POSSIBLE USES OF LEAVES OF EXOTIC SWEETPOTATO GENOTYPES IN LOCAL NIGERIAN FOOD PREPARATIONS

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Abstract: Fifteen acquired foreign sweetpotato genotypes in Nigeria (undergoing adaptation trials by National Root Crops Research Institute, Nigeria) were assessed for the possible culinary and nutritional uses of their leaves in Nigerian local food preparation. Leaves of leafy elite sweetpotato genotypes existing in Nigeria were used as experimental checks. Prior to the assessment of the organoleptic properties of the boiled experimental leaves by a food sensory panel, the fresh experimental leaves were botanically characterized. A sensory panel was used to conduct the sensory evaluation of the boiled leaves. The 20 member sensory panelists used a nine point Hedonic scale (where 9= like extremely; 5= neither like nor dislike;1= dislike extremely) to evaluate the appearance, taste and general acceptability of the boiled leaves. The panelists also commented on the possible uses of the leaves as substitutes or replacements for conventional local vegetables in Nigeria. Relevant biochemical/phytochemical analyses were also carried out on the experimental leaves. The result of their leaves external morphology characterization showed that about 25% were of simple palmate shape while the rest were simple non-palmate. The sensory panelists observed that the leaves from some of the experimental genotypes including local and International checks (Ex-Igbariam, TIS2532.OP.1.13 and TIS8164 respectively) could be used to replace or substitute some indigenous vegetables in local food preparation. The leaves of TIS8164 can also be used for traditional packaging in the preparation of *Ekpan-nkwukwo*(a local Nigerian dish). The nice aroma of the exotic Julian leaves could serve as a potential replacement for some indigenous spices in local food preparations. The chemical analysis carried out revealed that the leaves had high fibre, high chlorophyll and high flavonoids content. All these show that these experimental edible leaves are good sources of nutrients for certain food security requirements.

Keywords: Sweetpotato, edible, leaves, sensory evaluation, phytochemicals, nutrients

INTRODUCTION

The culinary and other attributes for processing the leaf of sweetpotato accessories is very important for end user's acceptability (Rodriguez, 1999). Though the tuberous roots of the crop serve as staples in many Nigerian homesteads, Ukpabi and Oji (1984) found that the cooked leaves were also cherished as leafy vegetables by many local consumers. The leaves serve as side dishes in Taiwan.

Young leaves are eaten as leafy vegetable (Abidin, 2004). Consumers' interest in vegetable (flavonoids) consumption is on the increase, due to possible medicinal properties- inhibiting cancer or cardiovascular disease (Seow-Mun, 2012). Antiviral activity against several viruses, such as poliovirus in the in vitro test (González *et al*, 1990). The leaves are also good sources of vitamin A, C and B_2 (FAO, 1990). The leaves contain 2.4mg/100g vitamin C and 709µg/100g Vitamin A (Woolfe, 1992).

National Root Crops Research Institute (NRCRI) Umudike acquired some elite sweet potato genotypes from CIP as new sweetpotato genotypes. Hence, the need to evaluate the culinary attributes of the elite sweetpotato genotypes.

MATERIALS AND METHODS

Sources of materials: The experimental materials from fifteen exotic sweet potato (NASPOT1, NASPOT 2, NASPOT 3, NASPOT 5, Costanero (1870162), Jewel (44031), Julian 440141, Salyboro 187017. Cemsa 40000,

Santo-Amaro, Carrot C, CIP-199024.2, CIP-199034.1, CIP-440203 and CIP-440443) and three locals (Ex-Igbariam, TIS8164 and TIS2532.OP.1.13) were obtained from the germplasm plot of Sweet potato Programme.

Characteristics of the Sweet potato leaves

The colour and the foliar morphology of the genotypes were visually observed and recorded.

Biochemical/phytochemical such as flavonoids, crude fibre, ash and moisture content analyses were also carried out on the experimental leaves.

Plate 1: Some Elite sweetpotato leaves samples.

Sensory Evaluation of the Leaves:

The respective leaves were boiled at 100°C for 10 minutes in glass beaker (Pyrex). Seven trained panelists (graduates of food science and allied disciplines) who were conversant with local leafy vegetables were used for the sensory evaluation with a nine point Hedonic scale (Iwe, 2002). In the scale 9 represented "like extremely", 5, represented "neither like nor dislike" while, 1 represented "dislike extremely". The sensory panelists were further requested to comment extensively on the samples.

Statistical Analysis:

The obtained experimental data were statistically analyzed with the appropriate SAS computer software.

RESULTS AND DISCUSSIONS

Table 1 shows the foliar characterization of the experimental genotypes (leaf colour, leaf shape/leaf size) (Dutta, 1981).

Table 1: Foliar characterization of the experimental genotype

Genotype	leaf colour	leaf shape/type	leaf size
NASPOT 1	green only	simple (palmate)	medium
NASPOT2	Green purple variegated	simple (palmate)	medium
NASPOT3	green purple variegated	simple (palmate)	big
NASPOT5	green purple variegated	simple (palmate)	big
Julian (440141)	green	simple (sagittate)	medium
Salyboro (187017)	green	simple (cordate)	medium
Cemsa (40,000)	green	simple (cordate)	small
Santo- Amaro	green	simple (cordate)	small
Carrot C	green	simple (cordate)	small
CIP-99024.2	green	simple (cordate)	big
CIP-99034.1	green	simple (cordate)	big
CIP-440203	green	simple (cordate)	small
CIP-440443	green	simple (sagittate)	medium
Ex-Igbariam	green/purple lines	simple (cordate)	medium
TIS8164	green/purple lines	simple (cordate)	big
TIS2532.OP.1.13	green	simple (cordate)	big

The percentage flavonoids ranged from 1.05-1.60%.While crude fibre result ranged from 1.30% to 4.70% and ash content from 0.03-2.60%, Fred and Honeybell, 2009 had earlier reported as content of 0.51%. The moisture content (MC) of the fresh leaves ranged from 77.47% (NR035) to 84.18% (TIS2532.OP.1.13). A range of approximately 82 to 81 % moisture content on the fresh weight has been reported.

Table 2: Moisture, Flavonoids, and Crude fibre of the experimental sweetpotao leaves

Sweetpotato varieties	Moisture content (%)	Flavonoids (%)	Crude Fibre (%)
NRS/05/1B	**81.08^{i}**	**1.30^{abcd}**	**2.20^{b}**
NR/05/022	**83.38^{b}**	**1.15^{cd}**	**1.30^{f}**
SHABA	**82.53^{e}**	**1.25^{bcd}**	**2.50^{c}**
TIS87/0087	**80.65^{j}**	**1.20^{cd}**	**1.30^{f}**
EX-OYUNGA	**83.10^{c}**	**1.05^{d}**	**1.70^{de}**
NRS/05/10D	**81.65^{h}**	**1.40^{abc}**	**1.40^{ef}**
EX-IGBARAM	**82.75^{d}**	**1.20^{cd}**	**3.03^{b}**
CENTINNIAL	**80.53^{k}**	**1.45^{abc}**	**2.20^{c}**
TIS8164	**82.13^{g}**	**1.20^{cd}**	**4.70^{a}**
BUTTER MILK	**80.33^{l}**	**1.20^{cd}**	**1.30^{f}**
TIS2532.OP.1.13	**84.18^{a}**	**1.60^{a}**	**1.70^{de}**
035	**77.47^{m}**	**1.55^{ab}**	**1.80^{d}**
CIP440293	**82.48^{f}**	**1.60^{a}**	**1.40^{ef}**
LSD(0.05)	**0.012**	**0.085**	**0.109**

The randomly selected sensory assessors generally found the experimental leaves (exotic and local checks) acceptable (Table 2) as boiled leafy vegetables (with varying degrees of liking). Table 3 shows that the leaves from some genotypes that could replace the convectional vegetables. In addition, the panelists reported the nice aroma of Julian genotype and possible use of the leaves of TIS 8164 as a replacement for the wrapping of cocoyam slurry/paste in the preparation of Ekpan-nkwukwo.

Table 3: Sensory evaluation of the elite **sweet potato boiled leaves.**

Sample	Appearance	Taste	General
TIS2532.OP.1.13	6.40^{abcd}	5.60^{cd}	6.00^{bcd}
Carrot C	6.40^{abcd}	6.80^{abc}	7.00^{ab} 6.00^{bcd}
SANTO-AMARO	6.40^{abcd}	6.20^{bcd}	
CIP440203	5.80^{bcd}	6.40^{bcd}	6.00^{bcd}
CIP199034.1	6.20$_{bcd}$	5.80^{bcd}	5.40^{cd}
EX-IGBARIAM	7.20^{ab}	7.0^{ab}	6.80^{abc}
SALYBORO	6.60^{abc}	6.20^{bcd}	6.20^{bcd}
NASPOT 2	6.60^{abc}	6.20^{bcd}	6.20^{bcd}
TIS8164	8.00^{a}	8.20^{a}	8.00^{a}
NASPOT	6.60^{abc}	6.20^{bcd}	6.20^{bcd}
TIS 8164	8.00^{a}	8.20^{a}	8.00^{a}
NASPOT 1	5.80^{bcd}	5.80^{bcd}	6.40^{bcd}
CIPI99024.2	5.40^{cb}	5.20^{d}	5.00^{d}
NASPOT 5	6.20^{bcd}	6.20^{bcd}	5.60^{b} 5.80^{bcd}
CEMSA	6.00^{bcd}	5.40^{cd}	5.20^{d} 6.00^{bcd}
NASPOT 2	4.80^{d}	5.80^{bcd}	1.493
JULIAN	6.20^{bcd}	6.60^{bcd}	
LSD	1.606	1.457	

Table 4: Sensory assessors' feedback on sweetpotato that could be used to replace conventional vegetables in the preparation of various food forms.

Food forms	Convectional vegetable	sWeetpotato genotype that could replace the conventional vegetable
Okro soup	Okro	NASPOT 3/CIP440203
Ugu/Egusi soup	Ugu (Telfaria)	Ex-Igbariam/TIS6184
Ewedu soup	Ewedu	Carrot C/Julian
Yam porridge	Green Amarantus	C1P199034.1/TIS8164
Ekpang Nkwokor	Fresh Coco yam /plantain leaves	CIP440203/TIS8164
Jollof Rice	Scent leaf	Julian

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