American Journal of Food Technology 7 (3): 142-150, 2012
ISSN 1557-4571 / DOI: 10.3923/ajft.2012.142.150

Kendall's Concordance Analysis of Sensory Descriptors Influencing Consumer Preference for Sweet Potatoes in Ghana

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ABSTRACT

Sweet potato is an important crop in the upper-east region of Ghana due to its adaptive ability on poor quality soils. It is a predominant snack and lunch for children during the peak harvest period, around October-February. This study assessed the influence of some sensory descriptors, with emphasis on the emerging influence of colour, on consumer taste preference. Boiled and fried samples of 7 cultivars were assessed by 57 taste panelists using a five-point hedonic score for taste, colour, flavour, texture, mouth-feel and overall acceptability. A further questionnaire on consumers' first-choice preference and reasons for preference was administered. Kendall's concordance analysis was performed to test the null hypothesis of independence between variables. Critical descriptors influencing consumer preference were orange-flesh (20.8%), mild flavour (20.8%), soft texture (20.8%) and hard texture (16.7%). Up to 24.1 and 21.8% of data variation when boiled and 24.2 and 28.5% when fried were associated with sweetness and soft texture, respectively. Cinkanse-Abiga showed distinct orange-fleshed colour score (3.9) followed by Cinkanse-Naabug (3.3) whiles the other varieties recorded a near-white colour (1.3-1.4). Overall scores for preference (%) were Purupuru (12.8), Obare-red (15.8), Obare-white (10.5), Kuffour (8.8), Cinkanse (12.3), Cinkanse-Abiga (31.6) and Cinkanse-Naabug (8.8). Kendall's concordance coefficients showed this order of preference: Cinkanse-Abiga (5.9), Purupuru (4.74), Kuffour (4.68), Obare-white (4.6), Obare-red (4.2), Cinkanse (2.8) and Cinkanse-Naabug (2.5). Sensory descriptors of the most preferred varieties (Cinkanse-Abiga and Purupuru) were starchy-soft texture requiring little chewing, strong flavour and good mouth-feel. Thus, orange-fleshed cultivars which combine these attributes would be appealing to consumers of wide diversities.

Key words: Sweet potatoes, cultivar, colour, texture, taste preference

INTRODUCTION

Consumer taste, preference and acceptance are critical in determining the degree of suitability of Sweet Potato (SP) cultivars to any locality (Tomlins *et al*., 2004; Kwach *et al*., 2010). In addition to yield components, attributes such as sensory, cooking, nutritional and food safety have become paramount due emerging sophistication in consumer taste (Hassanpanah *et al*., 2011; Keith *et al*., 2004). The use of objective physiological and compositional measurements alongside subjective studies of food palatability and acceptability are now regarded as complementary. In fact, instruments will only analyze components within their capabilities, whereas sensory panelists will employ human senses to give a total impression of requisite quality attributes. Textural characteristics have been identified as the most important attribute influencing consumer perception of SP quality (Van Oirschot *et al*., 2003; Kwach *et al*., 2010). A great deal of research has been conducted to elucidate the causes of textural difference among cultivars and processed

products as well as the influence on consumer preference and acceptability (Truong *et al*., 1997; Tomlins *et al*., 2004). However, since the emergence of Orange-Fleshed Sweet Potatoes (OFSP) in most parts of developing countries, research interest in consumer perception and preference has evolved to another dimension. The influence of colour of cooked and processed foods on consumer acceptance has gained impetus. Earlier attempts to introduce OFSP into the farming systems of Uganda in the early 1980s failed. Farmers and consumers rejected OFSP clones introduced from Taiwan, Mainland, China and the International Institute of Agriculture (IITA) because of low dry matter content (<30%) and squash-like flavour (Mwanga *et al*., 1991; Keith *et al*., 2004). However, consumer acceptance has improved tremendously following several researches in this regard. Studies on consumer acceptability of OFSP in Tanzania (Tomlins *et al*., 2007), Uganda (Mwanga *et al*., 2003; Yanggen and Nagujja, 2005) and Kenya (Hagenimana *et al*., 2001; Kwach *et al*., 2010), have revealed that consumers now generally prefer orange-fleshed cultivars to white ones. In processing sweet potato crisps, the most quality characteristics manufacturers endeavor to control are color and texture; since they are strictly associated with consumer taste (Abong *et al*., 2011).

The methods of cooking and form utilization have critical influence on taste and overall consumptive quality. Common methods include boiling, roasting, baking, steaming, microwaving and deep-fat frying. These cooking processes lead to changes in physical, sensory and chemical characteristics of the final product (Fontes *et al*., 2011; Vitrac *et al*., 2000). The effect of boiling SP is more profound on the peel than on the flesh. The peel consist of lipo-protein which degenerates/coagulates due to heating and loses its original properties thus can be easily peeled off. While the flesh is mainly starch, which only swells due to water absorption and the weak bonds are hydrolyzed, thus making it more easily digestible. Frying is known to enhance sensorial characteristics such as smell flavour, colour, texture as well as overall palatability; fried potatoes are usually appreciated by all ages and social classes. The process of frying involves drying, cooking or fast dehydration in which the water is removed from the food by means of immersion into oil at temperature of 120 to 180°C (Vitrac *et al*., 2000). The oil plays a dual function by acting as a means of transmitting heat and constitutes a new ingredient upon being absorbed by the food product. The absorption of the oil ranges from 10-60% and may be influenced by a series of parameters which act on the speeds of mass and energy transfer between the oil and the food and which depends on the food, the oil and the frying conditions. The frying oil is incorporated into the food, occupying part of the space left by the water and thereby increasing palatability, flavour, calorie supply and shelf life (Fontes *et al*., 2011; Vitrac *et al*., 2000).

This study, which was conducted in the Upper-east region of Ghana, reviewed the influence of SP sensory attributes on consumer acceptability using less complex and reproducible modules. Sweet potato is the most important root crop in this region due to the poor quality of soils. During the peak harvest period around October-February, deep-fried SP is usually the predominant snack and lunch for children in the area. It is also commonly sold as a road-side snack and at 'food joints' for commuters across the region. Until now, a vast majority of cultivars were white-fleshed which are low in beta-carotene. However, the Root and Tuber Improvement and Marketing Project (RTIMP) have made tremendous strides particularly with the introduction of OFSP as well as other high yielding cultivars to enhance productivity (www.mofa.gov.gh). Little research work has been conducted on consumer preference issues since the influx of these cultivars into the region. The specific objectives were to: (1) profile the distinguishing sensory descriptors of 7 popular SP cultivars and their interrelationships with consumer taste preference and non-preference and (2) assess the comparative influence of the sensory attributes with specific emphasis on texture and colour.

MATERIALS AND METHODS

Seven cultivars, Purupuru, Obare-red, Obare-white, Kuffour, Cinkanse, Cinkanse-Abiga and Cinkanse-Naabug, were obtained from arranged suppliers in three local markets for the study. Data on fresh and dry tuber weight (g), fresh and dry peel weight (g), tuber diameter and length (cm), cooking time as well as visual peel and flesh colour were determined.

Mode of cooking: The tubers were washed, peeled and diced into lamellas of ~3×6 cm for cooking by boiling and frying. Boiling was done by immersing the samples into a cooking pan containing water at boiling point. Deep-fat frying was done using a pan containing a non-flavoured vegetable oil at boiling point. About 2 intermittent checks and taste tests were done to ensure complete cooking.

Sensory quality evaluation: Using a five-point hedonic scale, the cultivars were scored for taste, colour, flavour, texture, mouth-feel and overall acceptability. Coded samples were assessed by 57 taste panelists, ages of 17-45, drawn from nearby communities in the Bawku municipal. The intensity of the scale was given numerical values to assist in statistical analysis. To increase consumer sensitivity, the session was held at early afternoon; coinciding with lunch period of the panelists.

Consumer preference evaluation: A further questionnaire based on consumers' first-choice preference was administered to determine the most preferred cultivar and the order of preference. The panelists were asked to assign reasons for preference or non-preference for the cultivars using same scale. For each cultivar, the Kendall's concordance analysis further identified the most peculiar sensory descriptors which were critical to panelists.

Data analysis: Data processing was done using SPSS and Analysis of Variance (ANOVA) depending on the parameter. Analysis of variance (ANOVA) was done using GenStat (Release 7.22TE) and test of significance for treatment means was by Fisher Least Significant Difference (F-LSD) at 0.05 probability. Kendall's concordance analysis was performed to test the null hypothesis of independence between the variables.

Kendall's rank correlation: Kendall's coefficient of concordance (W) is a measure of the agreement among several (m) quantitative or semi-quantitative variables that are assessing a set of n objects of interest (Siegel and Castellan, 1988). Kendall's rank correlation (W) provides a distribution free test of independence and measures the strength of dependence between two variables being compared. Where, W is expressed as:

$$W = \frac{S}{\frac{1}{2}K^2(N^3 - N)}$$

where, S denotes the sum of squares of deviation from rank means, is expressed as:

$$S = \sum\left(R_j - \frac{\sum R_j}{N}\right)^2$$

Where:
R_j = The sum of ranks for the jth sensory attribute of each cultivar
K = Number of ranking criteria or sensory panels
N = Number of sensory attributes which were ranked

$$\frac{1}{2}K^2(N^3-N)$$

is maximum possible sum of squared deviations which is expected to occur in case of perfect agreement among K ranking criteria.

Test of significance: The null hypothesis of no agreement (W = 0) among the rankings was tested for each cultivar and sensory descriptor using the Z statistic. If the computed Z is greater than the critical Z from Fisher Z statistical distribution table, the null hypothesis is rejected in favour of the alternative hypothesis. The Z statistic is expressed given below:

$$Z=\frac{1}{2}\log_e\frac{(m-1)\,w}{1-w}$$

RESULTS

Tuber characteristics: The important tuber and peel characteristics are summarized in Table 1. Traits such as tuber weight, length, diameter and dry weight are yield components. Time to boil (minutes) was Purupuru (13), Obare-red (10.5), Obare-white (12.5), Kuffour (12.5), Cinkanse (13), Cinkanse-Abiga (12.5) and Cinkanse-Naabug (15). Frying time was 6-9 min across cultivars. Both peel and pulp colour of Cinkanse-Abiga and Cinkanse-Naabug were orange but the other cultivars had different peel colours but pulp colour was white or cream. Average tuber weights (g) were Purupuru (97.8), Obare-red (212.5), Obare-white (166.3), Kuffour (153.2), Cinkanse (129.8), Cinkanse-Abiga (172.2) and Cinkanse-Naabug (172.2). Pulp dry weight (g), an essential indicator of cooking quality, was Purupuru (1.7), Obare-red (2.0), Obare-white (1.9), Kuffour (1.9), Cinkanse (1.9), Cinkanse-Abiga (2.2) and Cinkanse-Naabug (1.9). Generally, high dry matter represents a potential to yield economic weight when processed into other products as chips, crisps or flour.

Sensory quality evaluation: The cultivars received significantly different ($p<0.05$) scores for texture, colour, flavour and taste, except for mouth-feel, by the sensory panelists (Table 2). The

Table 1: Tuber and peel characteristics of 7 sweet potato cultivars

Cultivar	Tuber weight (g)	Tuber length (cm)	Tuber diameter (cm)	Pulp dry weight (g)	Peel dry weight (g)	Time to boil (min)	Peel colour (Uncooked)	Pulp colour (Visual score)	Pulp colour (Cooked)
Purupuru	97.8^{d}	10.7^{c}	12.5^{c}	1.7^{b}	1.4^{c}	13	Violet	White	Light-yellow
Obare-red	212.5^{a}	14.7^{ab}	19.7^{ab}	2.0^{ab}	1.8^{b}	10.5	Red	White	White
Obare-white	166.3^{bc}	15.5^{a}	20.7^{a}	1.9^{ab}	1.4^{c}	12.5	White	White	White
Kuffour	153.2^{bc}	13.0^{b}	17.0^{ab}	1.9^{ab}	2.3^{a}	12.5	Purple	White	White
Cinkanse	129.8^{cd}	11.0^{c}	13.7^{c}	1.9^{ab}	2.3^{a}	13	White	White	White
Cinkanse-Abiga	172.2^{ab}	15.0^{a}	19.7^{ab}	2.2^{a}	1.9^{b}	12.5	Orange	Orange	Orange
Cinnkanse-Naabug	172.2^{ab}	15.8^{a}	20.5^{ab}	1.9^{ab}	1.6^{bc}	15	Orange	Orange	Orange
$p<0.05$	0.001	0.001	0.001	0.042	0.001				

Values with different letters within column different significantly

Table 2: Overall sensory scores of 7 sweet potato cultivars

Cultivar	Taste (sweetness)	Flavour (characteristic aroma)	Mouth-feel	Colour	Texture (soft-hardness)	Overall acceptability
Purupuru	2.7^{b}	3.0^{ab}	3.0^{a}	1.4^{c}	3.1^{a}	3.1^{a}
Obare-red	2.7^{b}	2.8^{ab}	3.0^{a}	1.4^{c}	3.2^{a}	3.2^{a}
Obare-white	2.8^{b}	2.9^{ab}	3.0^{a}	1.3^{c}	3.0^{ab}	3.3^{a}
Kuffour	2.7^{b}	2.6^{b}	3.2^{a}	1.3^{c}	2.6^{b}	3.2^{a}
Cinkanse	3.0^{b}	3.2^{a}	3.1^{a}	1.3^{c}	3.0^{ab}	3.0^{a}
Cinkanse-Abiga	4.1^{a}	3.2^{a}	3.3^{a}	3.9^{a}	2.6^{b}	3.3^{a}
p<0.05	0.000	0.047	0.672	0.000	0.008	0.841

Values with different letters within column different significantly

Table 3: Effect of boiling and frying on sensory descriptors of 7 sweet potato cultivars

Cultivar	Taste (Sweetness)	Flavour (Aroma)	Mouth-feel	Colour (White-pink)	Texture (Soft-hardness)	Overall acceptability
Boiling						
Purupuru	2.9^{bc}	2.9^{bc}	2.9^{a}	1.6^{b}	3.0^{ab}	3.0^{a}
Obare-red	2.7^{c}	2.5^{c}	2.9^{a}	1.4^{b}	3.2^{a}	3.2^{a}
Obare-white	2.7^{c}	2.8^{bc}	3.0^{a}	1.4^{b}	3.0^{ab}	3.3^{a}
Kuffour	2.8^{bc}	2.4^{c}	3.0^{a}	1.4^{b}	2.4^{b}	3.0^{a}
Cinkanse	3.4^{ab}	3.6^{ab}	3.4^{a}	1.3^{b}	2.8^{ab}	3.0^{a}
Cinkanse-Abiga	4.0^{a}	3.1^{a}	3.4^{a}	3.7^{a}	2.4^{b}	3.2^{a}
p<0.05	0.000	0.000	0.205	0.000	0.026	0.843
Frying						
Purupuru	2.6^{c}	3.1^{a}	3.0^{a}	1.3^{c}	2.9^{a}	3.2^{a}
Obare-red	2.8^{bc}	3.3^{a}	3.1^{a}	1.5^{c}	3.3^{a}	3.2^{a}
Obare-white	2.9^{bc}	2.9^{a}	3.0^{a}	1.3^{c}	3.1^{a}	3.2^{a}
Kuffour	2.5^{c}	2.9^{a}	3.3^{a}	1.3^{c}	2.9^{a}	3.5^{a}
Cinkanse	2.6^{c}	2.9^{a}	2.8^{a}	1.3^{c}	3.2^{a}	3.0^{a}
Cinkanse-Abiga	4.1^{a}	3.4^{a}	3.2^{a}	4.0^{a}	2.9^{a}	3.4^{a}
p<0.05	0.000	0.595	0.642	0.000	0.680	0.879

Values with different letters within column different significantly

non-significant difference for mouth-feel (3-3.3) indicates that the cultivars had consumptive attributes well appealing to the panelists. This range corroborates well with the scores for overall acceptability (3-3.3); indicative that the cultivars will exhibit good acceptability across wide groups of consumers. Cinkanse-Abiga showed distinct orange-fleshed colour score (3.9) followed by Cinkanse-Naabug (3.3) whiles the other cultivars recorded white or cream colour score (1.3-1.4). The order of sweetness score was Cinkanse-Abgja (4.1), Cinkanse-Naabug (3.1), Cinkanse (3.0), Obare-white (2.8), Obare-red (2.7), Purupuru (2.7) and Kuffour (2.7). The methods of cooking influenced product quality as well as consumer judgment (Table 3). Boiling showed minimal masking of sensory qualities. For instance, significant differences ($p<0.001$) among cultivars existed for taste, flavour, colour and texture when samples were boiled. Whereas differences was noticed for only colour and taste when fried (Table 3). For each cultivar and sensory descriptor, the fried samples received consistently higher scores. This probably explains why sweet potatoes are usually fried for sale as a 'road-side snack' and at 'food joints' for commuters and children during the during harvest season.

Table 4: Kendall concordance coefficients and peculiar sensory descriptors influencing consumer taste preference

Cultivar	Characteristic sensory descriptor	Kendall concordance coefficient (W)	Z statistic (Fisher Z)	Conclusion
Boiling				
Purupuru	Soft texture, strong flavour	74.0	12.8	Agreement
Obare-red	Hard texture, mouth-feel	62.3	9.6	Agreement
Obare-white	Hard texture, mouth-feel	86.1	20.6	Agreement
Kuffour	Mouth-feel, hard texture	99.1	51.3	Agreement
Cinkanse	Strong flavour, Mouth-feel	88.2	25.6	Agreement
Cinkanse-Abiga	Very sweet, orange colour	41.4	23.3	Agreement
Frying				
Purupuru	Soft texture, strong flavour	119.4	12.8	Agreement
Obare-red	Hard texture, mouth-feel	98.9	9.7	Agreement
Obare-white	Hard texture, mouth-feel	122.1	20.6	Agreement
Kuffour	Mouth-feel, hard texture	150.1	51.3	Agreement
Cinkanse	Strong flavour, mouth-feel	130.9	25.6	Agreement
Cinkanse-Abiga	Very sweet, orange colour	61.0	23.3	Agreement
Cinkanse-Naabug	Hard texture, very sweet	4.7	21.4	Agreement

Where: V_1 ($d._{rank}$) = 4.96; V_2 ($d._{samp}$) = 273.04; $Z_{(Critical)}$ = 2.37

Table 5: Overall reason for preference and non-preference for the cultivars

	Reason for preference (%)		Reason non-preference (%)	
Sensory descriptor	Boiling	Frying	Boiling	Frying
Very sweet	23.7	20.4	24.1	24.2
Not sweet	25.3	13.1	11.7	16.0
Hard texture	5.0	9.4	11.8	6.2
Soft texture	14.6	19.1	21.8	28.5
White colour	4.5	0.0	0.0	7.7
Orange colour	17.4	17.1	0.0	5.6
Strong flavor	3.4	1.9	11.8	7.6
Mild flavor	6.2	19.1	18.8	4.2

Analysis of consumer preference: Table 4 and 5 showed that consumer preference for any cultivar was influenced by a combination of sensory descriptors. Consistent data variations were related to textural characteristics and to some extent colour. Panelists scores (%) showed that very sweet (23.7), not sweet (25.3), soft texture (14.6) and orange colour (17.4) were the main descriptors driving consumer preference when boiled (Table 5). Similar scores (%) were noticed for fried samples. Very sweet (24.4), soft texture (19.1), orange-fleshed (17.1) and mild flavor (19.1) were the main descriptors causing data variation. For non-preference, up to 24.1 and 21.8% of data variation when boiled, 24.2 and 28.5% when fried were due to very sweet and soft texture, respectively (Table 5). Panelists rating showed Cinkanse-Abiga as the most preferred cultivar when fried or boiled, the others received statistically comparable scores (Table 6). The overall scores (%) for preference were Purupuru (12.8), Obare-red (15.8), Obare-white (10.5), Kuffour (8.8) Cinkanse (12.3) Cinkanse-Abiga (31.6) and Cinkanse-Naabug (8.8). The Kendall's concordance coefficients (Table 4) showed the following order of preference: Cinkanse-Abiga (5.9), Purupuru (4.74), Kuffour (4.68), Obare-white (4.6), Obare-red (4.2), Cinkanse (2.8) and Cinkanse-Naabug (2.5). Analysis of consumers' 1st choice preferences revealed that 40% preferred Cinkanse-Abiga compared with Purupuru (8), Obare-red (12), Obare-white (4), Kuffour (16) Cinkanse (16) Cinkanse-Naabug (4) (Table 7). Second choice preference revealed a wider hedonic range as follows Purupuru (20.8),

Table 6: Overall ranking of most preferred cultivar by panelists

	Cooking method					
	Boiling		Frying		Total rating	
Cultivar	Frequency	%	Frequency	%	Frequency	%
Purupuru	5	16.7	2	7.4	7	12.8
Obare-red	6	20.0	3	11.1	9	15.8
Obare-white	4	13.3	2	7.4	6	10.5
Kuffour	1	3.3	4	14.8	5	8.8
Cinkanse	4	13.3	3	11.1	7	12.3
Cinkanse-Abiga	7	23.3	11	40.7	18	31.6
Sankanse-Naabug	3	10.0	2	11.1	5	8.8
Total	30	100.0	27	100.0	57	100.0

Table 7: Consumer 1st to 4th preference for the seven sweet potato cultivars (%)

Cultivar	1st Preference	2nd Preference	3rd Preference	4th Preference	Sum of rankings
Purupuru	8.0$^{(4)}$	20.8$^{(1)}$	13.6$^{(4)}$	14.3$^{(3)}$	12
Obare-red	12.0$^{(3)}$	20.8$^{(1)}$	36.4$^{(1)}$	14.3$^{(3)}$	8
Obare-white	4.0$^{(5)}$	20.8$^{(1)}$	22.7$^{(2)}$	23.8$^{(1)}$	9
Kuffour	16.0$^{(2)}$	4.2$^{(3)}$	18.3$^{(3)}$	19.0$^{(2)}$	10
Cinkanse	16.0$^{(2)}$	4.2$^{(3)}$	4.5$^{(5)}$	14.3$^{(3)}$	13
Cinkanse-Abiga	40.0$^{(1)}$	20.8$^{(1)}$	4.5$^{(5)}$	4.8$^{(5)}$	12
Cinkanse-Naabug	4.0$^{(5)}$	83.0$^{(2)}$	0.0$^{(6)}$	9.7$^{(4)}$	17

Values in parenthesis are the particular ranking of the cultivar at that stage

Obare-red (20.8), Obare-white (20.8), Kuffour (4.2) Cinkanse (4.2) Cinkanse-Abiga (20.8) and Cinkanse-Naabug (8.3) (Table 7). By these rankings, Kuffour, Cinkanse and Cinkanse-Naabug were among the least preferred; these cultivars showed hard or mealy texture (Table 4).

DISCUSSION

Several combinations of sensory descriptors can exert influence on consumer taste and preference. Food preference may vary among individuals, age groups, gender and sometimes cultures as well as geographical locations. The results suggest that pulp texture and colour after cooking were the most critical descriptors influencing consumer preference. Somehow, strong affinity existed for Cinkanse-Abiga, an orange-fleshed variety, across majority of panelists particularly when fried. Similar trends were noticed in several other studies on consumer acceptability of OFSP in Tanzania (Tomlins *et al*., 2007), Uganda (Mwanga *et al*., 2003; Yanggen and Nagujja, 2005) and Kenya (Hagenimana *et al*., 2001, Kwach *et al*., 2010). This is essential as OFSP are currently promoted in the fight against vitamin-A deficiency in Sub-Saharan Africa. Two taste preference groups were noticed. The foremost group preferred cultivars with soft texture, strong flavour and sweet taste whiles the second group preferred hard texture, mild flavour and less sweet. These differences in taste may relate to age of consumers. Children and young adults are likely to prefer traits in the first stratum compared with adults who may prefer less sweet, mild flavour and less soft food cuisines. In an earlier study, cooked SP were arbitrarily classified into two textural types (Truong *et al*., 1997). The 'moist or yam type, which has soft, syrupy texture and the dry type which has firm and mealy texture. They noticed strong affinity for the moist type, which were soft, less dense and required fewer chews.

Emphasis of which traits to select during crop improvement programmes will depend on the target beneficiaries. For instance, in North America and South Africa low dry-matter cultivars are grown, while in East Africa only high dry-matter cultivars are preferred (Tomlins *et al*., 2004). In Uganda, high yield, early maturity and drought resistance were most critical (Yanggen and Nagujja, 2005). In Kenya, farmers selected varieties based on roots taste, ease of cook, aroma and texture. But in drier areas such as Kendu, farmers' emphases were on yield, market potential, drought tolerance and resistance to pests and diseases (Kwach *et al*., 2010). In participatory sensory evaluation in Tanzania. Tomlins *et al*. (2004) identified the most important sensory descriptors influencing acceptability to be starch and stickiness. Consumers preferred varieties which were starchy but not sticky while least preferred varieties were not starchy and not sticky. Combining several descriptors, Tomlins *et al*. (2007) noted that the most acceptable varieties had sensory descriptors as watery, pumpkin flavour and orange colour. In some cases, consumers preferred varieties with high dry matter content greater than 27%, mealy-fleshed and starchy (Hagenimana *et al*., 2001; Keith *et al*., 2004).

CONCLUSION

The decision to adopt a new cultivar is complexly related to field and yield performance as well as consumer taste acceptability. Results of this study will be integral in ongoing varietal trials and sweet potato improvement programs in Ghana. Sensory descriptors of the most preferred variety, Cinkanse-Abiga, were orange flesh, sweet, strong flavour and starchy. The 2nd preferred variety, purupuru, was white, sweet, strong flavour and starchy. These sensory attributes indicate that in addition to colour, cultivars which combine descriptors as starchy and stickiness, less dense texture requiring little chewing, strong flavour and good mouth-feel would be more appealing to consumers of wide diversities. Though Cinkanse-Naabug is orange-fleshed, it was ranked among the least preferred due to its mealy and hard texture. Kuffour, Obare-white and Obare-red were noted for hard texture and good mouth-feel. The last two Cinkanse and Cinkanse-Naabug were hard and mealy. The mealy types turn to deform less or break into small particles which adhere to the mouth surface such as gum, teeth or palate during chewing. Where critical differences among cultivars are expected during sensory evaluation of sweet potato, boiling is recommended. However, frying quite enhances the overall consumptive quality.

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