The 1st International Conference on New Ideas in Agriculture
Islamic Azad University Khorasgan Branch
26-27 Jan. 2014, Isfahan, Iran

DETERMINATION OF CHEMICAL COMPOSITION AND GAS PRODUCTION OF DRIED OR ENSILED TOMATO SHOOT

Reza Khodaverdi[1], Abbas Ali Naserian[2], Ahmad Ebrahimi[3], Mahdi talebi[4], Milad rahati[5]
[1,2]*Department of Animal science, Agricultural Faculty of Ferdowsi University, Mashhad,Khorasan,Iran*
[3] *Department of Animal science, Agricultural Faculty of rasool akram damghan ,Iran*
[4,5]*Department of Agricultural Faculty of Ferdowsi University, Mashhad,Khorasan,Iran*
E-mail: Reza.khodaverdi57@yahoo.com

INTRODUCTION

The use of cereals in animal diets creates a competitive conflict with human nutrition. An interesting challenge for scientists in the field of animal nutrition is the introduction of alternative feedstuffs that could overcome the problems of environmental harshness and production costs. The inclusion of one of the Agriculture byproducts is tomato stem and leaf that in most farms remain unused and disappears. About 6.27 % share of vegetables harvested area in Iran (154.000 h) is related to the tomato crop. According to the average percentage of dry matter (17.7 %) at harvest time, conducted research in the fields, the final digit of the number of plants per hectare (45,000-50,000 plant) and the production of DM per hectare (about one ton); So, it is possible the yield of more than one million tons per year (equivalent 180000 DM) from the tomato shoot in the country. It is a considerable amount. Several experiments have been conducted in order to evaluation of dried or ensiled tomato pomace in ruminant diet. However, there are a few studies in this subject. The objective of the current study was determine the nutritive value of farm and greenhouse tomato plant (dried and ensiled) by *in vitro* (gas production and batch culture system) methods.

MATERIALS AND METHODS

The plant samples were collected (from farm or greenhouse) including leaves, stems and slightly unripe fruit in growth final stages in the farms of semnan province. The browse was dried in the shade and then chopped mechanically (5 cm). the plant samples were dried or ensiled in plastic buckets and sealed for 60 days as completely randomized design (CRD) with 2 treatments and 4 replicates per treatment. Then sensory evaluation and pH are determined. The chemical composition (including crude protein, ash, neutral detergent fiber, acid detergent fiber) of the samples were measured by standard methods.
In vitro gas production (IVGP), The gas production was measured at 2, 4, 6, 8, 12, 24 ,36 ,48 ,72 and 96 h. The volume of gas production characteristics were estimated using the equation $Y = a + b (1 - e^{ct})$. estimated organic matter digestibility (OMD), ME (metabolize energy) and short chain FA (SCFA) of each treatment were measured. The fermentability of plants was examined in an in vitro batch fermentation system. The amount 0.2 g of plant material was transferred to an anaerobic chamber maintained at 39 ˚C and supplied with CO_2. They incubated for 24 h at 39 ˚C, with constant shaking at 50 rpm. After 24 h, the pH was determined in culture fluid and samples for ammonia N were collected for analyses.

RESULTS AND DISCUSSION

Plant dry matter and crude protein were 26.3, 14.9 and 20.1, 15 % in field and greenhouse dried samples respectively. Field tomato plant had higher DM than greenhouse tomato plant whereas greenhouse tomato plant contain higher ash than filed tomato plant. Ensiling decreased plant pH (in harvest time were 6.59 and 6.80 and ensiled plant were 4.78 and 4.87 in greenhouse and field silage respectively). This drop is because of the production of lactic acid and other volatile fatty acids. Silage pH was lower for greenhouse tomato plant compared to filed tomato plant throughout the ensiling. Ensilage increased CP and DM but decreased NDF and ADF in both of them. Increasing protein in ensilaged plant is probably due to the breakdown of cell walls by bacteria fermentation. In addition reduction in NDF or ADF can be due to the

breakdown of cell walls by *clostridia* in silage. There was no significant difference between the experimental silages quality parameters (including moisture content, color, smell and texture). Potential of gas production in the dried and ensiled field tomato plant, dried and ensiled greenhouses tomato plant, was 57.12, 44.39, 52.35 and 41.55 mg in 200 ml DM respectively. Higher levels of cell walls in dried field tomato plant can produce more gas. Gas production of dried field tomato plant in 96 h (56.88ml) was also significantly higher than other treatments but it would be cited that gas production is lower than conventional hay similar to alfalfa whereas it is higher than wheat straw. Generally, plant silage (field and greenhouses) compared with dry plant had less gas production. Gas production is mainly influenced by the chemical composition of plants. Sugar consumption in silage and higher ash can reduce gas production. Ensiling decreased OMD, ME, and NH_3-N compared to dry plant. In conclusion, tomato plant can be regarded as feed resources for ruminants, however, more *in vivo* studies are proposed.

Key Words: Tomato plant, silage, chemical composition, gas production.

REFERENCES

1. AOAC. 1997. Official Methods of Analysis. Association on Official Analytical Chemists, Arlington, VA, USA.

2. Ventura MR, Petain MC .2009. Evaluation of tomato crop by-products as feed for goats J.I.R. Cast anon. Animal Feed Science and Technology 154 .271–275.