

Utilization of elder *Sambucus nigra* silage as a supplement for dairy cattle in the Colombian High Tropic

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Introduction The cattle production occupies the first line of importance in the livestock sector. This productivity is seriously affected by climate variability, which sometimes forage availability decreases and hence is diminished the milk production, logically affect the income of producers from different regions of the country. In this situation, it is important to promote the conservation of forage as a management option to be interesting to try decrease spread negative effects. The use of silage, forage supply provides leverage this in the rainy season, to be delivered in the summer. Colombia has a wide diversity of plants, which has not been fully studied, and it has an interesting potential for use in animal feed and agro-industrial by-products, which generate target problems and can also be used in cattle feed. As a result of this, the plant species known high tropical own Colombia known Elder (*Sambucus nigra*) and the use of products such as corn and potato mash evaluate as few know their effect silage as animal feed supplement. The aim of this study was to determine the nutritional value and fermentation parameters by silage of forage elder mixed with corn and potato by-products and their effect in animal feeding and dairy production.

Material and Methods Elder leaves were cut 90 days regrowth and 2 years of establishment. Two trials were realized.

Trial 1. Eight treatments and four replicates per treatment were evaluated. The elder leaves were chopped and mixed with corn bran and potato bran, at inclusion levels of 20, 40, 50 and 60% respectively. These mixtures were stored in 1 kg for 42 days. At the end of the fermentation period, samples were taken for analysis of nutritional quality (dry matter, crude protein and gross energy) and fermentation parameters (pH, ammonia nitrogen and its relation with total nitrogen). The experimental design was a 2x4 factorial, (Factor A: corn bran vs potato bran; Factor B: 20, 40, 50 and 60% inclusion level of corn bran or potato bran). Data were analyzed using the GLM procedure of SAS.

Trial 2. Eight crossbred Holstein × Normande cows, between 100 and 200 days of lactation were used in two treatments in the San Miguel Farm, Mosquera, Cundinamarca, Colombia. Treatment 1 with four cows that did not receive in silage and corn bran Elder, of trial 1 selected. And in the treatment 2, supplementation included silage. The animals had two assessment periods each of 14 days, with 7 days for adaptation and 7 days evaluation. Variables were evaluated milk production, milk quality: protein, fat and total solids, and the concentration of urea in milk. The experimental design was a Latin square. The data variables were analyzed with ANOVA and to detect differences between treatment means was employed Tukey's test in SAS. Version 9.2 of 2008.

Results and Discussion

Trial 1. Inclusion of corn bran resulted increased ($P<0.001$) dry matter (60.83 vs 19.38%) and gross energy concentrations (4.4 vs 3.9 Mcal/Kg) as compared to inclusion of potato bran. Inclusion of potato bran resulted in increased ($P<0.001$) crude protein (16 vs 12 %) as compared to inclusion of corn bran. The ratio of ammonia nitrogen/total nitrogen was greater for the potato bran treatments (14.4 vs 6.8%). There was no difference in pH but the critical value of pH and water activity required for stabilizing a silage were not sufficient in the elder leaves with potato bran silage because the DM values were low (DM 19% and pH 4.47) while in the elder leaves with corn bran silage the DM values were high (DM 60% and pH 4.39) which indicates the silage was stabilized. The DM, CP and GE values increased ($P<0.05$) with inclusion level of corn bran in the silage while with the inclusion level of potato bran these variable decreased ($P<0.05$).

Trial 2. Milk production for each treatment did not present significant difference. The milk production average was 11.3 liters/cow/day. There was also no difference in terms of quality of the milk, or for fat, protein, lactose, total solids. Likewise, milk urea nitrogen did not present significant difference.

Conclusion

The results of fermentation and nutritional quality showed that elder leaves is a good option when mixed with corn bran 50% may be a viable alternative to be used as a dietary supplement for dairy cows. The utilization de corn bran and elder silage don't show difference when were offered to cows.