

ANALYSIS OF THE CORN STOVER FOR ENSILING, FEED NUTRIENTS AND DIGESTIBILITY IN CROSSBRED CATTLE.

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ABSTRACT: Corn stover are burnt after corn cobs collection in the field, creating global warming along with precious organic matter wastage. In this experiment corn stover silage (CSS) (stover without cobs and corn seeds/grains) inoculated with 10% water, 1% molasses and 0.2% urea were compared with the normal whole crop corn (WCC) silage at full bloom stage (30% DM). Twenty (n=20) bunker silos of > ten tons capacity each were prepared separately for both types. The results revealed that there was no significant difference ($P>0.05$) between both of these types regarding sensory score (colour, smell and structure) and flieg score. Values regarding average pH, feed intake (after balancing DM%) and time of appearance of fungal mass after opening of both types of bunkers was without any significant difference ($P>0.05$). Regarding chemical analysis high DM, Ash, NDF and ADF with significant difference ($P<0.05$) while low GE, ME, CP and Body weight gain but without any significant difference ($P>0.05$) were observed. It can be concluded that CSS can be successfully used instead of burning this precious commodity by adopting this method to fulfill all the maintenance requirements in large ruminants.

Keywords: Corn stover silage, flieg score, Inoculant, Urea, Molasses.

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INTRODUCTION

Sowing of forages and fodders is chiefly cyclic thus it leads to an irregular availability of feedstuffs for animals. In Pakistan there is a period of depression after a rich legume based crop seasons then fodders of cereal crop replace them again followed by a limited fodder availability period. On the performance animals these regular fluctuations in the fodder accessibility exert very negative effects (Sarwar, 2002; Nazar *et al.*, 2018)

It is a very wise approach to adopt forage preservation strategy during abundant supply for that specific time of the year when forage availability is minimum or totally diminished (Xu *et al.*, 2018). Considering the existing accessibility of green fodder and forages along with hay and silage, the techniques for making various methods for ensuring a permanent availability of fodder to the ruminants with better nutritive worth is getting extra attention (Michel-Villarreal *et al.*, 2018).

During the last ten to fifteen years cultivation of corn is increasing with the passage of time. Corn has occupied a huge proportion of the area of other cash crops specially cotton in South Punjab region of Pakistan. In the agriculture portion corn has contributed 2.4% in the value added percent and 0.5% to the Gross Domestic Production of Pakistan (Pakistan Economic Survey, 2017-18). Preserved form of fodder which is known as silage made from different cereal crops especially of corn

is getting more prevalent as main dairy animals feeding requirement (Kljak *et al.*, 2017).

At the time of final harvesting from the whole corn crop (WCC) the corn cobs having grains on them are removed and the remaining portion is called as stover which are one of the by-products of this commodity. Farmers do not use this by-product normally and waste it through burning in the field or at home to clear their field for next cultivation (Andini *et al.*, 2018; Alavijeh *et al.*, 2019).

Farming community is hesitant in consuming corn stover for the feeding of milking animals basically due to their opinion that (CSS) can not only decrease milk production but other harmful effects as well. Although some of the farmers utilize corn stover for feeding to their animals in fresh form immediately after cobs collection basically due to inaccessibility of any other feeding option.

There are various reasons behind this situation due to which corn stovers are not consumed as silage which include less mastication due to high fibrous contents, high dry matter percentage, less digestibility of feed nutrients due to high lignocellulose bond and less energy contents compared to the normal whole corn crop WCC silage prepared at a half milky stage having corn seeds as well. Milk production and body condition score is decreased in lactating and fattening animals mainly due to these types of issues. In this experiment it was tried to address the solution of these problems by adding specific

chemicals in CSS and compared this diet with the normal WCC silage.

MATERIALS AND METHODS

Ten bunker silos (> ten tons each) for maize/corn stover silage (after separating of seeded corn cobs inoculated with 10% water, 1% molasses and 0.2% urea) and ten bunker silos (> ten tons each) of normal whole crop maize/corn silage at full bloom stage with 30% DM were prepared. An incubation period of 40 days was given to both types before starting to feed the experimental animals. Eighteen healthy non-lactating crossbred cows/heifers (Sahiwal x Friesian with 25 to 75% blood ratio of each) were distributed randomly into two groups *i.e.* 1 and 2 (n=9 in each) and were fed individually.

After at least 40 days of incubation period for complete fermentation, the silos were opened from one side and silage samples were obtained and sent in sealed form to AgriPak Labs (NTI Islamabad^R) for chemical characteristics (Dry Matter DM, Crude Protein CP, Crude Fiber CF, Neutral Detergent Fiber NDF, Acid Detergent Fiber ADF, Gross Energy GE, Metabolizable energy ME, TDN and Ash contents) analysis. Along with this the physical characteristics (smell, colour and structure and the total flieg score as described by Kilic, 1986) were also analyzed on individual basis.

The data were also collected during this experiment of feeding for 60 days duration regarding feed intake and body weight gain/loss after giving 15 days for getting acclimatized to the new diet. Crossbred cows belonging to all groups were offered concentrate according to milk production at the rate of one Kg of concentrate for each 2.5 Liters of milk produced. The data obtained from these variables were analyzed through Paired Sample T-test (Steel *et al.*, 1997).

RESULTS AND DISCUSSION

Routine intake of silage in Crossbred cows was 22.92±0.92 and 26.33±1.15Kg fed on inoculated corn stover silage and untreated corn silage respectively. Inoculated silage of corn stover intake was significantly lower (P<0.05) in Crossbred cows than cows on untreated corn silage. This figure can be due to high DM in treated stover silage due to its high lignin contents as described by Ren *et al.*, (2007).

Crossbred cows provided with the inoculated corn silage diet had higher (374.49±41.02 g) body weight than the cows under control (358.96±55.27 g). A minor non-significant difference (P>0.05) was observed between the both treatments. Presence of apparent fungal mass in both the groups was negligible and there was not even a single case of apparent mycelial mass except in an

old open heap of inoculated corn stover silage. Appearance of fungi on silage was also directly proportional with the cutting size of silage. If the fiber length was more it was difficult to remove more air due to pressing problems which may lead to fungal contamination after its opening. The cumulative effect of all the physical traits (colour, smell, structure and flieg score) showed that both types of silages had good quality without any significant difference (P>0.05). These results are in line with that of Sariççek *et al.*, 2016.

Silage pH was more in the diet containing inoculated corn stover silage than the untreated silage showing a pH level at 4.2±0.15 as compared to the untreated corn silage as 4.1±0.06 indicating a non-significant difference (P>0.05) in both of these figures. High pH value but with un-significant difference in both of these values may be due to urea treatment as non-protein nitrogen source NPN in the corn stover diet. As for as Dry Matter content of both silages were concerned, inoculated corn stover silage had higher DM (36.30±0.70%) while untreated corn silage had the lowest (31.19±0.54%) statistically with a significant difference (P<0.05). Mean crude protein level was 5.04±0.42 and 7.63±0.55% in the diets having inoculated corn silage and untreated silage, with significant difference (P<0.05) respectively. Urea addition in the corn stover silage successfully compensated nitrogen deficiency while molasses not only neutralized and stabilized the effect of urea but also increased the basal energy of this diet. These results are in line with that of Khan *et al.*, (2006) where and addition of non-protein nitrogen source was beneficial in digestibility and overall production as well.

Inoculated corn diet had highest (29.13±0.34%) crude fiber level while untreated corn silage showed lowest (24.11±0.42%) crude fiber level again with a significant difference (P<0.05). Stover are the most mature stage as the plant of corn complete its life cycle so there was a huge difference observed in fiber quantity. Inoculated corn stover silage diet had the highest NDF (48.46±0.58%) while untreated silage diet showed the lowest (42.24±0.08%) feed NDF. A significant difference (P<0.05) was observed in the inoculated diet as compared to untreated silage. The inoculated silage had the highest ADF (30.63±0.87%) while untreated silage diet had the lowest (23.25±0.35%) level showed a significant difference (P<0.05). The diet of inoculated corn stover silage had the highest (9.06±0.72%) ash level while the level of ash contents was lowest (7.27±0.54%) in the untreated diet. Same types of improved nutrient values were observed after urea molasses addition as observed by Sarwar *et al.*, 2006. As the normal silage is made at about 80 days of growth while (CSS) is made after 110-120 days so a difference of one month added more DM and Minerals as well. Regarding ME (which is 63% of GE as described by Mandal *et al.*, (2003). It was seen that inoculated corn stover silage had lower (2.3±0.06) value

compared to normal silage (2.8±0.04) indicating a significant difference regarding GE and ME. Total digestible nutrients TDN were calculated in both types of silages as significantly higher (70±0.5%) in the non-inoculated corn silage compared to that of inoculated corn stover silage (63±2.6%). Although TDN, GE, ME and some other values are lower in the inoculated corn stover silage giving a better promising figure if cost of production is considered. These findings are in line with that of Saeed *et al.*, 2017 with improved nutrient contents after fortification with different levels of inoculants.

Conclusion: It was concluded that corn stover after harvesting of seed containing cobs, should not be wasted by the farmers. The cows under corn stover silage feeding had body weight gain comparable with control group in crossbred cows and the nutrient value of inoculated CSS diet (DM, CF, ADF, NDF and Ash percentage) was improved as compared to the untreated corn silage feed. If cost of production is compared with both of these types of silages then corn stover silage is not only economical but also provides relatively a promising figure.

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