COMPARATIVE STUDIES ON THE MICROBIOLOGICAL AND SENSORY PROPERTY OF *BURUKUTU* PRODUCED FROM RED AND WHITE VARIETY OF SORGHUM WITH OR WITHOUT PASTEURIZATION AND PRESERVATIVES

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Abstract
Burukutu is a traditional indigenous African beer mainly produced from red variety of sorghum. The purpose of this study is to evaluate and isolate microorganisms, determine the pH and titratable acidity and assess the sensory property of burukutu produced from white and red variety of sorghum with or without pasteurization or addition of 0.1% sodium benzoate during storage at ambient temperature (28 ± 2°C) for three weeks. The result showed that the unpasteurized red sorghum burukutu without sodium benzoate had the highest total viable count (7.76 log cfu.ml^{-1}) and fungi count (6.73 log cfu.ml^{-1}) while the unpasteurized white sorghum burukutu had the highest lactic acid bacteria count (7.17 log cfu.ml^{-1}) at the third week of storage. There was no viable organism in pasteurized burukutu samples treated with sodium benzoate throughout the period of storage. The pH was highest in unpasteurized burukutu produced from white sorghum at week zero and generally decreased with increase in titratable acidity. The results of sensory evaluation showed that burukutu produced from white sorghum was more preferred than the burukutu from red sorghum. This work has shown that white variety of sorghum is a good raw material for the production burukutu and also recommended pasteurization and use of sodium benzoate to further increase its shelf life.

Key words: *burukutu*, sorghum, microbiological, sodium benzoate

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INTRODUCTION

African beers are thick and sour in taste. They are spontaneously fermented and hops are not added during production. They are consumed in an active state of fermentation as no attempt is made to arrest fermentation; hence they are effervescent in appearance (Atter, 2015). African beers are produced from cereal such as maize, millet and sorghum. Beer made from malted sorghum (*Sorghum bicolour*) include *burukutu, otika, borde, kaffir, bouza, pombe, shukutu, shakparo, amgba, dolo,* and *tchapalo* (Egemba and Etuk, 2007).

Traditional alcoholic beverages feature prominently in many traditional Nigerian cultural groups. Alcohol consumption has a long history in Nigeria and its use is common in all the cultural groups in the country. It is one of the most available psychoactive substances in the country, and it is consumed in the form of traditional beverages such as *burukutu, pito, emu funfun, ogogoro* and *agadagidi* (Akanidomo *et al.*, 2005).

Sorghum beer is characterized by its opacity due to the suspended particles of cereals, starch and yeast (Dewar and Taylor, 1999). *Burukutu*, a thick creamy or brownish coloured suspension drink is a popular alcoholic beverage of a vinegar-like flavour produced from sorghum grains. It is consumed in Nigeria, Ghana and republic of Benin (Kolawole *et al.,* 2007; Atter *et al.,* 2014: Chikodili *et al.,* 2015). During malting of sorghum grains; starch is hydrolyzed into fermentable sugars mainly by amylolytic organisms capable of hydrolysing starchy constituents. The release of pleasant aroma and sugary taste by the sun-dried grinded malt shows that malting can improve aroma and conversion of starch to fermentable sugars (Mbajiuka *et al*., 2010). It is a cloudy alcoholic beverage containing almost all essential amino acids in required proportion except cysteine and tryptophan which are being completely destroyed by heat during processing and has a short shelf-life of 1 – 8 days. (Odetokun, 2006;

Eze *et al.,* 2011; Chikodili *et al.,* 2015). The major challenges in traditional production of *burukutu* includes non-availability of potable water, unhygienic processing area and utensils which could be potential vehicle for the spread and contamination pathogenic (Olaniyi et al., 2018). This research was carried out to advance the knowledge of the utilization of white sorghum in the production of *burukutu*, identify microorganisms associated with the products and extend the shelf life of the products.

MATERIALS AND METHODS

Procurement of raw material

White and red sorghum were obtained from Ife market, Osun state, Nigeria and all the chemicals used are of analytical grade.

Production of *burukutu*

Burukutu was produced using modified method described by Egemba and Etuk (2007). Each sorghum grain (white sorghum and red) was cleaned, weighed, washed, steeped in water for 12 h at room temperature (28±2) ^{o}C, washed and drained. The grains were thinly spread in a malting chamber with intermittent watering and turning over at regular intervals for germination. The grains were kilned at 60^{o}C for 24 h in Gallenkamp hot air oven and milled into flour using a plate disc mill and sieved. The milled malt was mixed with water, and allowed to settle for 30 min, the clear enzymatic supernatant was decanted and the remaining mash was boiled in a water bath at 100^{o}C for 30 min. The mixture was cooled to 60^{o}C, the clear enzymatic supernatant was added; filtered through a sieve and rinsed with water to allow complete extraction from grist. The products were left to ferment for 2 days, and thereafter boiled to stop active fermentation, followed by maturation for 2 days.

Burukutu produced from each sorghum variety was divided into four portions. The first portion was not pasteurized, the second was not pasteurized and sodium benzoate was added, the third portion was pasteurized and the fourth was pasteurized and treated with sodium benzoate. Samples were stored in sterile bottles at ambient temperature (28 ±2^{o}C) for three weeks.

Microbiological analysis

Burukutu samples were subjected to microbiological analysis on a weekly interval using pour plate method. Each sample (1 mL) was weighed into stomacher bag and homogenized with 9 mL of sterile peptone water. The resulting mixture was serially diluted and 1.0 mL of appropriate dilution was dispensed into Petri dish. Nutrient Agar (NA) was used for enumeration of total viable count, de Man Rogosa and Sharpe (MRS)
Agar for Lactic acid bacteria count and Potato Dextrose Agar (PDA) for fungi count (Harrigan, 1998). Plates were incubated for total viable count at 35^{o}C for 24 h, lactic acid bacteria count at 35^{o}C for 72 h, fungi count at 25^{o}C for 3 to 5 days (Harrigan, 1998). Following incubation, the colonies on each plate were counted using a Gallenkamp colony counter and pure isolates of the representative colonies were obtained by streaking on media of their primary isolation, incubated appropriately and kept in agar slant under refrigeration condition.

Identification of bacteria isolates

Biochemical test for identification of bacterial isolates was carried out following the scheme of Harrigan (1998) and Woods and Holzapfel (1995). These tests were catalase test, oxidase test, sugar fermentation test (glucose, fructose, lactose, sucrose, maltose, silicon, arabinose, trehalose and galactose), production of carbon dioxide from glucose, nitrate reduction, indole production, methyl red test**,** production of ammonia from peptone, production of ammonia from arginine, Voges-Proskauer test and production of hydrogen supplied.

Identification of fungi isolate

Yeast isolates were identified using colony characteristics (size, colour, elevation, shape, texture, margin, and surface type). Cell shape, size, type of budding and cell aggregation were determined by microscopy (Leica DM500 Model 13613210), and the ability of isolates to

assimilate various carbon sources and nitrate were assessed (Beech *et al.*, 1968; Barnett *et al.*, 2000). Mould isolates were identified based on morphological characteristics such as the colour of growth on agar, colour of mycelium and texture. As well as microscopic (Leica DM500 13613210) features such as hyphae (septate or non-septate), characteristics of spore head (size, shape and arrangement), mode of reproduction and presence of special structure such as foot cell or rhizoids were also employed (Harrigan, 1998). Mould isolate was identified based on morphological characteristics such as the colour of growth on agar, colour of mycelium and texture; as well as microscopic (Leica DM500 13613210) features such as hyphae (septate or non-septate), characteristics of spore head (size, shape and arrangement), mode of reproduction and presence of special structure.

Determination of pH

The digital pH meter (Philips model PHS-3C) was calibrated in standard buffer solutions of pH 4 and pH 7. Each sample (10 ml) was measured into a conical flask and the pH reading was taken in triplicate and the average was calculated (AOAC, 2005).

Determination of titratable acidity

Titratable acidity was determined by measuring 10 mL aliquot portion of each *burukutu* sample into 250 mL Erlenmeyer flask, 10 mL of distilled water and 3 drops of phenolphthalein indicator were added and titrated against 0.1 M sodium hydroxide (NaOH) solution (AOAC, 2005).

$$\% \text{ Lactic acid} = \frac{(Volume\ of\ acid) \times (0.1N\ NAOH) \times 0.09}{Volume\ of\ sample}$$

Sensory evaluation

The *burukutu* samples were differently coded and presented to twenty randomly selected Judges for evaluation of taste, colour, flavour and overall acceptability using a seven-point Hedonic scale, where 1 to 7 represented dislike extremely and like extremely, respectively (Montgomery, 2004).

Statistical analysis

Data obtained from the microbial analyses and sensory evaluation was subjected to analysis of variance and means were separated using Duncan's Multiple Range Test at 95% confidence level.

RESULTS AND DISCUSSION

Enumeration of microorganisms in burukutu during storage. The total viable count (TVC) of *burukutu* during storage is shown in Table 1. The count generally increased during the period of storage and was lower in pasteurized *burukutu* samples (0 - 6.59 log cfu.ml^{-1}) than unpasteurized (5.22 – 7.76 log cfu.ml^{-1}) samples. TVC was also lower in pasteurized samples than unpasteurized samples treated with 0.1% sodium benzoate. Addition of sodium benzoate further reduced the TVC of pasteurized *burukutu* during storage. There was no significant difference between UPRS (5.51 Log cfu.ml-1) and UPWS (5.62 log cfu.ml^{-1}) at the beginning of storage but UPWS (7.30 log cfu.ml^{-1}) had significant lower ($p > 0.05$) count than UPRS (7.76 log cfu.ml^{-1}) at the end of storage. PWS + SB (0- 6.18 log cfu.ml^{-1}) had the lowest TCV from the beginning to the end of storage followed by PRS SB (0 - 6.30 log cfu.ml^{-1}). Pasteurization destroyed the microorganisms at the beginning of storage but some were able to revitalize during storage. The presence of microorganisms in the pasteurized sample may be due to germination of spores or healing of microorganisms. Pasteurization was reported to be effective in eliminating all but the thermoduric microorganisms and occasionally some Gram-negative rods (Adepoju *et al.*, 2012).

The lactic acid bacteria count generally increased from week zero (0 – 5.70 log cfu.ml^{-1}) to week two (4.30- 8.25 log cfu.ml^{-1}) and decrease from week two to three (3.47 – 7.17 log cfu.ml^{-1}). Count was generally lower in pasteurized *burukutu* (0 – 7.43 log cfu.ml-1) than the unpasteurized (5.42 – 8.25 Log cfu.ml^{-1}) and was lowest in PWS +SB (0 – 4.22 Log cfu.ml^{-1}). Pasteurization and addition of sodium benzoate significantly ($p < 0.05$) reduced the lactic acid bacteria count of *burukutu*. In the food industry, sodium benzoate is used as a preservative in foods and beverages, as it is effective to inhibit the

growth of fungi and bacteria during storage, besides providing easy application. It is indicated for the preservation of margarines, sauces, marmalades, gelatin, liqueurs, beers, fruit juices and soft drinks (Zhang and Ma, 2013; Linke *et al.*, 2018).

Mean values along the same column with different superscripts are significantly different ($p < 0.05$) U: Unpasteurized; P: Pasteurized; W: White; R: Red; S: Sorghum; SB: Sodium benzoate

Fungi count was generally higher in unpasteurized *burukutu* than pasteurized *burukutu* and decreased with addition of 0.1 % sodium benzoate. UPWS (5.70 – 6.15 Log cfu.ml-1) had significantly lower ($p > 0.05$) count than UPRS (6.49 – 6.73 Log cfu.ml-1) at the beginning and the end of storage. There was no viable fungi in the pasteurized *burukutu* samples (PWS and PRS) at the beginning of storage but count increased to 3.65 Log cfu.ml-1 and 4.59 Log cfu.ml-1 respectively at the first week of storage. Count was also significantly lower ($p > 0.05$) in PWS than PRS throughout the period of storage and no viable fungi was observed in PWS+SB and PRS+SB. Yeasts are common in several fermented foods and beverages produced in the tropical part of the world (Halm et *al.*, 1993; Akabanda et *al.*, 2010; Adepoju et *al.*, 2012). Sodium benzoate has been reported to be more effective against yeast than bacteria (Adam and moss, 1999; Jay *et al.*, 2005). Symbiotic relationships exist between yeasts and lactic acid bacteria during fermentation, the bacteria provide the provide the rapid acidic environment and the yeast provide essential metabolites such as pyruvates, vitamins and amino acids for the bacteria (Owuzu-Kwarteng and Akabanda, 2014; Malomo *et al.*, 2018).

Occurrence pattern of microorganisms in *burukutu*

Table 2 shows the occurrence pattern of microorganisms during storage of *burukutu. Lactobacillus acidophilus, Lactobacillus fermentum, lactobacillus mesenteroides, Bacillus subtilis, Saccaromyces cerevisiae, Candida utilis* and *Aspergillus niger* were present in the unpasteurized samples throughout the period of storage. *Lactobacillus acidophilus, Lactobacillus fermentum, lactobacillus mesenteroides, Saccharomyces cerevisiae* and *Bacillus subtilis* were present in the pasteurized samples and the unpasteurized sample treated with sodium benzoate. Only *Lactobacillus acidophilus and Lactobacillus fermentum* were present in the pasteurized samples treated with sodium benzoate. Lactic acid bacteria produces lactic acid which give fermented products the desired sour taste. In addition to this, various flavour compounds are formed and these are responsible for the specific taste of different products (Akabanda and Owuzu-Kwarteng, 2010; Adepoju *et al.*, 2012).

Table 1. Microbial load (Log cfu. ml^{-1}) of *Burukutu* during storage

Weeks	UPWS	UPWS + SB	PWS	PWS + SB	UPRS	UPRS + SB	PRS	PRS + SB
Total Viable Count								
0	5.51±0.04^{a}	4.47 ±0.07^{c}	Nil	Nil	5.62 ±0.04^{a}	5.22±0.10^{b}	Nil	Nil
1	6.46±0.06^{a}	5.60±0.07^{c}	5.32 ±0.04^{d}	5.08±0.08^{e}	5.88 ±0.10^{b}	5.30±0.09^{de}	4.54±0.04^{f}	5.30± 0.05^{de}
2	7.23±0.08^{a}	6.39±0.13^{c}	6.22 ±0.15^{c}	5.32 ±0.05^{e}	6.99±0.09^{ab}	6.90±0.11^{a}	5.61±0.10^{c}	5.54± 0.10^{de}
3	7.30±0.09^{b}	6.49 ±0.07^{c}	6.38 ±0.03^{cd}	6.18 ±0.09^{d}	7.76 ±0.10^{a}	7.70±0.10^{a}	6.59± 0.08^{c}	6.30±0.12^{cd}
Lactic Acid Bacteria Count								
0	5.70±0.10^{a}	4.34±0.05^{c}	Nil	Nil	5.42±0.07^{b}	4.04±0.04^{d}	Nil	Nil
1	7.68±0.08^{a}	5.07±0.07^{d}	5.55±0.06^{c}	4.22±0.10^{e}	6.00±0.13^{b}	4.39±0.12^{e}	5.59±0.09^{c}	5.34±0.11^{cd}
2	8.25±0.13^{a}	6.53±0.18^{c}	7.43±0.08^{b}	4.30±0.0^{e}	7.19±0.08^{b}	6.48 ±0.08^{c}	6.74±0.04^{c}	5.72± 0.10^{d}
3	7.17±0.07^{a}	5.77±0.08^{d}	6.86±0.06^{b}	3.47±0.11^{f}	6.22±0.03^{c}	5.84±0.08^{d}	5.95±0.05^{d}	4.95± 0.12^{e}
Fungi Count								
0	5.70±0.10^{b}	4.48±0.12^{b}	Nil	Nil	6.49±0.11^{a}	4.30±0.15^{b}	Nil	Nil
1	7.08±0.08^{a}	4.15±0.05^{d}	3.65± 0.06^{e}	Nil	6.30 ±0.09^{b}	3.61±0.11^{e}	4.59±0.04^{c}	Nil
2	7.29 ±0.09^{a}	5.60±0.05^{c}	4.15±0.05^{e}	Nil	6.43±0.07^{b}	5.18±0.08^{a}	5.36±0.06^{d}	Nil
3	6.15±0.11^{b}	6.46±0.06^{a}	5.18±0.08^{c}	Nil	6.73± 0.13^{a}	6.60±0.10^{a}	6.49± 0.09^{a}	Nil

Lactobacillus fermentum had the highest occurrence of 29.5%, followed by *Saccharomyces cerevisiae* (24.4%), *Lactobacillus acidophilus* (20.3%), *Leuconostoc mesenteroides* (9.5%) and *Bacillus subtilis* (8.8%), *Candida utilis* (5.5%) and *Aspergillus niger* (2%). *L. fermentum* has been identified as the dominant organism at the end of several natural lactic acid fermentations probably due to its acid tolerance and superior ability to utilize the substrate including dextrins (Mugula *et al*., 2003; Adepoju *et al*., 2012).

Leuconostocs has been isolated from wine at the various production stage (De Vos *et al.*, 2014). Bacillus species are known to have roles in the postharvest processing and flavor development, in the production of several traditional fermented foods based on leaves and seeds often dominated by *Bacillus subtilis* (Beaumont, 2002; Sarkar *et al*., 2002; De Vos *et al.*, 2014).

Table 2 Occurrence pattern of identified microorganisms

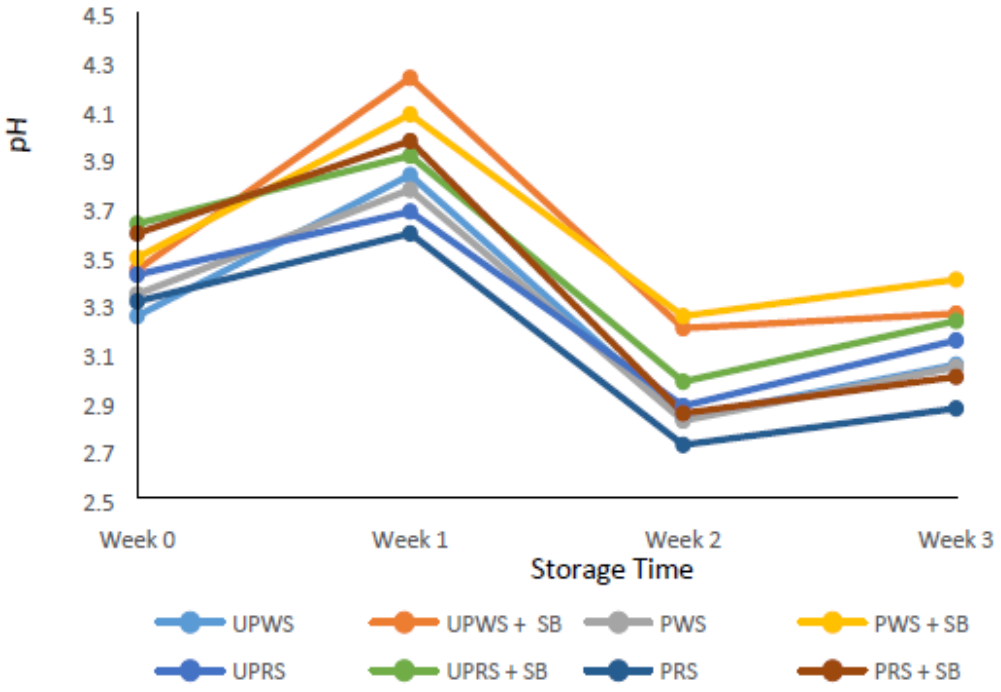
Sample	Microorganisms	Week 0	Week 1	Week 2	Week 3	Week 4
UPWS	*Leuconostoc mesenteroides*	+	-	-	-	-
	Lactobacillus fermentum	+	+	+	+	+
	Lactobacillus acidophilus	+	+	+	+	+
	Bacillus subtilis	+	+	+	+	+
	Saccharomyces cerevisiae	-	+	+	+	+
	Candida utilis	-	+	+	+	+
	Aspergillus niger	-	-	+	+	+
UPWS + SB	*Leuconostoc mesenteroides*	+	-	-	-	-
	Lactobacillus fermentum	+	+	+	+	+
	Lactobacillus acidophilus	+	+	+	+	+
	Bacillus subtilis	-	-	-	+	+
	Saccharomyces cerevisiae	-	-	-	+	+
	Candida utilis	-	-	-	-	+
PWS	*Lactobacillus fermentum*	-	+	+	+	+
	Lactobacillus acidophilus	-	+	+	+	+
	Bacillus subtilis	-	-	-	+	+
	Saccharomyces cerevisiae	-	-	+	+	+
	Candida utilis	-	-	-	+	+
PWS + SB	*Lactobacillus fermentum*	-	-	+	+	+
	Lactobacillus acidophilus	-	+	+	+	+
UPRS	*Leuconostoc mesenteroides*	+	-	-	-	-
	Lactobacillus fermentum	+	+	+	+	+
	Lactobacillus acidophilus	+	+	+	+	+
	Bacillus subtilis	-	-	-	+	+
	Saccharomyces cerevisiae	-	-	-	+	+
	Candida utilis	-	-	-	-	+
	Aspergillus niger	-	+	+	+	+
UPRS + SB	*Leuconostoc mesenteroides*	+	-	-	-	-
	Lactobacillus fermentum	+	+	+	+	+
	Lactobacillus acidophilus	+	+	+	+	+
	Bacillus subtilis	-	-	-	+	+
	Saccharomyces cerevisiae	-	-	-	+	+
	Candida utilis	-	-	-	-	+
PRS	*Lactobacillus fermentum*	-	+	+	+	+
	Lactobacillus acidophilus	-	+	+	+	+
	Bacillus subtilis	-	-	-	+	+
	Saccharomyces cerevisiae	-	-	+	+	+
	Candida utilis	-	-	+	+	+
PRS + SB	*Lactobacillus fermentum*	-	-	+	+	+
	Lactobacillus acidophilus	-	+	+	+	+

-: negative; + :positive

Saccharomyces cerevisiae is the yeast responsible for the production of ethanol which gives distinctive taste to *burukutu*. It was the dominant yeast during storage of *burukutu* and had been reported to be the most encountered yeast in fermented beverages and food based vegetables (Adam and Moss,1999). Achi (2005) and Atter (2014) also isolated *Saccharomyces cerevisiae* and *Lactobacillus fermentum* from *burukutu*. *Saccharomyces cerevisiae* has been identified as dominant yeast in *burukutu* production (Achi, 2005; Adewara and Ogunbanwo, 2013; Atter, 2014). *Candida utilis* was also isolated from *burukutu* (Adewara and Ogunbanwo, 2013). It was observed that no disease causing organism was isolated throughout the period of storage. Thus, safe *burukutu* could be produced under hygienic condition from both the white and red sorghum.

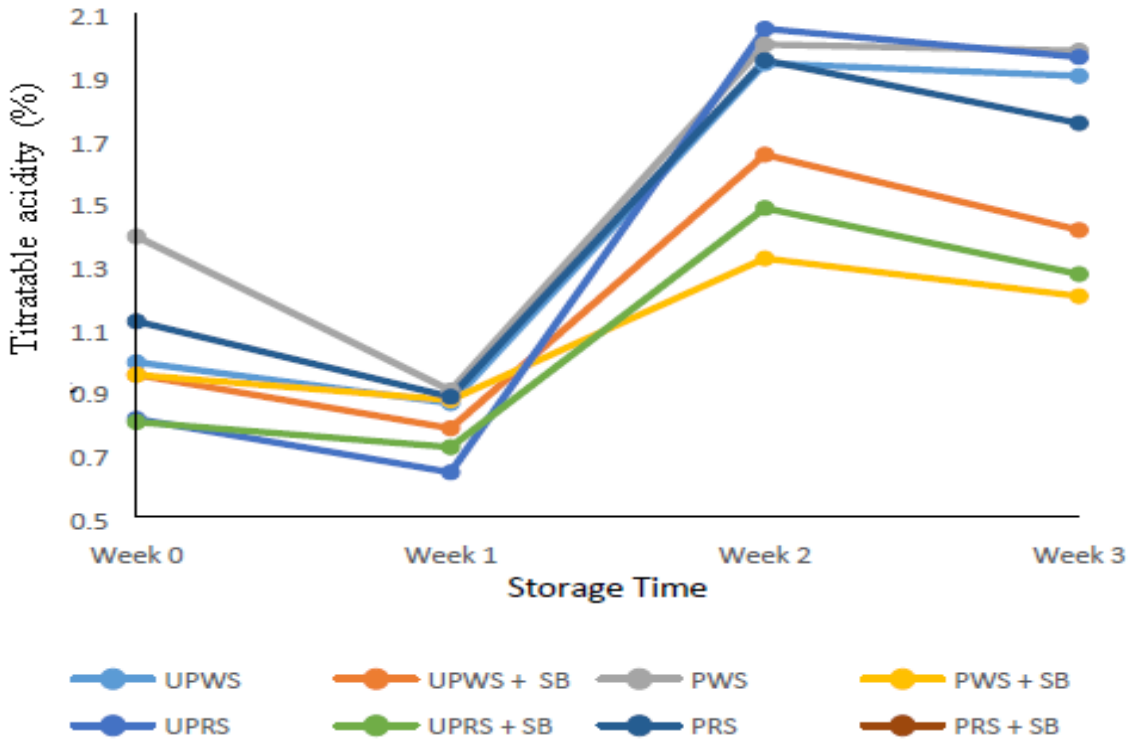
pH and titratable acidity of *burukutu* during storage

The pH of *burukutu* during the period of storage is shown in Fig. 1. There was a general decrease in the pH of *burukutu* after three weeks of storage. It was higher in *burukutu* samples treated with sodium benzoate (3 – 4.32) than *burukutu* without sodium benzoate (2.72 – 3.83). UPRS + SB (3.63) had the highest pH while UPWS (3.25) had the lowest at the beginning of storage. At the end of storage, the pH was highest in PWS + SB (3.40) and lowest in PRS (2.87). The lowest decrease in pH from week zero (3.49) to week three (340) was also observed in PWS + SB. Atter et al. (2017) also reported a decrease in pH and increase in titratable acidity of *burukutu*. Similar result was also obtained by Ogbo and Igwillo (2018) during storage of *burukutu*.



U: Unpasteurised; P: Pasteurised; W: White; R: Red; S: Sorghum; SB: Sodium Benzoate

Figure 1 Changes in pH during storage of *burukutu*



U: Unpasteurised; P: Pasteurised; W: White; R: Red; S: Sorghum; SB: Sodium Benzoate

Figure 2 Changes in titratable acidity during storage of *burukutu*

The titratable acidity during storage of *burukutu* is shown in Fig. 2. It was lower in *burukutu* samples produced from red sorghum (0.78 – 1.12 %)than the white sorghum (0.95 – 1.39 %) at week zero. The result showed that as the pH increased, the titratable acidity decreased. Increase in titratable acidity has been attributed to production of organic acids by fermenting microorganisms (Owusu-Kwarteng and Akabanda, 2010; Adepoju *et al*., 2016). Adebayo *et al.* (2010) and Adepoju *et al*. (2012) also reported the production of acid from sugar by various metabolic microorganisms such as lactic acid bacteria, acetic and butyric acid bacteria.

Sensory evaluation

The result of sensory evaluation of *burukutu* is presented in Table 3. *Burukutu* produced from white sorghum generally had higher score than *burukutu* produced from red sorghum. The colour of *burukutu* produced from white sorghum (6.0 – 7.2) were scored higher than *burukutu* from red sorghum (5.5 – 6.3). The UPWS + SB had the highest score (7.2) for colour while UPRS had the lowest (5.5). The flavour, taste and general acceptability of *burukutu* produced from white sorghum was significantly higher ($p < 0.05$) than those produced from the red variety. UPWS had the highest score for taste, and general acceptability while UPWS+ SB had the highest score for flavour (7.1) and colour (7.2). PRS + SB had the lowest score for flavor and general acceptability. The flavour, taste and general acceptability of *burukutu* produced from white sorghum was significantly higher ($p < 0.05$) than those produced from the red variety. This result thus showed that *burukutu* with better organoleptic quality can be produced from white variety of sorghum.

Table 3 Mean sensory score of *burukutu*

Samples	Colour	Flavour	Taste	General Acceptability
UPWS	6.7 ± 1.34^{a}	7.0 ± 1.33^{a}	7.5 ± 1.18^{a}	7.2 ± 0.92^{a}
UPWS + SB	7.2 ± 0.92^{a}	7.1 ± 0.88^{a}	7.0 ± 1.16^{a}	6.8 ± 1.03^{a}
PWS	6.0 ± 2.31^{a}	7.0 ± 1.05^{a}	6.7 ± 1.49^{a}	6.9 ± 1.29^{a}
PWS +SB	6.3 ± 1.70^{a}	5.9 ± 1.37^{ab}	5.9 ± 1.66^{a}	6.3 ± 1.57^{a}
UPRS	5.5 ± 2.72^{a}	4.7 ± 2.36^{bc}	3.1 ± 1.79^{b}	3.9 ± 1.91^{b}
UPRS + SB	6.2 ± 2.53^{a}	4.9 ± 1.85^{c}	3.5 ± 1.84^{b}	4.2 ± 2.10^{b}
PRS	$6.3 \pm 2.67^{a.}$	4.2 ± 2.10^{c}	3.5 ± 1.84^{b}	3.8 ± 1.75^{b}
PRS + SB	5.9 ± 2.77^{a}	3.7 ± 2.26^{c}	3.3 ± 2.16^{b}	3.6 ± 2.37^{b}

Mean values along the same row with different superscripts are significantly different ($p < 0.05$)

CONCLUSION

Pasteurization and the use of 0.1% sodium benzoate reduced the microbial load and totally eliminated yeast growth in *burukutu* during storage. *Lactobacillus acidophilus, Lactobacillus fermentum, Lactobacillus mesenteroides, Bacillus subtilis, Saccaromyces cerevisiae, Candida utilis and* Aspergillus *niger were* isolated. Pasteurized *burukutu* produced from white sorghum plus sodium benzoate had the lowest microbial count. All microorganisms isolated from the samples during storage were not harmful. Thus, production of wholesome *burukutu* can be achieved using aseptic method. Sensory evaluation showed that *burukutu* samples produced from white sorghum was more preferred to the *burukutu* produce from the red variety. Thus, this research advanced the use of white sorghum variety in the production of *burukutu* and extended the shelf life of *burukutu* produced from both white and red variety of sorghum.

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