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Full Length Research Paper

Profiling of processors for baked and fried wheat based products in Nairobi Kenya

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This study aimed at profiling bakers and fryers of wheat products in Nairobi to inform decisions leading towards incorporation of Orange Fleshed Sweet Potato (OFSP) puree in these products. An exhaustive sampling was carried out and 748 processors were interviewed in Nairobi County. The results indicate that even though there were more female processors than men, this difference was not significant ($p>0.05$). Majority of processors and consumers were youths and there was low adoption of OFSP as an ingredient (4%). However, about 78% of the processors were willing to adopt OFSP puree as an ingredient. Moreover, the youths dominated the micro-enterprises presumably because they have a lot of energy as well as huge potential for innovation. Major customers were street passerby as majority operated roadside kiosks or hotels while location had significant ($p<0.05$) influence on willingness to adopt OFSP, production trends, main customers as well as markets for the products. The survey recommends capacity building among the Micro-Small-Medium-Enterprises (MSMEs) in order to be able to adopt nutritious ingredients such as Orange Fleshed Sweet Potato (OFSP) puree as a way of improving food and nutrition security for the masses that rely on fried and baked products.

Key words: Bakers, fryers, orange fleshed sweet potato, micro-small-medium-enterprises, wheat products.

INTRODUCTION

Fried and baked products play a key role in food and nutrition security of many populations given that a number of people rely on these products in their daily meals beginning from breakfast to lunch and supper (Williams, 2014). The enticing flavour and convenience make fried and baked products preferred by many consumers and hence their popularity (Nwosu et al., 2014). Among the most popular baked and fried products

include bread, doughnuts (KDF), chapattis, cakes, bans and rolls all of which differ in their frequency and occasions they are required. Bread baking, for instance, is an old process that dates back to over 12,000 years ago being a deliberate experimentation with water and grain flour (Arranz-Otaegui et al., 2018). Bread is a widely consumed breakfast cereal globally with diverse recipes (Williams, 2014) with production being spread all over the

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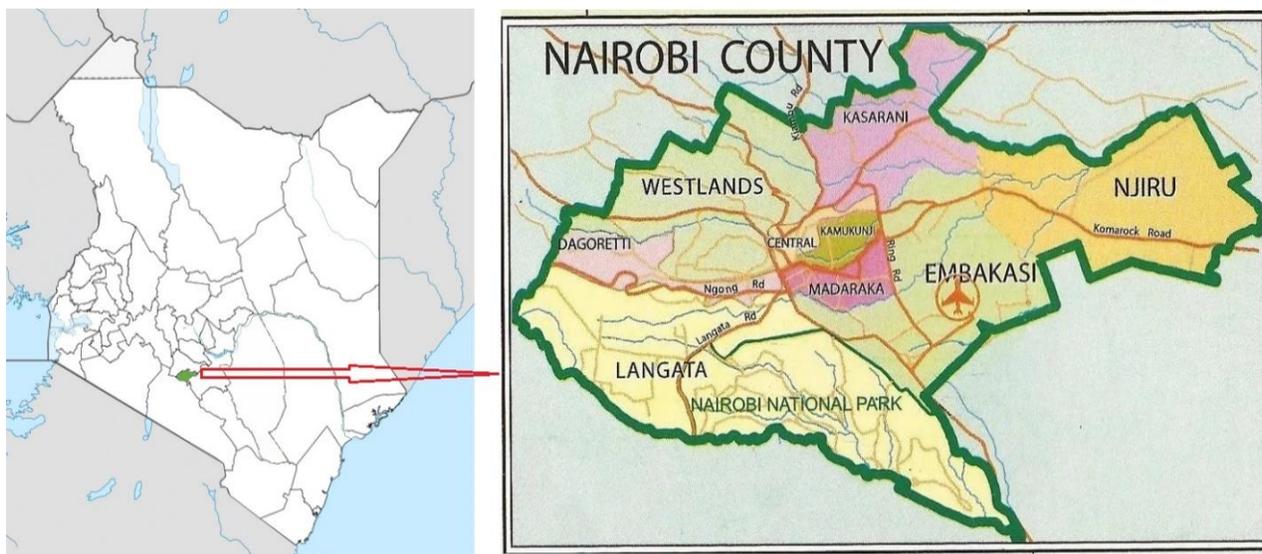


Figure 1. Study area, Nairobi County.
Source: <https://softkenya.com>.

world with different countries having different kinds of domesticated bread production methods (Adiguzel et al., 2019). Though initially crude, bread production has evolved over the ages in terms of ingredients used with the latest developments in bread production leading to the advancements in the bread industry that have enabled the use of various composite flours including purees to produce bread for improvement in the sensory acceptability and physico-chemical quality (Adeyeye and Akingbala, 2015; Julianti et al., 2015; Muzhingi et al., 2018).

There are different types of bread but the two main categories are leaven and unleaven breads. Leavened breads make use of yeast as the main fermenting agent and hence have large volumes (Nwosu et al., 2014). On the other hand, unleaven breads are usually flat given that no yeasts or fermentation agents are used. Processing of baked and fried products are carried out by diverse groups of processors ranging from small scale kitchen and street processors to medium and large scale processors of bread and cakes. There is no doubt that regulation of this sector is quite challenging, from quality and public health perspective. Products arising from the diversity of processors also vary in their quality and safety depending on the location and market base (Ijah et al., 2014; Nwosu et al., 2014).

Most of the industrial production of fried and baked products such as bread, doughnuts, cakes among others in sub-Saharan Africa (SSA), Kenya included, relies on wheat as the raw material. To change this scenario, alternative locally available, highly nutritious and more affordable raw materials such as orange fleshed

sweetpotato (OFSP) puree need to be adopted. There is therefore need to understand the current processing industry.

There is a huge diversity processed and baked wheat products in Nairobi that leads to huge variations in terms of quality and safety of processed products that are offered to consumers whose information is limited. Understanding this sector and characteristics of the products currently offered in the larger Kenyan market, Nairobi city, will provide a path on which OFSP puree products can get into the existing market. Consequently, this will also inform marketing strategies that will assure uptake and incorporation of OFSP based products as a way of scaling up. The objective of this study was to profile processors of baked and fried wheat products in Nairobi County in Kenya, with emphasis on assessing the formal and informal bakeries or fryers based on their location, size and nature of operation, range of products and their market base.

MATERIALS AND METHODS

Study area

This study was carried out in Nairobi County, Kenya. The county hosts the capital city of Kenya and has nine sub-counties: Makadara, Embakasi, Starehe, Langata, Kasarani, Westlands, Kamukunji, Dagoretti and Njiru (Figure 1). The county's population is estimated to be over 4.4 million according to the latest census (Kenya National Bureau of Statistics, 2019). Most of the population are low-income earners hence dwell in slums. The county has many markets offering food stuffs with most of these food markets being open air markets. For the purpose of this study, all sub-counties were sampled.

Study design

The study design was a cross-sectional study design employing qualitative data collection methods through interviews and observation.

Study population and sampling technique

The study consisted of street processors of fried and baked products as well as industries that are involved in processing baked and fried products commercially traded in Nairobi Kenya. A total of 748 respondents were exhaustively sampled from the survey. Since the study was carried out during COVID-19 pandemic period, the number that was surveyed may not include those who may have temporarily stopped processing.

The survey instruments

A semi-structured questionnaire was used for this study. The tool was written in English and captured information on ownership, size and years of operation, main ingredients, range of products and market base as well as any other relevant information. The tool was pre-coded in Computer Aided Personal Interview (CAPI) which facilitated the use of Open Data Kit (ODK) in data collection.

Data collection

The data collection was carried out in the year 2020 between the month of May and August. The questionnaire was administered to all processors, both small, medium and large-scale bakeries and informal street processors. For formal registered companies, visits to supermarkets/kiosks were made to map out all baked and fried products being sold, key ingredients and contacts of the same were picked to trace processors for interview. Kenya Association of Manufacturers (KAM) data base was consulted to ensure all formal bakeries are reached. Since informal processors are not easy to trace from their products most of which have no labels, all streets in sub-counties were scanned by research assistants. Data was collected using the ODK tool.

Study ethics

Before answering any question, consent was sought from the respondents. The respondents were taken through the purpose of the study, asked to voluntarily participate in the study and assured of confidentiality of their responses. They were then asked to give consent before proceeding with the study. A considerable distance was kept between the enumerators and the respondents as well as having mask on during the interview process; this was in compliance with the ministry of health protocols as the study was carried during Covid-19 pandemic.

Data analysis

Data obtained was coded and entered into SPSS for Windows software (IBM version 21) and analyzed. Descriptive statistics were used to summarize the data while associations were tested using appropriate inference statistics. Chi-square test of significance was used to test for any existing significant associations between the various variables under study with a *p-value* less than 0.05 being set as the level of significance.

RESULTS

Socio-demographic characteristics

Table 1 shows the socio-demographic characteristics of the respondents.

Most of the respondents involved in baking or frying business were of female gender (56%) compared to males (44%); this difference was, however, insignificant ($p > 0.005$) and hence the industry could as well be considered as an adventure for both genders. At least 80% had completed secondary school or colleges and university hence considered literate. It was therefore easy to converse with them during the interviews. Fifty-four percent of the respondents were the owners of the business while 46% were employees that could mean that a lot of youths either own or employed in this sector given, they were the majority respondents. The businesses could also be easy to start and may require smaller capital compared to other businesses. Promotion of these businesses should therefore target the youth.

Nature of business

Table 2 summarizes the nature of bakery/fryer businesses in Nairobi Kenya. Most (70%) of the respondents have been operating for the last 1 or more years hence were in a position to answer to questions regarding their operations. More than 50% have only been in the business for two years which could translate to the sector having progressive growth in terms of those getting into the sector and/or value chain.

Majority (94%) of the businesses were micro enterprises having between 1 and 10 employees and they processed either once or twice daily (80%), while others processed more than twice a day (7.5%). There were differing opinions on business trends. Those who indicated that the trend was increasingly attributed it to mushrooming new outlets, high customer demand, product diversification and good products quality.

On the other hand, others noted that there has been decreasing business trend attributed to COVID-19 pandemic partial lock down given that most clients closed down especially those who relied on schools that were shut for long periods, changing consumer preferences, shifting demand for homemade foods and alternatives such as sweet potatoes and the safety concerns from consumers.

Nature of products

Chapaties are the main products (74.5%) processed by the respondents followed by doughnuts (mandazis/KDF) (Table 3). The key ingredients for the baked and fried

Table 1. Socio-demographic characteristics of bakers/fryers in Nairobi Kenya.

Description	Number of respondents (N)	Respondents (%)
Gender		
Male	344	46
Female	404	54
Education Level		
College/University	231	30.9
Completed secondary	439	58.7
Completed primary	45	6
Dropped out from primary	3	0.4
Dropped out from secondary	12	1.6
In primary	2	0.3
In secondary	14	1.9
Never been to school	2	0.3
Age		
Teens (12-17)	11	1.5
Youth (18-35)	613	82
Middle age (36-60)	105	14
Not answered	19	2.5

Table 2. Nature of bakery/fryer businesses in Nairobi Kenya.

Description	Number of respondents	Respondents (%)
Years in business		
<1 year	226	30.2
1-2 years	200	26.7
> 2 years	322	43.1
Size		
Micro enterprise (<10 employees)	703	94
Small enterprise (11-50 employees)	38	5.1
Medium enterprise (51-250 employees)	6	0.8
Large enterprise (>250 employees)	1	0.1
Frequency of operation		
Once a day	285	38.1
Twice daily	401	53.6
Once a week	1	0.1
Twice a week	5	0.7
Others	56	7.5
Business trends		
Increasing	233	29.8
Decreasing	306	40.9
Indifferent	219	29.3

products include wheat flour, fats/oil, sugar/sweetener, baking powder and salt. Other ingredients used by a few

processors (12%) included carrots, lemon, pumpkin, milk, coriander, sweet potato, ginger, eggs and margarine.

Table 3. Nature of products and main ingredients used by processors in Nairobi.

Description	Number of respondents	Percentage
Main products		
Bread	42	5.6
Donuts	128	17.1
Cakes	137	18.3
Chapati	565	74.5
Others*	473	63.2
Main ingredients		
Wheat flour	743	99.3
Fats/oil	742	99.2
Salt	737	98.5
Sugar/sweetener	576	77
Baking powder/yeast	476	63.6
Others	86	11.5
Type of flour		
All-purpose wheat flour	665	88.9
Baking flour	269	36
Soft wheat flour	22	2.9
Others (self-raising wheat)	16	2.1
Unit of packaging		
Less than 20 kg	646	86.4
30 kg	64	8.6
50 kg	20	2.7
70 kg	3	0.4
Others (more than 70 kg)	15	2

*Others= Mandazi, Bhajia, KDF, biscuits confectionary, ngumu, mahamri, pastries, pizza, kebab, cookies.

Table 4. Names of premises incorporating of orange fleshed sweet potato in their production process.

Constituency of operation	Number	Name/contact
Dagorreti North	1	Kibanda
Dagorreti South	2	Wema Hotel
Langata	2	Tuskys Karen, The Mayura – Hub Karen
Kibra	1	Kwa Davie
Roysambu	4	Café 316 Fast Foods; Kini's Kitchen; Vale's Cakes; Victoria Eats
Kasarani	2	Farm fresh milk and Bakery; Mashan Café
Ruaraka	7	Cake Shop, Hotels and 5 Vibandas
Kamukunji	2	Mawan Hotel; Shawarma Hotel
Starehe	1	Tuskys Pioneer – Moi Avenue;
Total	21	

*These come from the 17 constituencies in Nairobi that were surveyed.

Majority of the processors use all-purpose wheat flour while a few uses self-raising wheat flour (2.1%). Majority package their products in quantities less than 20 kg, justifiably because most of them are micro-enterprises

and they depend on customers most of whom require convenient sizes.

Orange Fleshed Sweet Potato (OFSP) has only been used by 4% of the respondents (Table 4). However,

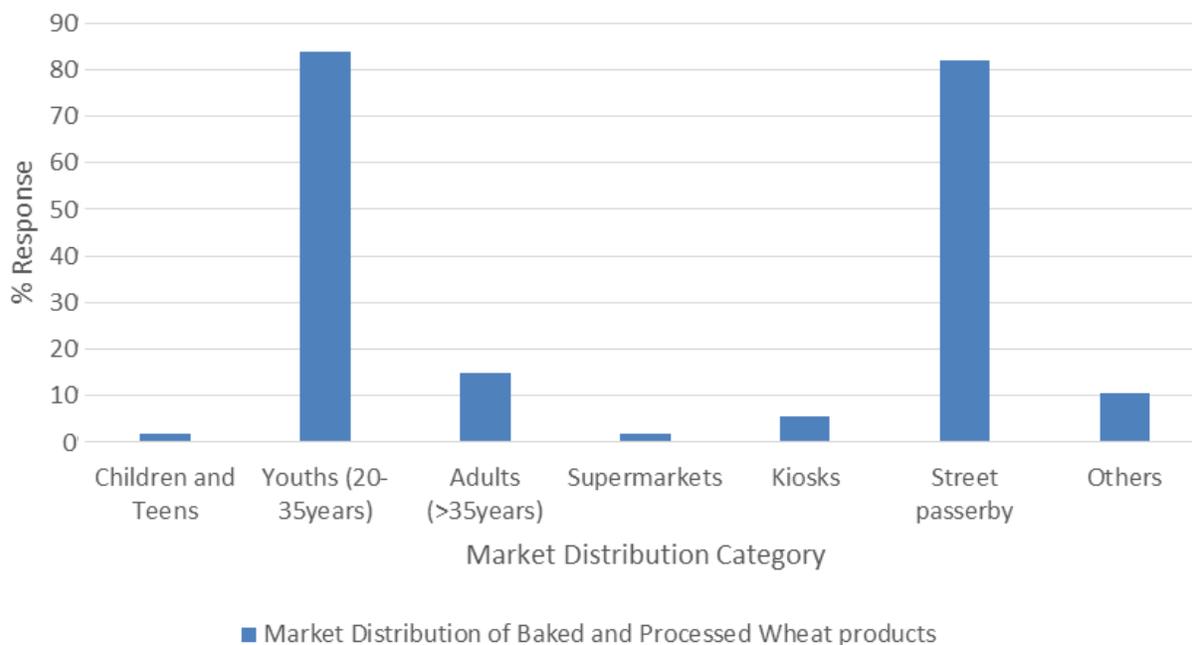


Figure 2. Market distribution of baked and processed wheat products based on age and outlets.

majority (78%) were willing to incorporate if it would improve health and volume of products. Sixty percent of processors were willing to participate in technology demonstration for incorporating OFSP into their products.

Marketing and customer base

Majority had youths as their main customers (84%) as shown in Figure 2. However, some of the respondents indicated that it was difficult to categorize who the main customers were. Street passersby are the main markets for most of the respondents justifiably because many processors are micro and street based as subsequently shown.

Food safety and training

Almost half of the respondents have not undergone any form of training on food safety and hygiene (55%). However, to ensure that hygiene and safety is kept at the operation area, the respondents have different copying mechanisms that include: cleaning their work place on a daily basis, try to comply with safety and health guidelines, using proper packaging materials, using proper packaging materials and sanitizing as part of the Ministry of Health (MoH) guidelines, equipping employees with safety gears. Some premises needed an overhaul of the set up to be a food processing business.

Associations between socio-demographics and other parameters

Table 5 shows the associations between socio-demographic characteristics and other practices.

DISCUSSION

The age of the respondents was significantly associated ($p < 0.05$) with adoption of Orange Fleshed Sweet Potato (OFSP) in the production, size of operation, frequency of production and main customers. Similar studies have reported that the elderly are less likely to venture into new technologies and/or innovations, as their energy is limited (Berkowsky et al., 2017). On the other hand, gender only influenced frequency of production, with majority being youth and risk takers especially the female gender (Canevari-Luzardo, 2019). The dominance of any business is determined by a number of factors, food business especially in the African context would be determined by the social culture where most of the cooking is usually left to the female gender (Gurung et al., 2016). This could explain the slightly higher numbers of females in this industry.

Education level was significantly associated ($p < 0.05$) with products produced, role played in business, main customers, main market, and size of operation. The level of literacy was quite high and agrees with the report by the Kenya National Bureau of Statistics that puts literacy

Table 5. Associations (p values) between socio-demographic characteristics and other practices.

Parameter	Gender (df=1)	Age	Education level (df=8)	Location (df=14)	Products	Production trends
Adoption of OFSP	0.986	0	0.405	0.001	-	-
Willingness to adopt OFSP	0.955	0.289	0.005	0	-	-
Size of operation	0.201	0.001	0.001	0.125	0	0.209
Production trends	0.024	0.12	0.015	0	0.023	
Scale/Frequency of production	0.001	0	0.025	0	0	0.296
Unit of package	0.083	0.916	0.046	0.008	0	-
Type of floor used	0.035	1	0.982	0	0	-
Main market	0.134	0.359	0	0	0	-
Main customers	0.102	0	0	0	0.013	0
Role in business	0.013	0	0	0.003	-	0.181
Products	0.346	0	0	0	-	-
Ingredients used in production	0.329	0.063	1	0	1	-

Association significant when the p-value is equal to or less than 0.005.

level at more than or equal to 82% (Kenya National Bureau of Statistics, 2019). The level of literacy could also be linked to the age of the respondents.

Majority of the respondents who engage in processing baked and fried wheat products being youths aged between 18 and 35 years old at 82% followed by the middle aged at 14%. With more than half of the country's population being youths, majority of them are engaging in agri-food entrepreneurship and value addition (LEO, 2016). Moreover, studies have indicated that with more knowledge acquired, individuals are able to make informed decisions on which business to venture into, technology to use and best markets hence improved productivity and returns (Mustapha et al., 2020; Raja and Nagasubramani, 2018).

More than 50% have only been in the business for two years which could translate to the sector having progressive growth in terms of those getting into the sector and/or value chain and that it is the quickest way many can earn a living (Canevari-Luzardo, 2019). It is not clear what was the contribution of COVID-19 that led a number of restrictions (UNDP, 2020), despite many attributing low business to the global pandemic (UNDP, 2020).

Location (constituency of operation) had significant ($p < 0.05$) relationship with incorporation of OFSP into the production, willingness to integrate OFSP, production trends, frequency of production, type of floor used, main market, main customers, main ingredients, products and role in business. There is need to increase puree use, improve nutrition and volume, there is need to target replacement or minimizing wheat flour (Gurung et al., 2016). According to other studies (Mukanyandwi et al., 2019), location determines production trends and frequency of operation as it has direct impact on

customers' preferences and customers will shy away from unhealthy environments. Additionally, location determines the type of raw materials used in production as a result of social class and purchasing ability, hence the smaller MSMEs will go for what they can afford as opposed to what is currently trending as the best (Caswell et al., 2013). Larger enterprises are attributed to better packaging materials, frequency of operations and better markets as opposed to smaller MSMEs whose customers are majorly locals consisting of street passersby (Connor et al., 2020; Mukanyandwi et al., 2019).

CONCLUSIONS AND RECOMMENDATION

Majority of the bakers and fryers are micro-enterprises with gender mainstreaming almost even, just depicting how this sector is fast growing as the youths take center stage in entrepreneurship, with frequency of production being at least twice a day. OFSP adoption into the sector is very low, however, with majority willing to adopt it, mainstreaming of this through robust sensitization through capacity building trainings is eminent hence recommended.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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