PROXIMATE AND MINERAL CONTENTS OF SOME VEGETABLE PARTS USED IN FEEDING RUMINANT ANIMALS

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ABSTRACT
The study was conducted to determine the proximate and mineral constituents present in the residues of some vegetables used in feeding ruminant animals. Four samples were used for the study namely; amaranth stem (Amaranthus viridis), fluted pumpkin stem (Telfaria occidentalis), carrot tops (Platysace linearifolia) and melon fruit (Cucumis melo). The samples were collected and shade dried after which they were ground and sieved with a 2 mm sieve before taken to laboratories for analyses. Collected data were analyzed using analysis of variance and results for all parameters revealed significant ($p<0.05$) differences. Results of proximate constituents showed ash content ranges from 8.00–13.75% with amaranth stem having the least and melon fruits have the highest. Crude fibre contents were between the range of 13.33 - 44.99 % for melon fruit and fluted pumpkin stem respectively. Results for crude protein ranged from 4.57–12.63 % with carrot tops having the least and amaranth stem have the highest. In terms of their mineral profile, potassium ranged from 13618.6 9– 48854.43 mg/kg with carrot tops having the least and amaranth stem having the highest. Phosphorus content ranged from 1208 – 2793 mg/kg for carrot tops and fluted pumpkin stem respectively. The values for nitrogen were in the range of 1.49–4.99 mg/kg where melon fruit had the least and carrot tops revealed the highest content. In conclusion, the vegetable part residues evaluated have the potential as feed supplement in ruminant animals and thus it is recommended that feeding trials be conducted in ruminant animals to establish their utilization by these species of livestock. 0030832292

Keywords: Vegetables residues, proximate constituents, mineral contents and ruminant animals

INTRODUCTION

Ruminants by their physiology of digestion have the ability to utilize forage based plant materials which monogastrics cannot ingest. Literature reports that feeding is the major constraint to livestock production especially in sub-Saharan Africa. This problem of feed scarcity is more pronounced during prolonged dry season when fresh roughages are not available and animals are at the mercy of nature to survive. Most countries in the tropics do not have enough feed resources to sustain high level of livestock production, therefore development of rations based on readily available resources is imperative (Aregheore and Ikhatua, 1999). In view of the readily availability of vegetable residues, the present study is designed to determine the proximate compositions and mineral contents of some vegetable residues used in ruminant feeding.

MATERIALS AND METHODS

The experiment was carried out in Bayero University Kano at Department of Animal Science laboratory. It involves 4 samples namely amaranth stem (*Amaranthus viridis*), fluted pumpkin (*Telfaria occidentalis*), carrot tops (*Platysace linearifolia*) and melon fruit (*Cucumis melo*). The experiment which includes the proximate analysis and mineral analysis were conducted in two different locations. Proximate analysis was carried out in the Department of Animal Science laboratory located in the Faculty of Agriculture, Bayero University Kano. Mineral analysis was carried out in the Department of Soil Science laboratory located in the Faculty of Agriculture, Bayero University Kano.

Sample Collection

Four samples namely amaranth stem (*Amaranthus viridis*), fluted pumpkin (*Telfaria occidentalis*), carrot tops (*Platysace linearifolia*) and melon fruit (*Cucumis melo*) were collected from Brigade market. After the samples were collected, they were shade dry until they are fully dried after which they are grinded and taken to the laboratories for the analysis.

Data Analysis

Data obtained were subjected to Analysis of Variance (ANOVA) using the SAS (2013). Significant differences in means were separated using Least Significant Difference (LSD).

Results and Disscussion

The Proximate constituent of some selected vegetable residues which include amaranth stem (*Amaranthus viridis*), fluted pumpkin (*Telfaria occidentalis*), carrot tops (*Platysace linearifolia*) and melon fruit (*Cucumis melo*) as shown in Table 1. The result shows low moisture content as attributed to high dry matter content, it have potential to be use as feed supplement for ruminant animal adequate moisture content in feed helps in preventing spoilage and ensuring good health of the animal. The ether extract content required for ruminant animals is moderate for fluted pumpkin stem, amaranth stem, carrot tops and melon fruit which range from 2.00 % to 7.00 % depending on the species, age, weight, reproductive status and level of production (National Research Council, 2016). The nitrogen free extract content for carrot tops, fluted pumpkin stem and amaranth stem are below the requirement for ruminant animals and moderate for melon fruit which range from 45.00% to 70.00% depending on the species, age, weight, reproductive status and level of production (National Research Council, 2007). The crude protein content for melon fruit and carrot tops are below the required protein for ruminant animals and moderate for amaranth stem and fluted pumpkin stem which range from 8.00% to 16.00% depending on the species, age, weight, reproductive status and level of production (National Research Council 2016). The crude fibre content for carrot tops, fluted pumpkin stem and amaranth stem are above the required fibre for ruminant animals and low for melon fruit which range from 18.00% to 30.00% depending on the species, age, weight, reproductive status and level of production (National Research Council, 2016).

Table 1: Proximate Analysis of Some Vegetable Parts

	Constituents (%)						
Treatment	Ash	MC	DM	CF	EE	CP	NFE
Amaranth stem	8.00^{c}	2.25^{b}	97.75^{a}	38.00^{b}	3.50^{b}	12.63^{a}	35.63^{c}
Fluted pumpkin stem	12.75^{ab}	3.50^{b}	96.50^{a}	44.99^{a}	7.50^{a}	10.63^{b}	20.63^{d}
Carrot tops	12.50^{b}	7.75^{a}	96.00^{a}	32.16^{c}	2.00^{b}	04.57^{c}	41.03^{b}
Melon fruit	13.75^{a}	4.50^{b}	92.25^{b}	13.33^{d}	3.50^{b}	05.02^{c}	59.91^{a}

Means with the same letter superscripts across the treatments has no significant difference at (P>0.05).

Tables 2 and 3 present the results for macro and micro mineral contents of the vegetable residues respectively. The result revealed that potassium content ranged from 13618.6 9– 48854.43 mg/kg with carrot tops having the least and amaranth stem having the highest. Phosphorus content ranged from 1208 – 2793 mg/kg for carrot tops and fluted pumpkin stem respectively. The values for nitrogen were in the range of 1.49–4.99 mg/kg where melon fruit had the least and carrot tops revealed the highest content.

Table 2: Macro Minerals Analysis of Some Vegetable Parts

	Constituents (mg/kg)			
Treatment	Ca	P	SO_4	N
Amaranth stem	7155.73^{b}	2071^{b}	606.07^{b}	2.72^{b}
Fluted pumpkin stem	3684.09^{c}	2793^{a}	681.83^{a}	1.76^{c}
Carrot tops	8793.12^{a}	1208^{d}	542.94^{d}	1.49^{c}
Melon fruit	0511.41^{d}	2028^{c}	568.19^{c}	4.99^{a}

Means with the same letter superscripts across the treatments has no significant difference at (P>0.05).

Table 3: Micro Minerals Analysis of Some Vegetable Parts

	Constituents (mg/kg)				
Treatment	Fe	Cu	K	Mg	Zn
Amaranth stem	731.12[a]	13.73[b]	48854.43[a]	3744[a]	29.43[a]
Fluted pumpkin stem	387.05[c]	17.53[a]	33850.52[b]	3662[b]	21.03[b]
Carrot tops	301.03[d]	10.80[c]	24627.54[c]	2641[c]	18.92[c]
Melon fruit	390.03[b]	08.69[d]	13618.69[d]	1694[d]	16.36[d]

Means with the same letter superscripts across the treatments has no significant difference at (P>0.05).

The results shows macro and micro nutrient of amaranth stem in this study are in the same range with that reported by Asare et al. (2014). It is also revealed that the macro and micro nutrient of fluted pumpkin stem and carrot tops in this study are within the range reported by Enwere et al. (2003) and Adetunji et al. (2012) respectively. The values obtained for melon fruit in the present study is in line with the findings of Adetuyi et al. (2013).

CONCLUSION

In conclusion, the vegetable part residues evaluated have the potential as feed supplement in ruminant animals and thus it is recommended that feeding trials should be conducted in ruminant animals to establish their utilization by these species of livestock.

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