SENSORY EVALUATION DURING IN-PROCESS OPTIMIZATION OF 'ITUGHA' PRODUCTION

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Introduction

In a report documenting traditional processing of *irvingiavar gabonensis* seeds into *itugha*, this traditional technology involves size reduction, repeated pounding, fermentation and heat treatment (1). In fermentation optimization different combinations, conditions and medium components needs investigation to determine the biomass with the physiological state best constituted for the product (2). This study aims at highlighting the unit processes, sensory evaluation, and a standardised process flow chart, for process validation andproduct reproducibility.

Methods

Two samples of de-hulled 120g fresh Irvingia seeds were used. One milled into a fine paste and stored away for six (6) days and second subjected to 45 minutes size reduction daily for six days afterwhich heat to both samples. Sensory analysis, pH, temperature, titratable acids, presumptive micro-organisms, were determined on daily basis for both samples. For sensory analysis, 9-point Hedonic Scale (3) for acceptance and preference tests were used. Organoleptic changes including texture, aroma and taste were also monitored during the production process. In assessing the role of identified micro-organisms, enumeration of aerobic heterotrophic bacteria was by Method (4) and enumeration of aerobic heterotrophic fungi was by method (5). Bacterial isolates characterization was by Method (6) and fungi screening by an Identification Schemes (7). Daily pH recording was carried out using a Phillip digital meter (Dye UnicampphL 442 K London, UK).

Result

Table I: Microbiological Identification and Prevailing Conditions of Treatment Materials

Day	P^H	Tempt (^{0}C)	Acidity	Microorganism
1	7.0 ± 2.6	36	0.5 ± 1.50	Micrococcus, streptococcus
2	6.4 ± 1.1	36	1.4 ± 0.40	Micrococcus, streptococcus, bacillus
3	6.0 ± 1.7	36	1.8 ± 0.10	-do-
4	5.6 ± 1.4	36	2.8 ± 0.11	Micrococcus, streptococcus, bacillus, Candida tropicalis, DMB 321
5	5.1 ± 2.2	36	4.4 ± 0.30	-do-
6	4.7 ± 1.1	36	5.0 ± 0.21	-do-
7	4.5 ± 1.1	70	5.4 ± 0.11	Micrococcus, streptococcus

Mean±SEM, (n=3)

Table 2: Role of Micro-organisms on organoleptic Attributes.

Days	Predominant Microorganism	Viable Count (cfu/ml)	Tempt (^{0}C)	Organoleptic Changes	
				Texture	Aroma
1	Bacteria	Too numerous to count	36	Drawy mash	No smell
2	Bacteria	Too numerous to count	36	Drawy mash	No smell
3	Bacteria	>300	36	Drawy mash	No smell
4	Yeast	87	36	Drawy mash	No smell
5	Bacteria	>300	36	Drawiness reduced	Alcohol smell
6	Yeast	260	36	Drawiness ceases	Alcoholic smell persist
7	Yeast	300	36	Drawiness ceases	Alcoholic smell persist
8	Bacteria	100	70	Spreadable & oily	Spicy aroma developed

Table 3: Organic acid content of seeds and Itugha ferment

Organic Acid	Sample (% DM)	
	Irvingia Seed	Ferment
Citric Acid	16.00± 1.13	2.40± 1.10
Glycolic Acid	1.26 ± o.01	1.22 + 0.01
Oxalic Acid	6.59± 1.20	2. 98± 0.08
Malic Acid	6.28± 1.40	0.11± 0.00
Tartaric Acid	1.44± 0.02	0.19± 0.01

Mean±SEM, (n=3)

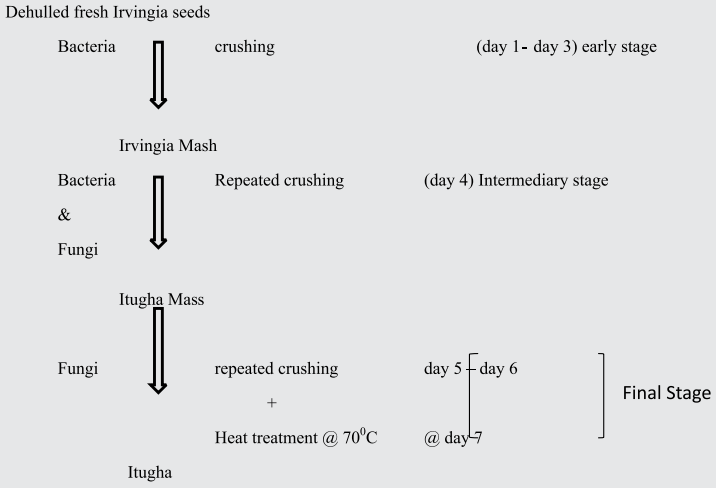
Table 4: Sensory Evaluation of Itugha

Rating	Sensory Attributes				Overall Acceptability
	Taste	Flavour	Texture	Odour	
Like Extremely	8.0 ± 0.1	7.1±3.0	9.1±0.1	7.7±1.4	7.5±0.8
Like very Much	7.9 ±1.1	7.8 ±4.1	8.4 ±1.4	6.8 ±1.7	8.8 ±1.2
Like Moderately	8.3 ±2.0	7.0 ±1.3	7.6 ±2.0	9.1 ±4.0	9.3 ±1.1
Like Slightly	8.1 ± 1.1	6.9 ± 2.3	7.7 ± 1.3	7.4 ± 2.1	7.1 ± 1.3
Neither Like nor Dislike	8.4 ± 0.1	7.3 ±1.1	8.1 ± 1.1	7.9 ±1.3	6.0 ± 1.0
Dislike Slightly	-	-	-	-	-
Dislike Moderately	-	-	-	-	-
Dislike very much	-	-	-	-	-
Dislike Extremely	-	-	-	-	-

In all determinations, the number (n) of ass essors =96, Present ability =7.0±1.1, Ranking =72.6±0.4

Discussion

Itugha Production Process Flow Chart Showing Mechanical Activities, Microbes and Stages of Production Processes.



Conclusion

This optimization technique used in *itugha* production,was an open-ended system. Hereafter a closed-ended system would be used to further the research. *Itugha* production method in-process optimization is a combination of borrowing and component replacing techniques (8,9,10) and parameters critical in sensory evaluation and by extension quality of the product were microbes, pH, temperature, fermenting medium acidity, texture and aroma.

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