Journal of Animal and Veterinary Advances 6 (12): 1450-1452, 2007
ISSN: 1680-5593

Investigation on the Possibility of Ensiling Cucurbit (*Cucurbita pepo*) Residues and Determination of Best Silage Formula

[1]A. Hashemi and [2]S. Razzaghzadeh
[1]Department of Animal Science, Agriculture College, Urmia University, Iran
[2]Department of Animal Science,
Agriculture and Natural Resources Research Center of W. Azarbaijan, Iran

Abstract: This study was done in order to investigate the possibility and the most suitable formula of ensiling Cucurbit (*Cucurbit pepo*) residues. In a completely randomized design, Cucurbit residues were ensiled in 5 different formulas with 5 and after 2 month were assayed. Based on obtained results, following formula was accepted: %71.4 cucurbit residues + %28.6 wheat straw + %20 of DM beet molasses + %5 of Dm urea.

Key words: Ensiling, pumpkin, residue, silage formula, silage characteristics

INTRODUCTION

The use of agriculture residuals is often a useful way of overcoming the shortage of animal feedstuffs. Agricultural residuals obtained after harvesting of vegetables, fruits and crops. Crop residues are materials, which are generated after crop has been harvested (Dixon and Egan, 1987).

All of the cucurbit SP. Are annuals (Castetter and Erwin, 1927). Cucurbit pepo was domesticated in North America form wild Cucurbit texana, occurring in the south central USA. And C. Fraterna, occurring in northeastern Mexico. From archeological excavations in Mexico, domestication can be dated back to about 8000 BC. Squashes were introduced to Europe by returning Spanish in the 1500`s (Sauer, 1993).

Pumpkin Residue (PR) is a by product remained after pumpkin seeds collection in a considerable amount (95% of fresh fruit including skin, fleshy part, inner fibers and minor seed). It is rich of carbohydrate substance. Church (1996) reported the composition of Pumpkin as follows: 9% Dm, 16%Cp, 14% CF, 0.24% Ca, 0.43% P, 3.32% K and 58 %TDN.

Therefor, PR can be used as animal feed. But, because of high moisture, reservation ability of this by-product in natural form is very low. Ensiling is one of the most suitable ways for conservation of such materials.

Invanchuk (1984) conducted experiments on ensiling the pumpkin. Analysis of ensiled materials showed that the composition per kg was: 350 mg Caroten + 867 gr water + 1.3 g Asetic Acid + 0.83 gr Butiric Acid + 10.2 gr Lactic Acid. pH of silage was 4.4-4.5.

In Iran, Mokhtarpour (1994) reported the nutritive value of PR before rnsiling, as follows: %12.5 DM, % 11.3 CP, %1.4 EE, %19.7 CF, % 17.6 Ash, % 50 NFE, 3870.2 cal/gr and pH = 5.9.

The objective of present study was to obtain the most suitable formula for ensiling Pumpkin Residues.

MATERIALS AND METHODS

Four sample of Pumpkin Residue (PR) (Fleshy part of fruit that remains after seeds collected) prepared and were sent to laboratory for determining the amount of Dry Matter (DM), Crude Protein (CP), Ash, Calcium (Ca) and Phosphorus (P) content.

Upon the analysis results, five ensiling formula each of them in 5 replicats were prepared and ensiled for 2 months (Table 1). Ensiling formula were as follows:

Wheat straw used to regulated silage dry matter content. After 2 months, ensiled materials were evaluated. In order to evaluation, Apparent evaluating and silage evaluating using pH and dry matter content percentage methods were used (Shama, 1983).

Table 1: Ensiling formula

Formula	PR %	Wheat straw %	DM beet molasses %	DM Urea %
1	71.4	28.6		
2	71.4	28.6	10	
3	71.4	28.6	20	
4	71.4	28.6	10	5
5	71.4	28.6	20	5

Corresponding Author: Ali Hashemi, Department of Animal Science, Agriculture College, Urmia University, Iran

RESULTS

Chemical composition of Pumpkin Residues, pH and dry matter content of different silage formulas presented in Table 2 and 3.

Apparent evaluation: Table 4 shows the results of apparent evaluation formula No 5 have the best condition from view of color, smell, flavor and physical shape (structure). There for this formula was the best.

Evaluation of ensiled materials using pH and DM content: Evaluation upon relationship between pH and DM is one of evaluation methods of ensiled materials (Shama, 1983). In this method, the quality of silage evaluated as good, good to accepted and bad to unaccepted.

The results of evaluation of ensiled materials methods, presented in Table 5.

Comparing pH means: Comparison of means of pH shows significant difference between formula ($p<0.05$). Statistically, 2, 3, 4 and 5 formulas have not significant differences and 1, 2, 4 and 5 formulas also have not significant differences. Formula 3 have lowest pH (pH = 4.85) and formula 1 have highest pH (pH = 7.61). Probably, adding urea to formulas 4 and 5 was the cause of high pH (Table 6).

Table 2: Mean chemical composition of Pumpkin residues

DM	CP	Ash	Ca	P
6.05±1.89	16.97±2.96	14.13±4.52	0.94±0.19	0.09±0.01

Table 3: Mean pH and DM content of different ensiling formulas

Formula	DM%	pH
1	8.38±3.77	7.61±1.59
2	37.68±4.14	6.25±2.13
3	30.36±2.19	4.85±0.95
4	30.24±1.55	6.31±1.41
5	30.88±2.07	6.24±1.63

Evaluation of ensiled materials

Table 4: Results of apparent evaluation of ensiled materials

Formula	Result
1	Unaccepted
2	Accepted
3	Accepted
4	Accepted to good
5	Good

Table 5: Results of evaluation of ensiled material using pH and DM% content

Formula	Silage quality
1	Bad to unaccepted
2	Bad to accepted
3	Good to accepted
4	Good to accepted
5	Good

Table 6: Comparing pH means

Formula	pH mean	S.D
1	7.61 B	1.59
2	6.54 AB	2.13
3	4.85 A	0.95
4	6.31 AB	1.41
5	6.24 AB	1.62

Table 7: Comparing DM means

Formula	DM mean	S.D
1	28.38 A	3.77
2	34.68 B	4.14
3	30.36 AB	2.19
4	30.24 AB	1.55
5	30.88 AB	2.07

Means marked with different alphabets have statistically significant differences ($p<0.05$)

Means marked with different alphabets have statistically significant differences ($p<0.05$).

Comparing DM means: Comparison of DM means shows statistically significant differences between formulas ($p<0.01$). Statistically 1, 3, 4 and 5 formulas have not significant differences and also 2, 3, 4 and 5 formulas have not significant differences. Formula No 1 have lowest DM (28.38 %DM) and formula No 2 have highest FDM (34.68%) (Table 7).

DISCUSSION

Results of chemical composition analysis in this study differ from others reports (Mokhtarpour, 1983). Probably the cause of this difference is the differing varity of Pumpkin, differing climates and different method of seed collection. Amount of pH in formula No 3 (pH = 4.85) from view point of suitable pH for ensiled materials is in agreement with others `reports (Mokhtarpour, 1994).

CONCLUSION

Based on the results of this study it can be concluded that Pumpkin residues could be ensiled with addition of wheat straw as an absorbent of moisture beet molasses as fermentable additive. The best formula could be : %71.4 PR + %28.6 wheat straw + % 20DM molasses.

REFERENCES

Castetter, E.F. and A.T. Erwin, 1927. A systematic study of the squashes and Pumpkins. Iowa Agric. Expt. Sta. Bul., 244: 107-135.

Church, D.C., 1996. Livestock feeds and feeding. 2nd Edn. Princeton Hall. New Jersey.

Dixon, R.M. and R.M. Egan, 1987. Strategies for utilizing fibrous crop residues as animal feeds. Paper presented to the 7th Aafarr workshop. Chiang Mai, Thailand.

Ivanchuk, V.A., 1984. Vitamin rich silage a valuable feed for Pigs. Prollemy Kormleniya. Sovrmennom Zhivotnovo dstve. Russia.

Mokhtarpour, GH., 1994. Selecting the best method of preparing silage of Pumpkin residues. Final report of research plan. Natural resources and animal affairs research center of Golestan Province. Iran.

Sauer, J.D., 1993. Historical geography of crop plants. CRC Press. Boca Raton. Florida.

Shama, M., 1983. Animal and poultry feeds and conservation methods of them. Tehran University Press. Tehran, Iran.