Scientific Publications

Open Journal of Food and Nutrition, 2023, 1, 770
www.scipublications.org/journal/index.php/ojfn
DOI: 10.31586/ojfn.2023.770

Article

Knowledge Base on "Burkina" Beverage in Ghana

Prince Musah Saeed *

[1] Department of Family and Consumer Sciences, University for Development Studies. Tamale, Ghana

*Correspondence: Prince Musah Saeed (princemusah20@gmail.com)

Abstract: The purpose of this study was to examine people's knowledge base on Burkina beverages in Winneba in the Central Region of Ghana. The study employed **a** Mixed Sequential Explanatory research approach. The population for the study were dairy consumers living in Winneba. The Krejcie and Morgan table in 1970 was used to determine the 381 sample size of this study. The study employed the purposive, convenient and simple random sampling technique to select 100 out of 381 respondents for the study. The instrument employed in this study was a semi-structured interview guide to generate responses on people's knowledge of "Burkina". An Independent t-test was used to test the null hypothesis raised at a 0.05 level of significance. Based on the results of the study, it is concluded that respondents have substantial knowledge of "Burkina". Street-sold "Burkina" can be modified using flavours and other cereals. Fresh milk must be pasteurized before using it for "Burkina", well packaged, and sold in a hygienic condition. Certain factors such as packaging, environment, food safety, price, variation in thickness and flavours influence the rate of consumption of the "Burkina". ''Burkina'' prepared with corn agglomerates had improved physicochemical attributes and health benefits. It is recommended that Food and Drug Authority representatives in winneba should regulate the "Burkina" samples on the Winneba market to ensure they are nutritious and, prepared and sold under hygienic conditions. There is the need also for Food and Drug Authority representatives in Winneba to ensure the standardization of the "Burkina" preparation to achieve a fair distribution of nutrients from all producers in Winneba and to ensure that the product meets standards before selling. Due to varying cereals, flavour options, good packaging, and pasteurization of the milk (fresh) and sold in a hygienic environment. It is again recommended that researchers develop ''Burkina'' with several flavour options and other cereals and test for consumer acceptability.

Keywords: Knowledge, "Burkina", Beverage, Cow Milk, Millet, Corn Cereals

How to cite this paper:
Saeed, P. M. (2023). Knowledge Base on "Burkina" Beverage in Ghana. *Open Journal of Food and Nutrition*, *1*(1), 74–89. Retrieved from https://www.scipublications.com/journal/index.php/ojfn/article/view/770

Received: May 21, 2022
Accepted: November 16, 2022
Published: September 9, 2023

1. Introduction

"Burkina" is a beverage enjoyed by a section of Ghanaians across the length and breadth of the Country. It has its origin from Burkina Faso and its original name is "Dègèr" [1, 2]. The beverage is not only popular in Northern Ghana, but also in Accra where it is sold in supermarkets, stores and on the streets commonly at traffic lights [3]. "Burkina" beverage mostly sold on the streets are street sold "Burkina". However, this could be due to the fact that Brukina as a street vended food provides occupation to several Ghanaians, while serving as a wholesome, economical and ready-to-eat food to millions of workers [4]. It is a fermented dairy beverage that contains cereal or grain agglomerates [5, 6]. Some individuals from various parts of the world, especially, Ghana do prepare homemade "Burkina" to take at home or serve at functions. The production of Burkina drink has become a fast growing business competing strongly with other locally prepared beverages such as "Ekudeme", "ice kenkey", "fula", "atadwe milk" among many other snacks vended on the streets of Accra [2]. "Burkina" is a nutritious product rich in protein, carbohydrates, minerals and essential vitamins, and some studies have confirmed the

probiotic nature of ''Burkina'' owing to the fermentation process [5-7]. The main ingredients for the preparation of "Burkina" are fresh or powdered cow milk or a combination of both, cereals, sugar and sometimes salt for taste [8].

Milk is one of the major food components used in the production of Burkina. Milk consists of major ingredients (water, lipids, sugar and proteins) and minor ingredients (minerals, vitamins, hormones and enzymes) [6]. The concentration of these ingredients varies among species of animals that produce milk, with the major ones being lipids (2% – 55 %), proteins (1% – 20 %), lactose (0% – 10 %) [9]. Cattle are the primary source of mammalian milk in most parts of the world, except the Indian subcontinent and portions of the Mediterranean region, Middle East and Africa, where buffalos, sheep and goats make a vital contribution to national milk production [10]. Cereal grains are described as essential dietary components which provide substantial amounts of nutrients including vitamins, dietary fibre, minerals, energy, protein and complex carbohydrates for human and animal consumption, particularly in developing and underdeveloped countries of the world [11]. Cereal grains such as corn, sorghum, rye, barley, millet, oats, wheat and acha are best for human nutrition when put into the form of flour, meal, pasta or flakes. Millets are comparable to major cereals with respect to their nutritional characteristics. They are very good sources of carbohydrates, micronutrients and phytochemicals with nutraceutical properties. The millets contain 7-12% protein, 2-5% fat, 65-75% carbohydrates and 15-20% dietary fibre. The millet grain contains about 65% carbohydrate, a high proportion of which is in the form of non-starchy polysaccharides and dietary fibre which help in the prevention of constipation, lowering of blood cholesterol and slow release of glucose into the bloodstream during digestion. Lower incidences of cardiovascular diseases, duodenal ulcers and hyperglycaemia (diabetes) are reported among regular millet consumers. Corn grain is a multipurpose crop, providing food and fuel for human beings, and feed for animals, poultry and livestock. It grains have great nutritional value and are used as raw materials for manufacturing many industrial products [12]. Its grains are important for the production of oil, starch and glucose [13]. However, Millet remains the only cereal grain used in the production of "Burkina" in Ghana [2].

"Burkina" popularly known to be a fermented milk product which contains millet has no alternative on the Ghanaian market and consumers are left with no other choice [2, 6]. Using corn agglomerates in the preparation of the beverage would serve potential consumers who do not consume millet. However, through anecdotal records, there is a paucity of knowledge on the use of corn grains for the production of "Burkina". Perhaps, researchers have not considered the nutritional profile and sensory properties of corn grains as an alternative to millet. Preparing ''Burkina'' under hygienic conditions may improve the safety of 'Burkina' and using corn agglomerates may also create a new product with sensory properties that may appeal to Ghanaian consumers. The purpose of this study was to examine people's knowledge base on Burkina beverages in Winneba in the Central Region of Ghana. A research question and hypothesis guided the study. What are people's knowledge of "Burkina" in Winneba? **Ho:** There is no statistically significant difference in acceptability of the developed "Burkina" with corn agglomerates and street-sold "Burkina". **H1:** There is a statistically significant difference in acceptability of the developed "Burkina" with corn agglomerates and street-sold "Burkina".

1.1. Production of ''Burkina''

1.1.1. Millet preparation

"Burkina" is prepared in small quantities according to traditional procedures [2]. The millet is initially sorted out to remove any foreign matter that might cause any contamination to the initial raw material. It is then washed three times to remove all forms of dirt after which it is air-dried and pounded in a mortar to remove the first coat

(epidermis) before grinding into a powdery form. Salt is dissolved in water, sprinkled on the dough and uniformly mixed. Using steam as a method of cooking the milled millet is steamed to cook until compact dough is formed. The compact dough is allowed to cool after which it is mashed manually to break the compacted dough into smaller granular coarse gravels using a masher. Margarine is rubbed in the granular coarse gravel for it to form uniformly and to add some taste to the granular millet. It is then kept in a container, covered and stored at room temperature until needed. The process is diagrammatically presented below:

Fresh millet
↓
Sorting out
↓
Washing
↓
Drain and air drying of millet
↓
Milling
↓
Cooking (steaming)
↓
Mashing of compact dough into Granules
↓
Packaging (keeping in a cool dry place)

Figure 1. Flow diagram of millet preparation [2].

1.1.2. Fermentation of raw (fresh) cow's milk

In the fermentation of fresh milk for "Burkina" beverages, no particular standard is used rather it is done traditionally based on the indigenous knowledge of the producer [2]. Raw milk is brought to a boil and transferred into a plastic basin. The boiled milk is allowed to attain a lukewarm temperature. The lukewarm milk is inoculated with starter cultures from previously fermented milk and covered overnight to ferment and then stored.

Fresh milk
↓
Boil
↓
Cool to incubation temperature (lukewarm)
↓
Inoculate with starter culture
↓
Incubate (fermentation)
↓
Package and store

Figure 2. Flow diagram of the fermentation of fresh cow milk [2].

Fresh milk consumption is linked to post-pasteurization contamination [14]. Post-pasteurization contamination of milk is mostly by contaminated hands of dairy workers, unsanitary utensils and polluted water supply [15]. Although fermented milk helps in organoleptic properties, the fermentation process results in a drop in pH which may not be able to inhibit the growth of the acidophilic microbes and thus carried to the consumer.

To address this challenge, some producers use fermented milk and yoghurt [16]. Fermented milk and yoghurt have nutritional advantages compared to raw milk. A fermented milk product has higher levels of calcium and potassium (199/255mg/100g) than raw milk (123/166mg/100g) and it plays an important role in the nutrition of infants and young children [16]. Fermented foods have special characteristics such as enjoyable flavour, aromas, textures, and improved cooking and processing properties [17]. In fermenting kinds of milk, specific combinations of microorganisms, which are defined according to national or international rules or industrial specifications, are used [18].

1.1.3. Using cow milk to produce "Burkina"

There are three different samples of preparing "Burkina" using whole milk powder, semi-skimmed milk powder and skimmed milk. Each one of these was classified as a homogenous mixture. Milk powder [whole or semi-skimmed (234 g)] was added to 900 mL of purified water to form reconstituted whole and semi-skimmed milk respectively. ''Burkina'' from skimmed milk was prepared using Ultra-High Temperature (UHT) pasteurised skimmed milk. The milk (whole, semi-skimmed and skimmed) was pasteurised at 72 °C, cooled to 43 °C and inoculated with 90 g of culture. The culture was obtained from a "Burkina" product. The inoculated milk (whole, semi-skimmed and skimmed) was incubated at 35 °C for 9 hours to form 'nunu' milk which varied in thickness and colour (based on the fat content of the milk). Fermented products were homogenized with a 20 μm mesh sieve to obtain a fine consistency [6].

1.2. Theoretical Framework underpinning the study

Diffusion of Innovation Theory which was developed by Rogers in 1962, was adapted. This is one of the oldest social science theories. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. This theory states that people as part of a social system, adapt a new idea, behaviour or product. For the researcher to adapt an innovation, the characteristics of the target population that help or hinder the adoption of innovation should be included. Adaption here means that a person does something differently than was previously done (purchase or use a new product etc.) [19].

This theory states that people as part of a social system, adapt a new idea, behaviour or product. In relation to the study, there is an innovation which seeks to create variety and provide consumers with choices on "Burkina" prepared with corn grains. The innovation was created based on the characteristics of the target population. As Rogers's theory states, before an innovation, the characteristics of the target population that will help or hinder the adoption of innovation should be included [19]. In the current study, it was observed that the target group mostly use cereals in their daily cooking, especially the use of maize is more highly used than other cereals. Further interview was conducted by the researcher to know individuals' knowledge of the "Burkina" product. Some suggestions were made by the interviewees that other cereals should be used in the preparation of "Burkina". They mentioned cereals like rice, maize and wheat. Based on their suggestions, the researcher chose maize in replacement of millet in "Burkina" to create variety and provide consumers with choices on "Burkina" in which the individuals may adopt the innovation or reject the innovation.

Diffusion refers to the pattern of adoption of a new product. The diffusion of innovation incorporates a 5-part process for adoption which includes knowledge, persuasion, decision-making, implementation and finally confirmation. The process can

be used to evaluate the efficiency of an adoption strategy and thus examine how that strategy can be amended to improve innovation. Diffusion of innovation explains how a target audience reacts to new products, whether the new products are adopted or rejected. Sometimes, an awful product is accepted enthusiastically by the customer base. Other times, a well-designed, superior product is rightly rejected.

In 1962, Everett Rogers proposed a 5-stage model to outline the diffusion of the innovation process. His framework was based on analyzing 500 studies across various disciplines [19].

The diffusion of innovation boils down to these 5 steps:

- Knowledge
- Persuasion
- Decision
- Implementation
- Confirmation

These 5 steps describe how the target audience perceives and interacts with the products up to the point where they make a decision to accept or reject. Sometimes a product fails not because of an inner flaw, but because the community is unable to support it appropriately at the time it enters the market. (https://www.interaction-design.org/literature/topics/diffusion-of-innovation)

- ***Knowledge*** **–** when the person who is the would-be adopter becomes aware of an innovation and has some idea of how it functions. They do not have enough information to make a decision to accept or reject the innovation. The current research focused on interview schedules to find the knowledge individuals have on the products. Products were explained to respondents, what it is, what they are expected to do, what the products are made of and their inputs needed during the sensory evaluation.
- ***Persuasion*** **–** a person forms a favourable or unfavourable attitude toward the innovation. Individuals may be persuaded whether or not the conditions are favourable for them or they may not be used to the product. The would-be adopters seek information which will allow them to make decisions towards the innovation. At this point, producers will be seeking to convey information about the benefits of the innovation to the would-be adopters.
- ***Decision*** **–** person engages in activities that lead to a choice to adopt or reject the innovation. The researcher will then allow the respondents to decide whether to be part of the evaluation or not which will lead to adaption or rejection. They will weigh the pros and cons of adoption and either adopt or reject. They make a decision based on their underlying perceptions and feelings.
- ***Implementation*** **–** a person puts an innovation into use once the decision is made. At this stage, the adopter makes a decision as to whether or not the innovation is useful. The adopter may also seek more information to support the use of the innovation.
- ***Confirmation*** **– a** person evaluates the results of an innovation-decision already made. The adopter evaluates their decision and decides whether to keep using the innovation or stop using it. This can be influenced by either intrapersonal or interpersonal influences.

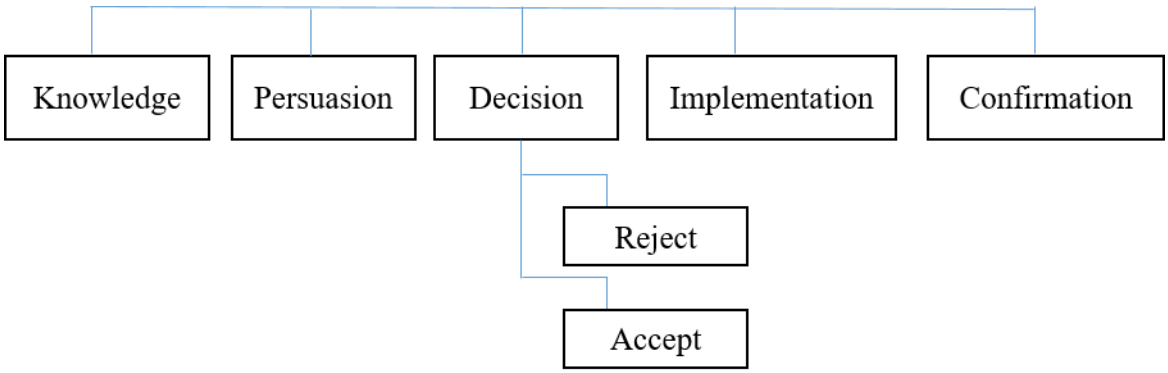

Figure 3. The five stages in the decision of innovation; Source: https://www.interaction-design.org/literature/article/the-diffusion-of-innovation-strategies-for-adoption-of-products (30th November 2020 at 11:40 am)

2. Materials and Methods

The study employed a Mixed Sequential Explanatory research approach. The study was conducted in the Winneba Township of the Central Region of Ghana. The targeted population for the study were dairy consumers living in Winneba. Three hundred and eighty-one (381) respondents were sampled for the study. The Krejcie and Morgan table was used to determine the sample size of this number [20]. The table indicates that 381 respondents were a fair representation of a population of 55,331. Out of the 381 sample size, one hundred (100) respondents were used for the study. The sample size was justifiable based by researchers that the correct sample size for consumer evaluation is between 40 and 100 consumers [21]. The study employed the purposive, convenient and simple random sampling technique.

The first stage employed purposive sampling to select all 100 diary consumers who were readily available to partake in the study. Purposively diary consumers, because, they may have minimal risk taking the "Burkina", but their participation was strictly voluntary. Convenience sampling was also used to recruit individuals who consume milk but happen to be easily accessible and, in proximity to the researcher. A simple random sampling technique was used to select ten (10) out of the 100 respondents for the interview. The instrument employed in this study was an interview guide which uses in-depth interviews (semi-structured) to generate responses on people's knowledge of "Burkina".

Test methods were done at the laboratory in triplicate to determine the characteristics of the samples in terms of the proximate and mineral analysis, pH and fatty acids carried out. All samples were made available and aseptically carried on ice in a sterile ice chest and sent to the laboratory for nutritional analysis, pH determination and fatty acids determination immediately on arrival. An acceptance test was done (sensory evaluation) to assess the degree of product likeness by respondents using the 9-point hedonic scale.

Interviews were recorded, transcribed (invivo) and analyzed thematically (inductive analysis) using a qualitative data analysis software, ATLAS.ti. All laboratory analysis was done in triplicates so as to reduce the margin of error as much as possible. Statistical Tools for Social Science (SPSS) was used to determine the Mean and Standard Deviations. The data was subjected to a one-way analysis of variance (ANOVA) and the significant difference between the means of the samples for the parameters. An Independent t-test was used to test the null hypothesis raised at a 0.05 level of significance. Results were tabulated for easy interpretation. ANOVA Statistics Solutions in 2013 is a statistical technique that assesses potential differences in a scale-level dependent variable by a nominal-level variable having 2 or more categories.

3. Results and Discussion

3.1. Existing knowledge

Figure 4 demonstrates the key points associated with the existing knowledge on "Burkina". Numbers in bracket indicates number of people interviewed with similar responses.

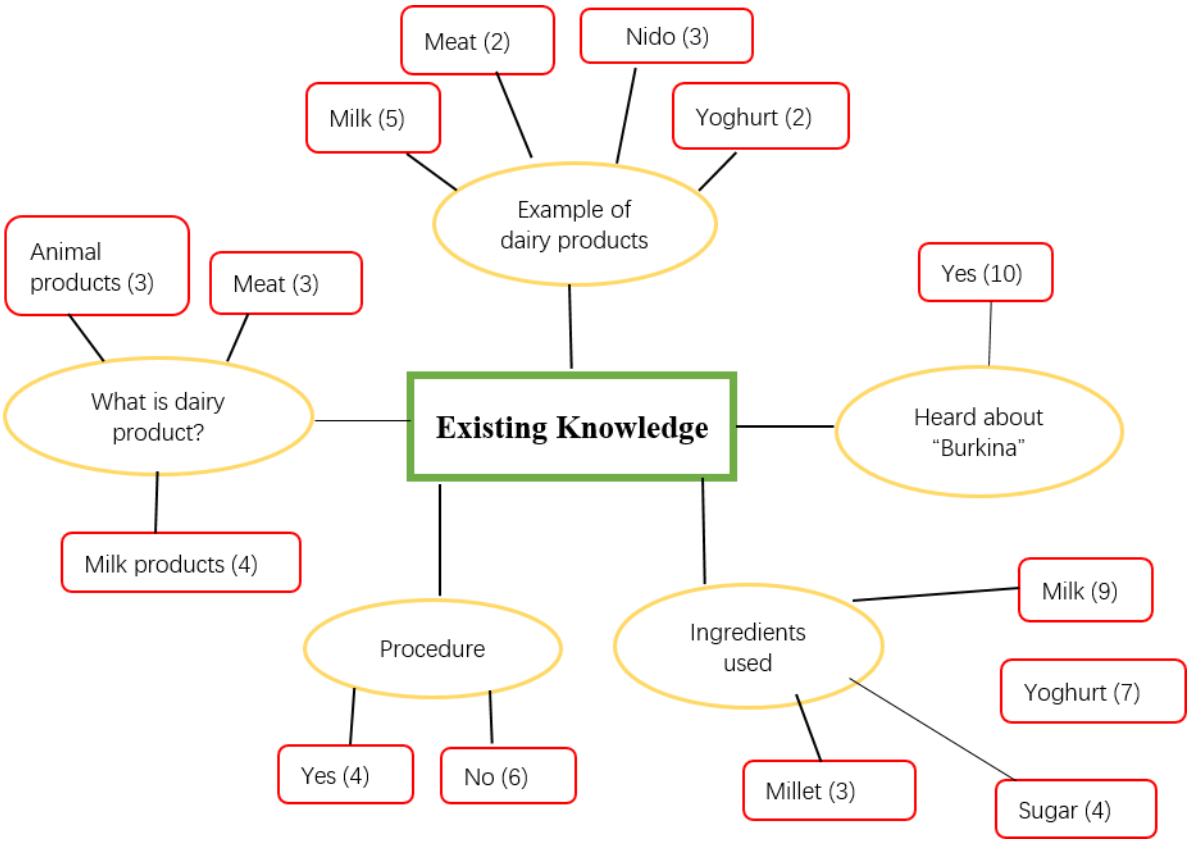

Figure 4. Existing knowledge of "Burkina" beverage (Numbers attached to various themes represent the total number of people interviewed with similar responses. Themes may appear in more than one person).

To examine the existing knowledge people, have on the "Burkina" beverage, respondents were asked what a dairy product is. Responses were animal products (3), meat (3) and milk products (4). Milk (5), yoghurt (2), nido (3) and eggs (1) were some of the examples of dairy products given by respondents. Below are some statements made by respondents: *"Dairy products are animal products that we eat, like milk ……. oh they are the meat we buy……they are the milk products we often use…"*

Examples of dairy products by respondents: *"Examples are yoghurt, nido and others"." products like milk and yoghurts". "Eggs are also a dairy product because they are animals that produce it"*

All respondents (10) said they had heard about the beverage but some (3) indicated that they did not know how it was prepared but knew of the ingredients used. However, seven respondents said they have an idea of the processes involved in the production of the beverage. Respondents (10) stated the ingredients used in the production of the beverage (milk (9), yoghurt (7), millet (3) and sugar (4)).

"The ingredients I know they use milk, sugar and the millet inside"

"They use milk and millet"

"I know someone who uses fresh yoghurt to make it and she adds the cooked millet and some sugar to it".

Results revealed that respondents had substantial knowledge on "Burkina" beverage. Some of these responses were supported by an earlier study that dairy products as milk products produced from mammals such as cows, goats and camels. It was added that ice cream, cheese, milk based dessert, yoghurt and butter were also some examples of a diary product [22]. Based on the themes (Figure 4) derived from the responses, it can be said that almost all respondents knew the ingredients for the production of "Burkina" beverage as supported by a previous study that, the main ingredients for the preparation of "Burkina" were fresh or powdered cow milk or combination of both, cereals, sugar and sometimes salt [8].

3.2. Consumption pattern

Figure 5 demonstrates the key points associated with the consumption pattern of "Burkina". Numbers in brackets indicate the number of people interviewed with similar responses.

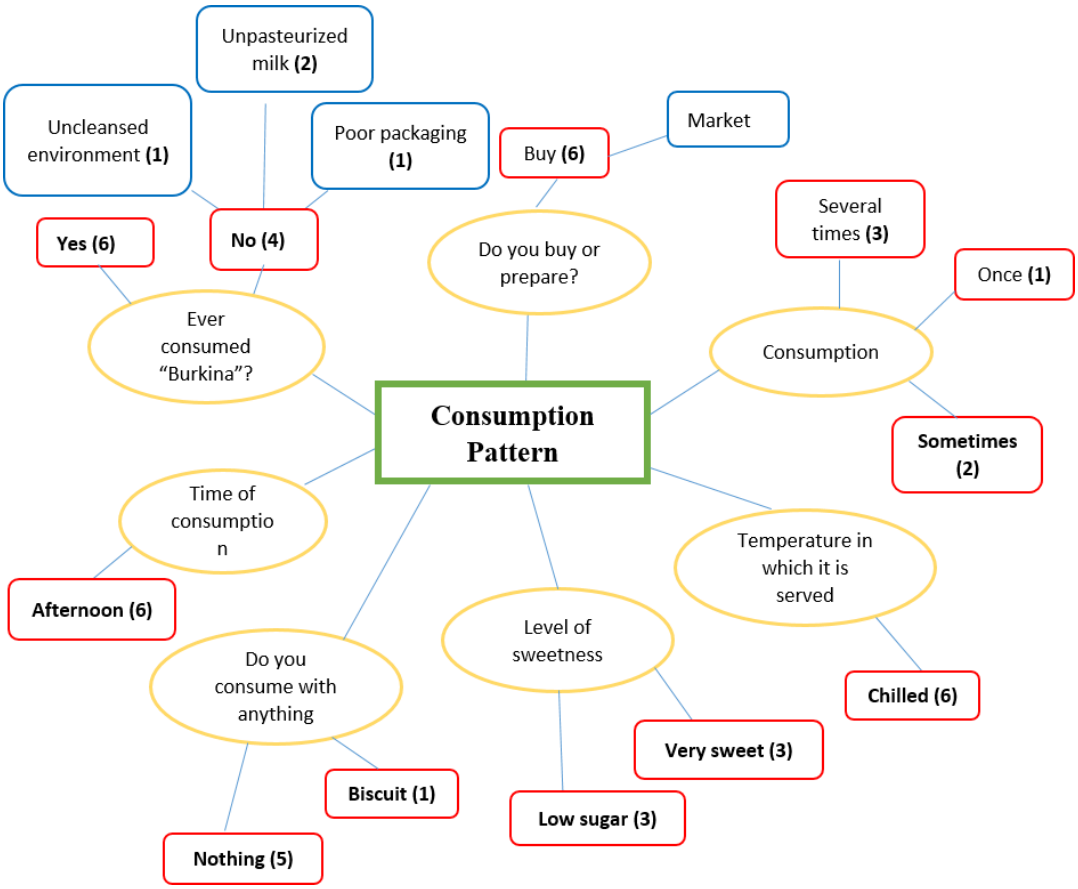

Figure 5. Consumption pattern of "Burkina" beverage (Numbers attached to various themes represent the total number of people interviewed with similar responses. Themes may appear in more than one person).

A lot of people may have reasons for not consuming or to consume the "Burkina" beverage. From the theme (Figure 4) some respondents (6) said they have consumed the beverage before while others (4) indicated that they have not consumed the beverage

before for some reasons such as unclean environment (1), the use of unpasteurized milk (2) and poor packaging (1) were the facilitators that prevents them from consuming the beverage. Findings were similar to previous study that facilitator that influences the aesthetics value of the products and desire to purchase [6]. Below are some statements made by respondents:

> *"No because they use cow milk, I thought they don't process it well"*
>
> *…No because I saw how it was made on a documentary and was kind of not liking the environment and the way they were doing it…*
>
> *…I don't like the way they package it…*

Respondents (6) who had consumed the beverage before stated that they mostly bought them from the market. One respondent stated that he had consumed it once, three said several times and two said sometimes they consumed it. All respondents (6) indicated that the temperature at which the beverage is served should be very chilled. Understanding the key role temperature plays in keeping food safe is vital. When the temperature at which food has been processed is known, then the question, is —Is it safe? can be answered [23]

Questions were further asked on the level of sweetness the (respondents) would like the beverage to taste. Respondents (3) stated that it should be very sweet and others (3) also stated that it should have low sugar. Below are some responses made by respondents:

> *..it should have a lot of sugar; it should taste very sweet…*
>
> *…I want it very low sugar, not too sweet…*

One respondent said she consumes the beverage with a biscuit while others (5) said they consume it without anything. All respondents indicated the afternoon as the time of the day they consumed the beverage.

> *… Normally afternoon especially when the sun is very high…*
>
> *… In the afternoon because it was in iced blocks and I wanted a cool drink…*

3.3. Modification

Figure 6 demonstrates the key points associated with the modification of "Burkina". Numbers in bracket indicates number of people interviewed with similar responses.

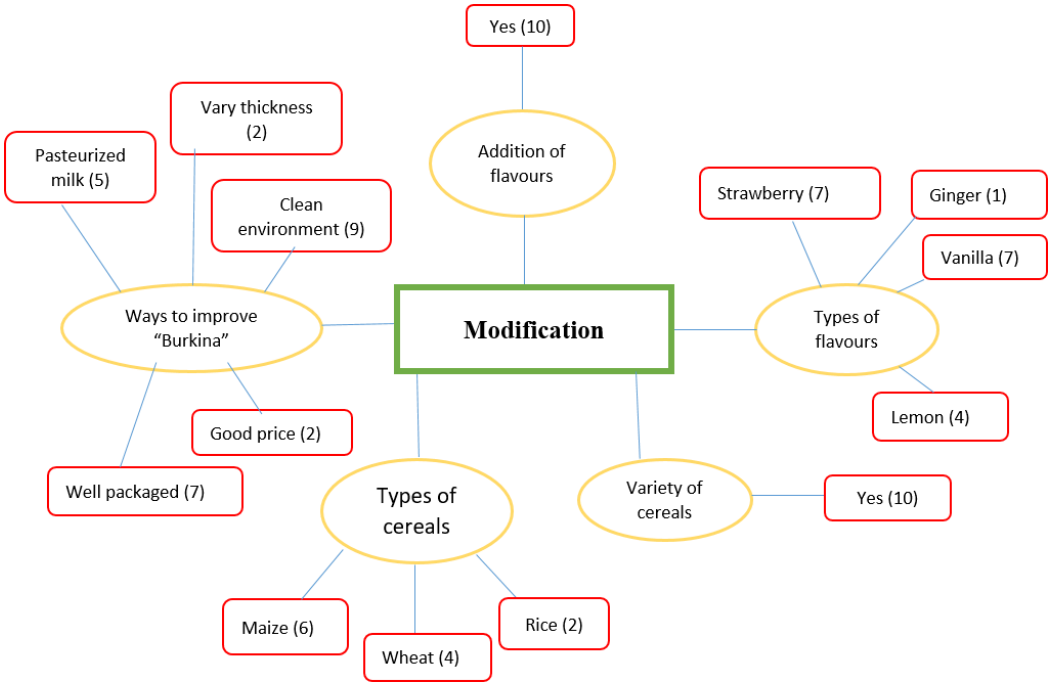

Figure 6. Modification of "Burkina" (Numbers attached to various themes represent the total number of people interviewed with similar responses. Themes may appear in more than one person).

Different views were given by respondents as to if the beverage on the market needs some modification. Respondents indicated some ways to which the beverage can be improved. Majority (9) said the environment should be clean, others (7) said it should have good packaging, two (2) said the thickness should be varied and have good price. Below are some responses given by respondents':

> *…The milk that is being used should be well processed because of the milk related diseases like tuberculosis, other lungs and heart diseases, so it should be well pasteurized so that people will not suffer from TB…*
>
> *…the thickness should be varied; it is very thick so I suggest they make some lighter…*
>
> *… If it is yogurt as perceived it is, the way it is sold on the market is not good. It should be well prepared and kept at a good place for purchase…*
>
> *…they should prepare it at a clean environment…*

This finding confirms earlier studies that street food vendors are mostly unauthorized and unskilled in food hygiene or sanitation and work under very primitive and unhealthy conditions [24, 25]. Street vendors provide affordable meals for thousands of Accra citizens but concerns over foodborne disease have led to efforts by Ghanaian authorities to enhance food safety and urge vendors to adopt more hygienic practices [26].

Respondents (10) agreed to the question on the addition of flavours to the beverage. One respondent said they can add ginger to flavour, others (7) stated the addition of strawberry and vanilla and (4) others also mentioned the use of lemon flavour. Findings in this study were similar to another scientific that vanilla and strawberry flavours used for the "Burkina" beverage [6]. All respondents (10) also suggested that "Burkina" beverage should be made with other cereals. Millet remains the only cereal grain used in

the production of "Burkina" in Ghana. Respondent (6) suggested that the beverage should be prepared from maize, others (4) said from rice and others (2) said wheat [2]. Below are some statement made by the respondents:

> *…They should attach some flavours and use rice or maize. With Yummy you see strawberry and vanilla with wheat. So you can get other alternative…*
>
> *…I think lemon flavour can be added, Fun Milk has introduced lemon flavoured type…*
>
> *…since they use millet, rice can be used…*

3.4. Health and nutritional benefits

Figure 7 demonstrates the key points associated with the Health and nutritional benefits of "Burkina". Numbers in brackets indicate the number of people interviewed with similar responses.

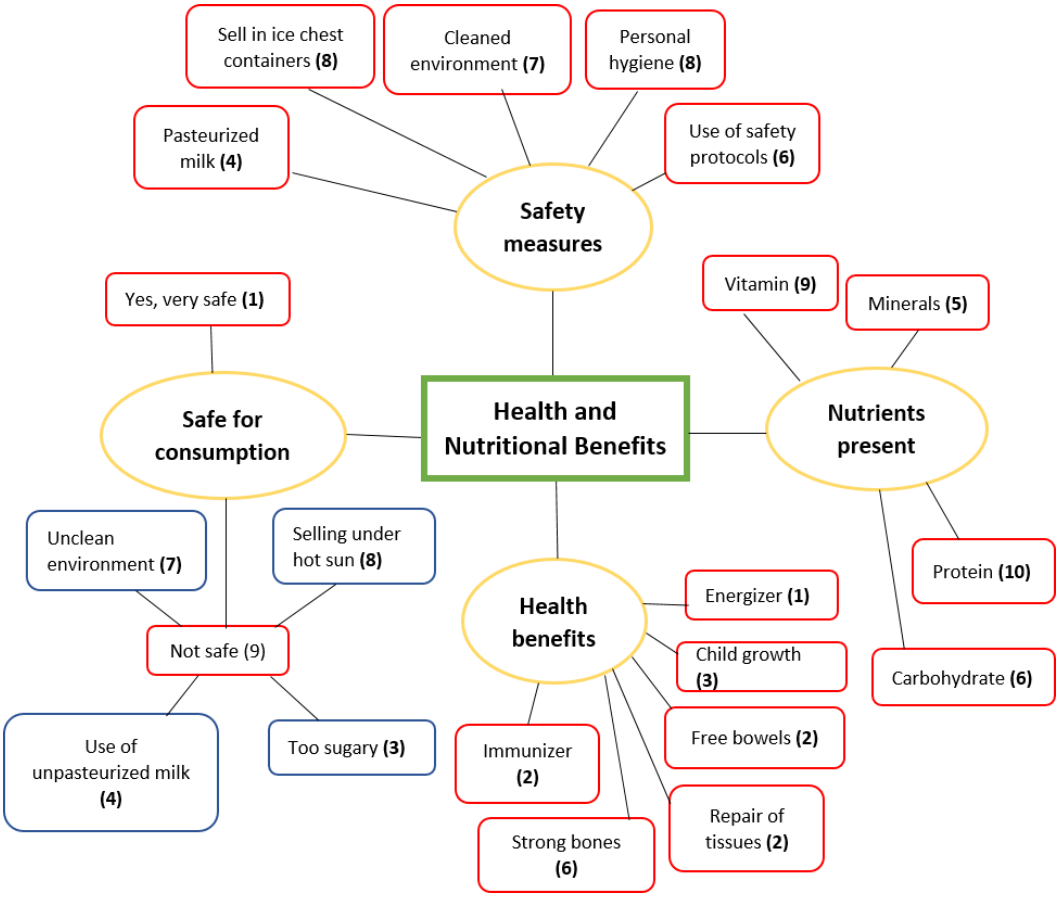

Figure 7. Health and nutritional benefits of "Burkina" (Numbers attached to various themes represent the total number of people interviewed with similar responses; Themes may appear in more than one person).

To determine whether people have knowledge of the health implications and benefits of ''Burkina'' beverages, the interviewees were asked if the beverages sold on the street are safe for consumption and why. From the themes (Figure 6) that emerged on the safety aspect of "Burkina" for consumption, there were mixed responses. It was observed that one (1) out of ten (10) said yes it was very safe. Conversely, nine (9) out of ten (10) stated

it was not safe and that, seven (7) said it was prepared in an unclean environment, and eight (8) said the beverage is sold under the hot sun. Others (4) also indicated that they (producers) use unpasteurized milk and three (3) said the beverage is too sugary. Below are some responses from the respondents:

> *…I believe so because people seem to be consuming it, if it wasn't safe they wouldn't be consuming it that much…*
>
> *… Not really safe. Some of them sell in buckets under the hot sun and some too in an untidy environment.…*

A question on safety measures that should be observed in the preparation of the beverage was asked. Respondents (4) stated that the milk used should be well pasteurized, and some (7) said they should be prepared and sold in a clean environment. Others (8) also said the beverage should be kept in an iced chest to keep it cool all the time and also adhere to personal hygiene and use safety protocols in the preparation. Responses by respondents are listed below:

> *…they have to boil the milk very well to kill all microorganisms present…*
>
> *…I think personal hygiene is very important when it comes to cooking, so they have to practice it…*
>
> *…the product should be placed in an ice chest containing iced blocks to keep it chilled all the time…*
>
> *…they have to follow safety protocols…*

From the theme (Figure 6), it can be said that respondents (10) knew the nutrients that are present in the beverage. They (respondents) stated vitamins, minerals, protein and carbohydrates as nutrients that are found in the "Burkina" beverage based on the ingredients used. Findings from this study confirm earlier studies that "Burkina" is a nutritious product rich in proteins, carbohydrates, minerals and essential vitamins [6]. Below are some responses made by respondents:

> *…Since it dairy product it should contain vitamins, minerals and protein also…*
>
> *…I actually don't know but because of the milk I think it contains protein and the grains or cereals contain vitamins too…*

Respondents described health benefits they may derive from consuming "Burkina" based on the constituents of the products. These health benefits could improve the health of the respondents. Respondents indicated some health benefits such as energizer, strengthening of bones, helping in free bowel movements, for child growth, as immunizer and repair of worn-out tissues. Some responses from respondents are listed below:

> *…I believe it can help to build the body and repair worn-out tissues because milk is good and when taken you grow very healthy…*
>
> *…the millet in it will give you carbohydrates which gives energy …*
>
> *…so far as it contains fiber it will help in bowel movement…*

A study on the hygienic and sanitary practices of vendors of street foods in Nairobi, Kenya, in Africa showed that 85% of the population of these vendors prepared foods such as fish, fruit salads, roasted maize and chips in insanitary surroundings [27]. Increasingly, the level of cultural awareness among vendors about the importance of economic and public health from zoonotic diseases is low and this increases the effort required to control these diseases [28]. High nutritional composition for the "Burkina" drink; however, the microbial counts from most of the "Burkina" sources studied exceeded the maximum acceptable limits making the samples microbiologically unsafe for human consumption [2].

3.5. Hypotheses

Null hypothesis of "Burkina" samples were tested to see differences or no differences in the samples. The result may show a rejection or acceptance of the hypothesis. Results are presented in Tables 1 and 2 respectively.

Table 1. Descriptive statistics of SSB, HMB and PBC on overall acceptability

Sample	N	Minimum	Maximum	Mean	Std. Deviation
SSB	100	4	9	7.56	1.351
HMB	100	3	9	8.04	1.072
PBC	100	3	9	7.73	1.476
Valid N (list wise)	100				

Product Code and meaning SSB = Street sold "Burkina" (control), HMB = Homemade "Burkina", PBC = Prepared "Burkina" with corn

The mean acceptability of SSB, HMB and PBC are 7.56, 8.04 and 7.73 respectively as shown in Table 1. SSB recorded a standard deviation of 1.351 as compared to 1.072 recorded by HMB. PBC also recorded a standard deviation of 1.476. The maximum mean acceptability of SSB, HMB and PBC is 9 each while the minimum mean acceptability for SSB is 4, HMB, 3 and SSB, 3.

1. Ho: There is no statistically significant difference between the acceptance of HMB "Burkina" with corn and street sold "Burkina" (control) in terms of acceptability by consumers as against the alternative hypothesis significant difference between the mean of developed "Burkina" with corn and street sold "Burkina" in terms of sensory properties on the overall acceptability.

Table 2. Result of independent sample t-test for PBC and SSB on consumer acceptability

Sample	Independent Differences					T	Df	p-value
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
SSB-PBC	-.170	2.094	.209	-.586	.246	-.812	99	.419

Source: Saeed, (2020); Product Code and meaning: SSB = Street sold "Burkina" (control) and PBC = Prepared "Burkina" with corn

This tests the hypothesis that there is no statistically significant difference between the means of sensory properties of "Burkina" with corn and street sold "Burkina" on overall acceptability as against the alternative hypothesis of significant difference between the means of "Burkina" with corn and street sold "Burkina" in terms of sensory properties on the overall acceptability. The p-value from Table 2 is 0.419 which is greater than 0.05. This means the null hypothesis is rejected and there is no statistically significant difference

in the means of PBC and SSB. Hence, it is concluded that at a 95% confidence level, there exists no statistically significant difference between the means of PBC and SSB.

2. Ho: There is no statistically significant difference between the acceptability of developed homemade "Burkina" and street sold "Burkina" (control) versus the alternative hypothesis that statistically significant difference between the mean of developed homemade "Burkina" and street sold "Burkina" in terms of sensory properties on the overall acceptability.

Table 3. Result of independent sample t-test of HMB and SSB on overall acceptability

Sample	Independent Differences					T	df	P-Value
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
SSB - HMB	-.480	1.567	.157	-.791	-.169	-3.064	99	.003

Source: Saeed, (2020); Product Code and meaning HMB = Homemade "Burkina" and SSB = Street sold "Burkina" (control)

The null hypothesis is that there is no statistically significant difference between the acceptability means of homemade "Burkina" and street-sold "Burkina". The reported p-value in Table 3 is 0.003 which is less than 0.05. This implies that at a 95% confidence level, the null hypothesis should be rejected as no statistically significant mean difference between the HMB and SSB. It is therefore concluded that at a 5% level of significance, there exists a statistically significant difference between the means acceptability of HMB and SSB (control).

4. Conclusions and Recommendations

Based on the results of the study, it is concluded that respondents have substantial knowledge of "Burkina". Street-sold "Burkina" can be modified using flavours and other cereals. Fresh milk must be pasteurized before using it for "Burkina", well packaged, and sold in a hygienic condition. Certain factors such as packaging, environment, food safety, price, variation in thickness and flavours influence the rate of consumption of the "Burkina". ''Burkina'' prepared with corn agglomerates had improved physicochemical attributes and health benefits. Results indicated that there exists no statistically significant difference between the means of PBC and SSB, and HMB and SSB in terms of acceptability. Therefore, "Burkina" can be produced using corn. It is recommended that Food and Drug Authority representatives in winneba should regulate the "Burkina" samples on the Winneba market to ensure they are nutritious and, prepared and sold under hygienic conditions. It is also Food and Drug Authority representatives in Winneba should ensure the standardization of the "Burkina" preparation to ensure a fair distribution of nutrients from all producers in Winneba and to ensure that the product meets standards before selling. Due to varying cereals, flavour options, good packaging, and pasteurization of the milk (fresh) and sold in a hygienic environment. It is therefore recommended that researchers develop ''Burkina'' with several flavour options and other cereals and test for consumer acceptability.

Author's Contributions: Conceptualization; methodology; validation; formal analysis; investigation; resources; data curation; writing—original draft preparation; writing—review and editing; visualization; supervision; project administration. The author has read and agreed to the published version of the manuscript.

Funding: "This research received no external funding"

Data Availability Statement: Data is available on request from the corresponding author.

Acknowledgements: I acknowledge the respondents for their time and patience.

Conflicts of Interest: "The author declares no conflict of interest." "No funders had any role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results".

References

[1] Appiah, S. (2013). *Latest millet smoothie in town.* Retrieved from http://m.ghheadlines.com/agency/dailygraphic/.../pdf on 13th May 2019.

[2] Tawiah, U. X. (2015). Microbiological and proximate composition of Burkina drink. (MPhil thesis), Kwame Nkrumah University of Science and Technology.

[3] Ghana News Agency. (2013). *FDA trains ''Burkina'' drink producers in Accra: Online Ghana Business News, 5th September, 2013.* Retrieved from https://www.ghanabusinessnews.com on 23rd September 2019.

[4] Shekar H., (2010). Street foods and their implication for food safety in the context of Bangladesh. Voluntary Consumers Training and Awareness Society (VOCTA), Bangladesh. *http://www.voctabangladesh.org/articles/street-foods-and-itsimplication-for-food-safety- in-the-context-of-Bangladesh.*

[5] Caiquo, B. A. & Mensah, M. A. (2013). Burkina Beverage: A Fermented Milk Product. *Milk and Dairy Technology, 2,* 67-70.

[6] Nyarko-Mensah, P. (2018). Sensory and physicochemical evaluation of ''burkina'' made with composite (cow and tiger nut) milk. (Published MPhil Home Science thesis), University of Ghana, Legon.

[7] Caplice, E. & FitzGerald, G. F. (1999). Food fermentations: role of micro-organisms in food production and preservation. *International Journal of Food Microbiology, 50*, 131-149.

[8] Osei-Onomah, S. (2014). *Applying a consumer-led product development process to develop a traditional milk-based drink ('Burkina').* BSc. Thesis, University of Ghana, Ghana.

[9] FitzGerald, R. J., & Meisel, H. (2003). *Milk protein hydrolysates and bioactive peptides* (3rd ed.). New York: Kluwer Academic/Plenum Publishers.

[10] Tamime, A. Y. (2006). *Brined cheeses*. Ames, Iowa: Blackwell Publishing.

[11] Durojaiye, I. A., Usman, D. D., & Chukwu, O. (2016). An evaluation of proximate composition on cereal grains for confectionery and pasta production. *International Refereed Journal of Engineering and Science (IRJES), 5(5), 1-6.*

[12] Afzal, M., Nazir, Z, Bashir, M. H. & Khan, B. S. (2009). Analysis of host plant resistance in some genotypes of maize against Chilo partellus (Swinhoe) (Pyralidae: Lepidoptera). *Pak. J. Bot.,* 41(1), 421-428.

[13] Niaz, I., & Dawar, S. (2009). Detection of seed-borne Mycoflora in maize. *Pakistan Journal of Botany, 41,* 443-451.

[14] Olsen, S. J., Ying M., Davis M. F., Deasy M. and Holland B., (2004). Multidrug-resistant Salmonella Typhimurium infection from milk contaminated after pasteurization. *Emerging Infectious Disease Journal*, *10*(5), 932-935.

[15] Pantoja, J. C. F., Reinemann D. J., & Ruegg P. L., (2009). Association among milk quality indicators in raw milk. *Journal of Diary Science, 92,* 4978-4987.

[16] Yasmine, M., (2000). Impact of Small scale fermentation technology on food safety in developing countries. *International Journal Food Microbial*, *75*(3), 213-229.

[17] Holzapfel, W. H., (2002). Appropriate starter culture technologies for small-scale fermentation in developing countries. *International Journal Food Microbiology*, *75,* 197– 212.

[18] FAO/WHO (2012). *Joint FAO/WHO Food Standards Programme FAO/WHO coordinating committee for Asia discussion paper on the development of a code of hygienic practices for street-vended foods (Asia)* (pp.5 -9*).* Eighteenth Session Tokyo, Japan.

[19] Rogers, E. M. (1962). Diffusion of innovations. In *Google Books*. Free Press of Glencoe. https://books.google.com.gh/books?id=zw0-AAAAIAAJ&redir_esc=y

[20] Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30,* 607-610.

[21] Gacula, M. & Rutenbeck, S. (2006). Sample size in consumer test and descriptive analysis. *Journal of Sensory Studies, 21*, 129-145.

[22] Adigbo, E. C. & Madah, C. K (2011). *A complete course in food and nutrition.* Obodjo, East Legon: Kwadwoan Publishing.

[23] USDA. (2011). How temperature affects food. https://www.fsis.usda.gov/food-safety/safe-food-handling-and-preparation/food-safety-basics/how-temperatures-affect-food

[24] Barro N., Ouattara C. A. T., Nikiéma A. P., Ouattara A. S. & Traoré A. S., (2002). Evaluation de la qualité microbiologique de quelques aliments de rue dans la ville de Ouagadougou au Burkina Faso. *International Journal for the Cultural and Social Analysis on Health, 12,* 369-74.

[25] Muinde, O. K. & Kuria, E. (2005). Hygienic and sanitary practices of vendors of street foods 727 in Nairobi, Kenya. A*frican Journal of Food Agriculture and Nutritional Development, 5,* 1-14.
[26] WHO, (2006). Street food boom in Ghana spurs calls for better hygiene. *Bulletin of the World Health Organization, 84,* 765-840.
[27] Micinski, J., Zwierzchowski, M., Ireneusz, M., Kowalski, J., Bogusław,P., & Juozas, R. (2018). The effect of bovine milk fat on human health. *Journal of Polish Annals of Medicine, 19*, 170 – 175.
[28] Munyeme,, M., Muma, J. B., Skjerve, E., Nambota, A. M., Phiri, I.G. K., Samui, K. L., Dorny, P., Tryland, M. (2008). Risk factors associated with bovine tuberculosis in traditional cattle of the livestock/wildlife interface areas in the Kafue basin of Zambia. *Preventive Veterinary Medicine, 85*(3–4), 317-328.