

Short Communication

Proximate analysis of some dry season vegetables in Anyigba, Kogi State, Nigeria

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Vegetable is a vital component of human diet that should be eaten all year round, but they are scarce during dry season in Anyigba community in Kogi State, Nigeria. Available dry season vegetables such as the leaves of *Manihot esculentum* (Cassava), *Piper guineense* (Oziza), *Chromolena odorata* (Akintola), *Solanum melanogaster* (Garden egg) and *Voandzeia subteranea* (Babara-nut), are either not accepted as conventional vegetable or they are classified as non edible leaves from neighboring States. This study compared the nutrient content of these vegetables with that of *Telfaria occidentalis* (Ugwu). The result of the sensory evaluation carried out showed that *T. occidentalis* had sensory evaluation mean value of 6.28, which was statistically significantly different ($P = 0.001$) when compared with the mean value of *S. melanogaster* (5.64). The highest mean value from the sensory evaluation was recorded in *C. odorata* (6.44). However, there was no significant difference ($P > 0.05$) in the mean values of the sensory evaluation of *M. esculentum*, *P. guineense*, *C. odorata* and *V. subteranea* (6.02, 6.22, 6.44 and 6.10 mean values respectively) when compared with that of *T. occidentalis* (6.28). In the proximate chemical analyses, it was observed that *M. esculentum* and *C. odorata* contained higher protein (29.30 and 32.40%, respectively), than *T. occidentalis* (13.33%). Also, the Carbohydrate content of *P. guineense* and *V. subteranea* (77.17 and 89.42% respectively) was higher than that of *T. occidentalis* (63.64%). *M. esculentum*, *C. odorata*, *P. guineense* and *V. subteranea* are recommended as edible vegetables.

Key words: Sensory evaluation, dry season vegetable, available, Anyigba, Nigeria.

INTRODUCTION

Dry season vegetables are shrubs or herbaceous annuals or biennial plants. In Nigeria, most of the commonly eaten vegetables are the succulent leaves of plants; they are eaten as supplementary foods, side dishes or in soup as condiments, or eaten with other main staple dishes (Van et al., 1968). The production of dry season vegetables has developed from small home garden to a form of commercial farming because of the production of both local and exotic vegetables. Some of the exotic vegetables cultivated in Nigeria are cabbage, lettuce, cauli-flower and turnip leafy as well as stems such as Carrot (Aliyu, 2006).

It has been reported that vegetable supplies part of the

protein, vitamins and minerals needed in diet; as well as roughage which promote digestion and prevent constipation (Aliyu, 2006). He also reported that in young leaves, 4 - 10% of freshly picked weight are proteins, while in older leaves the percentage is only 1 - 2%.

The need for vegetables in man's diet throughout the year cannot be overemphasized. It is apparent from observation in Anyigba Community in Kogi State, Nigeria, that there are inadequate vegetables during dry season. Available dry season vegetables such as the leaves of *Manihot esculentum* (Cassava), *Piper guineense* (Oziza) and many other plants, are either not accepted as conventional vegetable or they are classified as non edible leaves from neighboring Eastern State.

This study is aimed at comparing the nutrient value of some dry season vegetables available in Anyigba Market with a conventionally accepted vegetable (*Telfaria occidentalis*, Ugwu); and to carry out sensory evaluation on the vegetables, by which consumers' acceptability can

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Table 1. Sensory evaluation of tested dry season vegetables.

Vegetable	General appearances	Colour	Taste	Flavour	Texture	Mean
<i>T. occidentalis</i>	6.5	6.3	6.3	6.4	5.9	6.28*
<i>M. esculentum</i>	5.9	6.0	6.2	6.2	5.8	6.02*
<i>S. melanogaster</i>	5.9	5.6	5.5	5.5	5.7	5.64
<i>P. guineense</i>	6.0	6.4	6.4	6.0	6.3	6.22*
<i>C. odorata</i>	6.1	7.3	6.4	6.2	6.2	6.44*
<i>V. Subteranea</i>	5.8	6.0	6.0	6.6	6.1	6.10*

* No significant difference.

Table 2. Proximate moisture and chemical contents of tested vegetables.

Vegetable	Moisture (%)	Ash (%)	Fat (%)	Protein (%)	Crude fiber (%)	Carbohydrate (%)
<i>T. occidentalis</i>	0.90	1.88	0.68	13.33	19.57	63.64
<i>M. esculentum</i>	0.91	2.21	0.69	29.30	8.14	58.79
<i>S. melanogaster</i>	0.60	1.02	2.90	2.50	5.40	87.57
<i>P. guineense</i>	0.83	1.38	0.28	10.50	9.84	77.17
<i>C. odorata</i>	1.01	1.86	0.96	32.4	8.4	55.37
<i>V. Subteranea</i>	0.60	3.05	0.63	3.3	3.0	89.42

be assessed.

MATERIALS AND METHODS

Six dry season vegetable, *Piper guineense* (Oziza), *Manihot esculentum* (cassava), *Solanum melanogaster* (Garden-egg), *Voandzeia subteranea* (Babara-nut), *Chromolena odorata* (Akintola) and *Telfaria occidentalis* (Ugwu) were purchased from Anyigba market in Dekina Local Government Area in Kogi State, Nigeria. Each of the fresh vegetables was used to cook Egusi (mellon) soup separately, with *T. occidentalis* leaves which has been generally accepted as edible vegetable as a reference (while the other five plant leaves were used as the test plants). Each soup was served with 'Eba' (Garri made into dough) to ten panelists for a sensory evaluation.

Sensory evaluation of food products based on Hedonic Scale was carried out as described by AOAC (1990). Acceptability parameters such as appearance, colour, taste, flavour and texture were evaluated, using a questionnaire to score the seven-point Hedonic scale.

Moisture determination and chemical analysis

The moisture content was determined by drying in an oven at 100°C until constant weight, ash by incineration in a muffle furnace at 550°C for 48 h, proximate chemical composition of each vegetable sample was carried out to determine the moisture, ash, fat, crude fibre, protein and carbohydrate content of each plant sample using various techniques. Proteins by nitrogen determination using the Kjeldahl micro method and conversion of nitrogen to proteins by the factor 6.25. Fat was by Bligh dyer technique, crude fibers by successive digestion of the defatted sample with 0.26 N sulphuric acid and 0.23 N potassium hydroxide solutions, and carbohydrates difference method (AOAC, 1980). All data generated were statistically analyzed, using the Analysis of Variance (ANOVA).

RESULTS AND DISCUSSIONS

Sensory evaluation of food products is an important criterion by which its consumer acceptability can be assessed (Samuel et al., 2006). The sensory evaluation test on the six plant samples, based on the seven-point Hedonic Scale showed that, *C. odorata* recorded the highest mean value of 6.44, which was higher than the mean value of the reference vegetable (*T. occidentalis*), whose mean value was 6.28. *S. melanogaster* had the least mean value of 5.64; while *M. esculentum*, *P. guineense* and *V. subteranea*, recorded mean values of 6.02 and 6.10 respectively (Table 1). There was no significant difference ($P > 0.05$) between the mean values of *T. occidentalis* and those of *M. esculentum*, *P. guineense*, *C. odorata* and *V. subteranea*. However, there was significant difference ($P=0.001$) between the mean value of *T. occidentalis* and that of *S. melanogaster*.

Edible vegetable is a vital component of human diet that should be eaten all year round (Aliyu, 2006). Roger et al. (2005) reported that protein level of green leafy vegetables range from 20.48 - 41.66% D.W. The result from the proximate chemical analysis in this study showed that *M. esculentum* contained 29.30% and *C. odorata* 32.40% protein, both vegetables contained more protein than the reference vegetable (*T. occidentalis*) that contained 13.33% protein (Table 2).

It has been reported that protein-calories malnutrition deficiencies is a major factor responsible in nutritional pathology (Roger et al., 2005). The result of this work showed that adequate protein is present in *M. esculentum* and *C. odorata* leafy vegetable. There was

no difference in the mean value of sensory evaluation of *M. esculentum*, *P. guineese*, *C. odorata* and *V. subteranea* when compared statistically with *T. occidentalis* which has been generally accepted as edible vegetable in this community. Also, there was no difference in the mean values of *T. occidentalis* and those of *P. guineese* and *V. subteranea* in their sensory test, despite their lower protein content than that of the former. However, the carbohydrate content of the later vegetables are higher than that of the reference vegetable, although there was no significant difference in their analysis. This is probably the reason for their high acceptability by the consumers in the sensory test.

Therefore, *M. esculentum*, *C. odorata*, *P. guineese* and *V. subteranea* are hereby recommended as edible vegetables, particularly during the dry season when other conventional vegetables are scarce, expensive or not available.

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