Laboratory Standard Operating Procedure

Sensory Characterization of Boiled Yam

Biophysical Characterization of Quality Traits, WP2

Cotonou, Benin, January 2020

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Ethics: The activities, which led to the production of this document, were assessed and approved by the CIRAD Ethics Committee (H2020 ethics self-assessment procedure). When relevant, samples were prepared according to good hygiene and manufacturing practices. When external participants were involved in an activity, they were priorly informed about the objective of the activity and explained that their participation was entirely voluntary, that they could stop the interview at any point and that their responses would be anonymous and securely stored by the research team for research purposes. Written consent (signature) was systematically sought from sensory panelists and from consumers participating in activities.

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RTBfoods

WP2: Biophysical Characterization of Quality Traits

SOP: Sensory Characterization of Boiled Yam

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ABSTRACT

This activity aims to standardize the procedure for sensory attributes mapping of boiled yam using quantitative descriptive analysis. Major quality attributes of boiled yam are related to colour, texture, taste and odour. Beside yam varieties, the effect of sections alongside the tuber on the sensory attributes were highlighted. In this respect, boiled yam was prepared according to the Standard Operating Procedure (SOP) related to sample preparation and cooking time for texture analysis. Five varieties and three cutting sections (proximal, central and distal) were designed giving a total of fifteen samples of boiled yam piece (50 g) with approximately 1.5 to 2 cm of thickness. The samples were stored for approximately 2 to 3 min before being served at around 60-68 °C. They were evaluated by 15 trained panellists through four attributes of appearance, four of texture by hand, two of texture in mouth, one of odour and three of taste. Each sample was tested in triplicate during three sessions. In parallel to sensory analysis, instrumental analyses such as texture, colour and dry matter content were performed on a part of samples while another part was dried at 50 °C for 24 h for future biochemical analyses.

Keywords: Yam tuber, tuber section, preparation, boiled yam, quantitative descriptive analysis, colour, texture, taste

1 SCOPE OF THE STUDY

1.1 Scope

The study aims to establish the sensory mapping of boiled yam using QDA methodology

1.2 Prerequisite

The setting up and managing a sensory analysis tasting panel was explained in the deliverable: RTBfoods_F.2.2_2018.pdf

2 PRODUCT

2.1 Product Preparation in Laboratory conditions

1. Select 2-4 yam tubers per variety, corresponding to approximately 4 kg
2. After washing, cut each tuber into three equal sections: proximal, central and distal (photo 1)

Photo 1: Section of yam tuber for samples preparation

3. Assign a 3-digit code to each sample. Attach coded labels to the samples/ appropriately for minimising bias. Use and maintain these 3-digit codes throughout the preparation process to label cooking pots and trays, and also as dish codes when serving the panel.
4. After peeling and washing, 1/10 at the bottom side of section length is removed and discarded for the proximal and distal parts.
5. Cut each section into pieces of about 40 - 50 g with approximately 1.5 to 2 cm of thickness.

   Introduce successively in the pan/pot, the tap water (approximately 1.7 L), support material, and then yam pieces (3 kg). They are covered with polypropylene bag (photo 3) before closing of the pot/pan by lid.

Photo 2: Raw peeled-sliced yam pieces in cooking pot

6. Cook for 35 min using gaz cooker

2.2 Sample storage conditions after cooking

Samples are stored in insulated containers, for sensory analysis, texture and “colour and dry matter” analysis in laboratory. A part of samples are dried at 50°C for 24 h for future analyses.

3 TASTING SEQUENCE

3.1 General Information

3.1.1 Test Responsible Person/Group Animator

Laurent Adinsi: (laurent.adinsi@yahoo.com or adinsil2003@yahoo.fr)

Noël Akissoé: (noel.akis@yahoo.fr

3.1.2 Date/Time Phase of the test

The tests were done from 20/01/2020 to 31/01/2020, and at 10:00 to 11:00 a.m and 12:00 to 13:00 p.m. The first two sessions are devoted to the generation of vocabulary, the definition and techniques for evaluating sensory attributes. The three following sessions are used to train panellists for the use of attributes and scales. Finally, the sensory test is performed when the accordance is established within and between panellists.

3.2 Sample

3.2.1 Quantity of sample to be given to each panellist

Each panellist received one piece of about 50 g at each session

3.2.2 Type of dish

Each sample is served in a plastic plate

3.2.3 Temperature of tasting

After cooking, the samples are stored for approximately 2 to 3 min before being served at around 60-68 °C. The panellists immediately assess the appearance attributes during 3 to 4 min and thereafter, the texture. When assessing texture, the temperature of the sample is around 45 °C (43-50). Sensory evaluation takes approximately 15 minutes per sample.

NB. During preliminary tests, the temperature varied from 60 to 68 °C after 2 to 3 min, and is around 43-50°C after 5 to 6.

3.2.4 Repeated sample

Each sample is tested in triplicate during three sessions.

3.2.5 Sample Codification

The fifteen samples (5 varieties and three sections) (Table 1) were evaluated by the panel and they were randomized according the codification aforementioned in section 2.1.

Table 1: Yam samples evaluated

Age	Harvest month	Name of varieties	Part of the tuber
6	December	Laboko	Proximal
			Central
			Distal
10	December	Ala-Kodjèwé	Proximal
			Central
			Distal
10	December	Gnidou	Proximal
			Central
			Distal
10	December	Dèba	Proximal
			Central
			Distal
10	December	Kpètè	Proximal
			Central
			Distal

3.3 Service

3.3.1 Number of sample tasted by session

At each day, two sessions of 1 hour were carried out with a break of 1h. For a session, 4 samples are tasted.

3.3.2 Type of service (ex: monadic, …)

The samples are served monadically (one after another), once they have been tasted by all the panellists.

3.4 Panel

3.4.1 Number of panellists who participate in this study

15 trained panellists participate to the sessions

3.5 Vocabulary

Type	Attributes	Definition	How to measure?	Scale (mm)
Colour / appearance	White colour	Both inner and outer colour can range from light yellowish (off-white) to white (pure white)	Observe the surface of product and evaluate the intensity of each type of the colour and its homogeneity	0 : Off-white 100: Pure White
	Brown colour	Brown colour of product after cooking		0 : No brown 100 : Brown
	Purple colour	A purple colour drawing on the pink		0 : No purple 100 : Purple
Aspect / appearance	Presence of black points	Refers to the presence of small black points on the surface of product	Observe the surface of product and evaluate the frequency/number of the black points	0 : Absent 100 : Present
Texture by hand	Sticky	Property related to the adhesion of the product between the fingers	Press the product between the fingers and assess the ease of the product to come off the upper finger or to adhere to fingers	0 : No sticky 100 : Sticky
	Hard to break/cut	Force required to cut/break with fork	Use the side of the disposable fork to break / cut the product	0 : Ease to cut 100 : Difficult to cut
	Crumbly	Property of the product to crumble or break between the fingers	Crush the product between two fingers and assess the ease of breaking	0 : No crumbly 100 : Crumbly
	Presence of fibers	Refers to the presence of fine fibers between the fingers and visible to the eye	After breaking / cutting, breaking / crumbling, evaluate the intensity of fine fibers between the fingers and visible to the eye	0 : No fibers 100 : Fibers
Texture in mouth	Granular	Refers to the presence of small grains during chewing	Put the product and mash/crush it between the molars to assess the presence of small grains on the tongue	0 : No granular 100 : Granular
	Easy to chew	Property related to the number of chews necessary to swallow the product	Put the product between the molars and mash it to assess the number of chews before swallowing	0 : Difficult 100 : Easy
Odour	Yam odour	Odour of boiled yam	Take a whiff and evaluate the intensity of yam odour	0 : Low 100 : High

Type	Attributes	Definition	How to measure?	Scale (mm)
Taste	**Sweet/sugary**	Basic light sugary taste like a little glucose or sucrose in water solution	Put a part of the sample in the mouth and on the tongue; then evaluate the intensity of sugary taste	0 : Neutral/Absent 100 : Sweet
	Bitter	Basic bitter taste like small quantity of quinine or caffeine in water	Put a part of the sample in the mouth and on the tongue, and then evaluate the intensity of bitterness	0 : Neutral/Absent 100 : Bitter
	Bitter aftertaste	During chewing, bitter taste after swallowing, eg there is a light bitter aftertaste	After swallowing, observe the feeling/sensation of the bitter taste on the tongue and assess its intensity	0 : Absent 100 : Present

3.6 Pictures to illustrate the tasting sessions

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