS of 2, 2.5 and 3.5.

**Conclusions**

The results showed that treated wheat straw with *Pleurotus florida* fungi increased DM and OM coefficients of digestibility before and after harvesting fungi. There was a significant negative correlation between ewe BCS at the beginning of the experiment and lamb birth

**Table 7.** Correlation coefficients between the ewe feed intake, body weight (BW), body condition score (BCS) and lamb birth weight (BW)

	Total feed intake	Average feed intake	Ewe BW <sup>1</sup>	Ewe BCS <sup>1</sup>	Lamb BW
Total feed intake	1				
Average feed intake	0.68**	1			
Ewe BW <sup>1</sup>	-0.15	0.08	1		
Ewe BCS <sup>1</sup>	-0.14	-0.17	0.44*	1	
Lamb BW	0.04	0.07	-0.17	-0.50*	1

\*  $P < 0.05$  \*\*  $P < 0.01$

<sup>1</sup>At the beginning of experiment.

weight. Therefore, ewe with medium BCS had better performance than those with high and low BCS.

## References

- Akinfemi, A., Ogunwale, O.A., 2012. Chemical composition and *in vitro* digestibility of rice straw treated with *Pleurotus ostreatus*, *Pleurotus pulmonarius* and *Pleurotus tuber-regium*. *Slovak Journal of Animal Science* 45, 14-20.
- Akinfemi, A., Adu, O.A., Doherty, F., 2009. Conversion of sorghum stover into animal feed with white-rot fungi: *Pleurotus ostreatus* and *Pleurotus pulmonarius*. *African Journal of Biotechnology* 9, 1706-1712.
- Aliyari, D., Moeini, M.M., Shahir, M.H., Sirjani, M.A., 2012. Effect of body condition score, live weight and age on reproductive performance of Afshari ewes. *Asian Journal of Animal and Veterinary Advances* 7, 904-909.
- Anderson, O., Kernen, Z., Hadar, Y., 1998. Enhancement of lignin degradation and laccase activity in *Pleurotus ostreatus* by cotton extract. *Canadian Journal of Microbiology* 44, 676-680.
- AOAC, 1990. Official Methods of Analysis, 13th ed. Official Methods of Analysis of AOAC International, Gaithersburg, MD, USA.
- Banchero, G.E., Quinans, G., Martin, G.B., Lindsay, D.R., Milton, J.T.B., 2004. Nutrition and colostrum production in sheep. 1. Metabolic and hormonal responses to high-energy supplement in the final stages of pregnancy. *Reproduction Fertility and Development* 16, 633-643.
- Barber, G.D., Given, D.I., Kridis, M.S., Offer, N.W., Murray, I., 1990. Prediction of organic matter digestibility of grass silage. *Animal Feed Science and Technology* 28, 115-128.
- Belewu, M.A., Okhawere, K., 1998. Evaluation of feeding fungi treated rice husk to ram. In Proceedings of the 25<sup>th</sup> Annual Conference and Silver Jubilee of the Nigerian Society of Animal Production. Nigeria.
- Bell, A.W., 1995. Regulation of organic nutrient metabolism during transition from late pregnancy to early lactation. *Journal of Animal Science* 73, 2804-2819.
- Caldeira, R.M., Portugal, A.V., 2007. Relationships of body composition and fat partition with body condition score in Serra da Estrela ewes. *Asian-Australasian Journal of Animal Sciences* 20, 1108-1114.
- Fazaeli, H., 2007. Nutritive value index of treated wheat straw with *Pleurotus* fungi. *Biotechnology in Animal Husbandry* 23, 169-180.
- Fazaeli, H., Mohammadzadeh, H., Azizi, A., Jelan, Z.A., Liang, J.B., Rouzbehan, Y., Osman, A., 2004. Nutritive value of wheat straw treated with *Pleurotus* fungi. *Asian-Australasian Journal of Animal Sciences* 17, 1681-1688.
- Foroughi, A., 1996. Nutritive value of wheat straw treated with the *Pleurotus sajor-caju* fungi and its use in Moghani fattening male lambs. M.Sc. Thesis, Tehran University. Iran.
- Jahanbakhsh, H.R., 2004. Effect of supplementary feeding of urea, protein and vitamins on performance of ewes grazing in pasture and cereal stubble in the dry season. M.Sc. Thesis, Tarbiat Modares University. Iran.
- Iyayi, E.A., Ade-rolu Z.A., 2004. Enhancement of the feeding value of some agro industrial byproducts for laying hens after their solid state fermentation with *Trichoderma viride*. *African Journal of Biotechnology* 3, 182-185.
- Jennings, D.H., Lysek, G., 1996. Fungal Biology: Understanding the fungal lifestyle. Guildford, UK: Bios Scientific Publishers Ltd.
- Kelly, R.W., Speijer, E.J., Ralph, I.G., Newnham, J.P., 1992. Lambing performances and wool production in maiden adult Merino ewes fed different amount of lupin seed in midpregnancy. *Australian Journal of Agricultural Research* 43, 339-354.
- Lynch, J.J., Leng, R.A., Hinch, G.N., Nolan, J.V., Bindon, B.M., Piper, L.R., 1990. Effects of cottonseed supplementation on birth weights and survival of lambs from a range of litter sizes. Proceedings of the Australian Society of Animal Production 18, 516-519.
- Murphy, P.M., McNeill, D., Fisher, J.S., Lindsay, D.R., 1996. Strategic feeding of Merino ewes in late pregnancy to increase colostrum production. Proceedings of the Australian Society of Animal Production 21, 227-230.
- NRC. 1985. Nutrient Requirements of Sheep. National Academy Press, Washington, DC.
- Odenyo, A.A., Mackine, R.I., Fhey J.R., White, B.A., 1991. Degradation of wheat straw by *Ruminococcus albus* 8 and *Ruminococcus flavefaciens* FD-1. *Journal of Animal Science* 69, 819-826.
- Raghuwanshi, S., Misra, S., Saxena, R.K., 2014. Treatment of wheat straw using tannase and white-rot fungus to improve feed utilization by ruminants. *Journal of Animal Science and Biotechnology* 5, 13-21.
- Robinson, J.J., 1990. Nutrition in the reproduction of farm animals. *Nutrition Research Reviews* 3, 253-276.
- Russel, A., 1991. Body condition scoring of sheep. In: Boden, E., (Ed.), Sheep and Goat Practice. Bailliere Tindall Publishing, Philadelphia, pp. 259-261.
- Rymer, C. 2000. The measurement of forage digestibility *in vivo*. In: Givens, D.I., Owen, E., Axford, R.F.E., Omed, H.M., (Eds.), Forage Evaluation in Ruminant Nutrition. CABI Publishers, New York, NY; pp. 113-134.
- SAS. 2005. SAS User's Guide. SAS Institute Inc. Version 9.1, Cary NC, USA.

- Sallam S.M.A., Nasser, M.E.A., El-Waziry, A.M., Bueno, F.C.S., Abdallah A.L., 2007. Use of yam *in vitro* rumen gas production technique to evaluate some ruminant feedstuffs. *Journal of Applied Sciences Research* 3, 34-41.
- Samsudin, A.A., Masori, M.F., Ibrahim, A., 2013. The effects of effective microorganisms on the nutritive values of fungal-treated rice straw. *Malaysian Journal of Animal Production* 16, 97-105.
- Taniguchi, M., Suzuki, H., Watanabe, D., Sakai, K., Hoshino, K., Tanaka, T. 2005. Evaluation of pre-treatment with *Pleurotus ostreatus* for enzymatic hydrolyses of rice straw. *The Journal of Bioscience and Bioengineering* 100, 637-643.
- Teimouri Yansari, A., Afshar Hamidi, B., PirMohammadi, R., Mohsenpour Azary, A., 2007. Rumen contents and ruminal digesta particle size distribution in buffalo steers fed three different size of alfalfa. *Italian Journal Animal Science* 6, 429-432.
- Thomas, V.M., MacInerney, M.J., Kott, R.W., 1988. Influence of body condition and lasalocid during late gestation on blood metabolites, lamb birth weight and colostrum composition and production in Finn-cross ewes. *Journal of Animal Science* 66, 783- 791.

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م. شریفی حسینی\*، ا. دیانی و ر. طهماسبی

نویسنده مسئول، پست الکترونیک: mmsharifih@gmail.com

**چکیده** این آزمایش برای مقایسه اثر گندم فرآوری شده و فرآوری نشده با قارچ پلوروتوس فلوریدا بر مصرف خوراک، گوارش پذیرگی و امتیاز وضعیت بدنی میش‌ها پس از زایش انجام شد. چرخه فعلی سی راس میش چهار ساله کرمانی با میانگین وزنی  $48 \pm 3/05$  کیلوگرم و در شکم سوم، با اسفنج های پروتسترونی درون واژنی همزمان شد. میش‌ها ۶۰ روز پیش از زایش به صورت تصادفی به یکی از سه جیره گروه بندی شدند: (۱) جیره شاهد (دارای ۵۰ درصد گندم فرآوری نشده)، (۲) جیره دارای ۵۰ درصد گندم فرآوری شده پیش از برداشت قارچ، (۳) جیره دارای ۵۰ درصد گندم فرآوری شده پس از برداشت قارچ. جیره‌های آزمایشی دارای ۲/۱ مگا کالری انرژی قابل سوخت و ساز و ۱۱ درصد پروتئین خام بودند و نسبت کلسیم به فسفر ۱/۸ به ۱ بود. مصرف ماده خشک و ماده آلی میش‌ها تحت تاثیر جیره‌های آزمایشی قرار گرفت ( $P < 0/05$ ) و مقدار آن‌ها در جیره‌های دارای گندم فرآوری شده پیش و پس از برداشت قارچ بیشتر از جیره دارای گندم فرآوری نشده بود. ضرایب گوارش پذیرگی ماده خشک و ماده آلی در جیره‌های دارای گندم فرآوری شده پیش و پس از برداشت قارچ بیشتر بود ( $P < 0/05$ ). اما ضریب گوارش پذیرگی پروتئین خام، لیاف نامحلول در شوینده‌های خنثی و اسیدی تحت تاثیر جیره‌های آزمایشی قرار نگرفت. وزن بدن میش‌ها و امتیاز وضعیت بدنی آن‌ها پس از زایش نیز تحت تاثیر جیره‌های آزمایشی قرار نگرفت. همبستگی بین وزن تولد بره‌ها و امتیاز وضعیت بدنی میش‌ها در ابتدای آزمایش، منفی و معنی‌دار بود و میش‌های دارای امتیاز وضعیت بدنی بیشتر از چهار، بره‌های کوچکتری زاییدند که نشان دهنده اثر مثبت امتیاز بدنی متوسط بر وزن بدن بره‌ها بود. فرآوری گندم با قارچ پلوروتوس فلوریدا سبب افزایش ضریب گوارش پذیرگی ماده خشک و ماده آلی شد، ولی این افزایش برای تاثیرگذاری بر وزن بدن و امتیاز وضعیت بدنی میش‌ها و وزن بره‌ها هنگام زایش کافی نبود.