

Effect of Pleurotous *Eryngii* mushroom-treated wheat straw on the function of Afshari fattened lambs

Ali Mirzaei^{1*}, Noormohammad Torbatinezhad², Seyyed Esmail Razavi³

¹ MSc student of animal science, animal nutrition sub-disciplinary, Gorgan University of Agricultural Sciences and Natural Resources, Iran ² Faculty member of animal science, Gorgan University of Agricultural Sciences and Natural Resources, ³ Faculty member of phytopathology, Gorgan University of Agricultural Sciences and Natural Resources.

Correspondence: Ali Mirzaei, MSc student of animal science, animal nutrition sub-disciplinary, Gorgan University of Agricultural Sciences and Natural Resources, Iran.

ABSTRACT

This study evaluates the effect of wheat straw treated by pleurotous *eryngii* mushroom at different levels on the function of Afshari fattened lambs. It was conducted on 24 male Afshari fattened lambs with a mean weight of 30 kg as a replicated observational study design with four treatment groups and 6 replications. In the experiment ration, the base ration was substituted by 0% treated straw (ration 1), 50% treated straw (ration 2), 75% treated straw (ration 3) and 100% treated straw (ration 4). Study time was considered to be 90 days (7 days for adoption and 84 days for conducting experiments). During fattening period, the studied lambs were weighted once every 15 days and mean daily weight gain, mean daily feed conversion ratio (FCR) were determined. The results of this study revealed that replacing ordinary wheat straw by pleurotous *Eryngii* mushroom-treated one in the ration of lambs significantly increases the daily dry matter (DM) use in treatment group 3 compared to control group but the difference was not significant in other treatment groups ($p < 0.05$). Wheat straws treated at different levels had a significant effect on mean daily weight gain and FCR ($p < 0.05$). It may be recommended that a portion of lambs ration can be substituted by pleurotous *Eryngii* mushroom-treated wheat straw without an inverse effect on their function. This, in turn, promotes the productivity of fattening lambs and the production of micronutrient-enriched products.

Keywords: Fattened lambs, pleurotous *Eryngii* mushroom, treatment, wheat straw

Introduction

Feeding animals with straw and roughage has a limited rate as they have low nutrition value and low nitrogen content. It appears that the biological treatment of straw using white-rot-fungus can serve as an acceptable approach to improving the nutrition value of straws^[1]. Bekshi et al (1985) fed buffalos with wheat straw after harvesting pleurotous *ostereatus* mushroom. They concluded that the use of DM is higher in treated wheat straw (8.76 kg/day) compared to non-treated one (8.54 kg/day)^[2]. Vali et al (1991) cultivated wheat straw with *coprinus fimetarius* mushroom and fed male holstein-friesian cattle by the treated wheat straw after two weeks. Their results showed no increase in DM use^[3]. Fazaeli et al (2001) treated

wheat straw by pleurotous *ostereatus* mushroom and used them to feed male cattle. Among different groups, i.e. non-treated wheat straw, mycelium spawn run-treated wheat straw and wheat straw after harvesting mushroom, the use of DM, organic matter and digestible organic matter was significantly higher in the group of wheat straw after harvesting mushroom^[4]. There are some reports indicating that the treatment of lignocellulose materials with mushroom improves their digestibility^[5,6]. This experiment was conducted to evaluate the effect of the biological treatment (mushroom) of wheat straw on the function of fattened lambs.

Materials and Methods

Cultivating mushroom on wheat

Pleurotous *Eryngii* Mushroom was prepared for cultivation in the phytopathology laboratory of Gorgan University of Agricultural Science in extra-sterilization condition. The examined matter was wheat straw. It was crushed and filled in plastic bags and the bags cap was fastened tightly. The next day, the samples were transferred to nylon bags after wetting for one night and pasteurization for 1.5 hours at 80°C. They were,

Access this article online

Website: www.japer.in

E-ISSN: 2249-3379

How to cite this article: Ali Mirzaei, Noormohammad Torbatinezhad, Seyyed Esmail Razavi. Effect of pleurotous *eryngii* mushroom-treated wheat straw on the function of afshari fattened lambs. *J Adv Pharm Edu Res* 2018;8(S2):189-191.

Source of Support: Nil, Conflict of Interest: None declared.

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then, inseminated by pleurotous eryngii mushroom at a ratio of 3% to 5% and were transferred to the culture room.



Figure 1: Pleurotous Eryngii

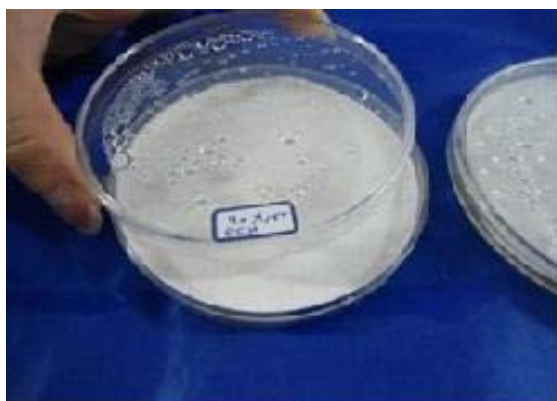


Figure 2: laboratory cultivation medium of the mushroom



Figure 3: mushroom cultivated on wheat straw

Feed tests on animals

Experiment matters

The used matters were as follows: 1) ordinary straw (as control), 2) 50% treated wheat straw substituted with base ration wheat straw, 3) 75% treated wheat straw substituted with base ration wheat straw, 4) 100% treated wheat straw substituted with base ration wheat straw. A total number of 24 Afshari lambs with a mean weight of 30 kg were selected for test. The lambs were kept in separate places and then were grouped into 4 groups in random and underwent experiment ration test. The ingredients of the base ration were wheat straw, wheat bran, alfalfa, and mineral and vitamin supplements. Wheat straw contributed to 20% of the base

ration. The rations were completely mixed and supplied to the lambs. In the beginning of the test, all lambs were vaccinated against typical known diseases. In addition, they received anti-parasite drugs. The total duration of test was considered to be 91 days (7 days for adaption and 84 days for conducting the test). The lambs received nutrition and water with no limitation and were weighed once every 15 days after 16 hours food deprivation. In the beginning of each day, remainders of nutrition were collected and at the end of each period total daily nutrition intake was calculated. Daily mean weight gain, daily mean nutrition intake and FCR were considered as measurement parameters. This study has a completely random design with 4 treatment groups and 6 replications. Collected data was analyzed using SAS and Tukey's compare mean test at 5% sig. level.

Results and Discussion

Table 1 shows the measured traits. Daily mean weight gain of the aforementioned treatment groups during test period is 216.7, 221.9, 247.9 and 245.4, respectively indicating a significant difference in weights before and after tests with treatment groups 3 and 4 with higher significance compared to other groups ($p < 5\%$). Mehdilhani et al (2009) observed higher overweight in fattened lambs fed by urea-molasses-treated wheat straw [7]. Mean use of DM in the treatment groups was 2.20, 2.17, 2.32 and 2.29, respectively with treatment group 3 with higher DM use but without significant difference ($p < 5\%$). Click et al (2003) observed no significant difference in DM use during wheat straw treatment process [8]. FCR was lower in treatment group 3 but its difference with groups 4 and 4 was not significant ($p < 5\%$).

Table 1: mean performance parameters of different groups

Measured trait	Care groups			
	1	2	3	4
Daily weight gain (gr/day)	216.7±3 ^b	221.9±4 ^b	247.9±3 ^a	245.4±4 ^{ab}
Daily feed (kg/day)	2.20±2 ^b	2.17±3 ^a	2.32±2 ^a	2.29±1 ^a
FCR	9.9±72% ^b	8.3±76% ^{ab}	7.6±80% ^a	8.1±81% ^{ab}

- Different letters in each row indicates significant difference at sig. level 5%

- Control group
- 50% treated wheat straw substituted with wheat straw of the base ration
- 75% treated wheat straw substituted with wheat straw of the base ration
- 100% treated wheat straw substituted with wheat straw of the base ration

The results of this study showed that in the groups where ordinary wheat straw ration was substituted by 75% and 100% treated wheat straw, DM use raised compared to control group. Cultivating mushroom on wheat straw increased the use rate of DM, organic matter, digestible DM and digestible

organic matter during mycelium spawn-run and before, and even after, fructification stages. This improvement may be due to the chemical changes (including the degradation of cellular wall) of straw during solid state fermentation (SSF). There are limited studies on the use of the straw remaining on mushroom cultivation bed. According to researcher reports, crude protein (CP) is higher in compost straw than ordinary one but the latter is more energizer than the former. However, the energization rate is influenced by ash rate. The nutrition value index showed a significant rise when mushroom mycelium completely covered straw surface and get ready to germinate and enter to fructification stage^[9]. In general, it can be concluded from the results of this study that the growth of the mycelium of pleurotus eryngii mushroom on wheat straw improves the nutrition value of it and applying such wheat straw on fattening ration improves function parameters.

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