

**PJN**

ISSN 1680-5194

PAKISTAN JOURNAL OF  
**NUTRITION**

**ANSI***net*

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## Physico-chemical Properties of Commercial Local Beverages in Osun State, Nigeria

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**Abstract:** This research work evaluates the physico-chemical properties of local beverages form, Osun State, Nigeria. The drinks were analyzed for P<sup>H</sup>, titratable acidity, specific gravity, total soluble solids, ethanol content, total solids, total sugar, reducing sugars, non reducing sugar and ascorbic acid. From the analysis, the P<sup>H</sup> value ranged from 4.2-6.3, the titratable acidity ranged from 0.8-11.7. The highest specific gravity was in fura da nunu (1.3180) and the lowest in ogogoro (0.9897). Total soluble solid ranged from 0.3-10.7%. Ogogoro (distilled palmwine) had the highest percentage of alcohol content of 37.6%, burukutu (sorghum beer) had 4.6% and palm wine had 3.1% while nunu (fermented skim milk), omi wara (cheese whey), kunnu zaki (millet food drink), Adoyo (maize drink) and fura da nunu (fermented skim milk with millet dough) had lower values. Fura da nunu had highest total solid (21.8%) and total sugars (7.5%). These values were significant different ( $p \leq 0.05$ ) from other samples. Adoyo had highest value of 32.0 mg/100 g ascorbic acid while ogogoro had the lowest value. The P<sup>H</sup> of ogogoro was nearer to neutrality compared with the other local drinks analyzed. Titratable acidity and ascorbic acid of zobo and pito were not feasible due to the products colour. The high alcoholic content of ogogoro, burukutu and palmwine signifies that the product can cause health problem such as obesity and can damage the organs in the body. Adoyo, fura da nunu, nunu and kunnu zaki are good source of ascorbic acid but diabetic patient may take them without sugar.

**Key words:** Kunnu zaki, zobo, adoyo, burukutu, fura da nunu, pito, Ogogoro, physico-chemical propertie

### INTRODUCTION

The major Nigerian local beverages are burukutu (sorghum beer), kunnu zaki (millet food drink), pito (fermented alcoholic beverage from sorghum or maize), palmwine, adoyo (ripe pineapple juice and supernant derived form ogi), ogogoro (distilled palm wine or local gin), nunu (fermented skim milk), fura da nunu (fermented skim milk with millet dough), zobo (extracts of calyx of *Hibiscus sabdariffa*) and omi wara (cheese whey).

Kunnu zaki is a traditional non-alcoholic fermented beverage widely consumed in the northern part of Nigeria (Obadina *et al.*, 2008; Adeyemi and Umar, 1994). The beverage (milky cream appearance) is a millet based food drink which is consumed within few hours of its production. Kunnu is consumed mainly by people within the low and middle income workers who cannot afford industrially produced beverages like Coca-cola, Pepsi etc. (Obadina *et al.*, 2008). Zobo drink (Sorrel, zoborodo) is an aqueous extracts of calyx of rosella and is a non alcoholic local beverage made from the reddish purple, acid-succulent calyces of the flower *Hibiscus Sabdariffa*. This flower is highly cultivated in the northern part of Nigeria because of the climate (Aliyu, 2000; Osueke and Ehirim, 2004). The calyces of *Hibiscus sabdariffa* have been found to be rich in vitamin and

other anti-oxidants (Wong *et al.*, 2002) and mineral (Babatunde *et al.*, 2000). Burukutu (sorghum beer) and pito are popular fermented alcoholic drink among the people in the Northern part of Nigeria. Both are produced mainly from the grains of guinea corn (*Sorghum vulgare* and *Sorghum bicolor*).

Palmwine or toddy is an alcoholic beverage from the sap of various species of palm tree such as palmyra and coconut palm. This is commonly called "emu" and "oguro" in western part of Nigeria. Palm wine may be distilled to produce a strong drink "ogogoro" (local gin). Adoyo is produced from ripe pineapple juice and supernant derived from ogi (ogi is a fermented product, made from sorghum or maize) (Kolawole *et al.*, 2007). Adoyo is a yellowish local drink from and does not undergo fermentation. It is very high in ascorbic acid. Omi wara is one of the local drinks in the Northern part of Nigeria and it is the water obtained from cheese. It is highly nutritious and serves the same advantage with liquid milk. Nunu is a fermented skim milk (Jideani *et al.*, 1999) and clear white naturally fermented thick milk product with a sour taste and is commonly taken as afternoon meal in conjunction with millet cereal "Fura" (Akinyele *et al.*, 1999). Fura da nunu is the mixture of both fura, a semi solid dumpling cereal meal (Jideani and Wedzicha, 1994) and nunu. The objective of this

Table 1: Physico-chemical analysis of local beverage in Osun State, Nigeria

Product	P <sup>H</sup>	Titratable acidity	Specific gravity	Total soluble solid %	Ethanol content %	Total solids %	Total sugar	Reducing sugars %	Non-reducing sugars	Ascorbic acid (mg/100 g)
Zobo	5.6b	-	1.0224f	6.2c	0.1c	8.6c	5.6b	0.8c	4.8b	-
Ogogoro	6.3a	0.8e	0.9897g	0.3f	37.6a	1.2g	0.0e	0.0d	0.0d	0.0d
Burukutu	4.8bc	11.7a	1.0812c	6.1c	4.6b	7.9cd	0.8e	0.2d	0.6d	5.6cd
Kunnu zaki	5.3b	8.4b	1.2110a	5.5cd	0.2c	9.1c	3.7c	0.6c	3.1c	15.0b
Pito	5.1bc	-	1.0634d	4.2d	0.3c	5.3e	3.4c	1.2b	2.2c	-
Palmwine	4.3c	8.9b	1.0387e	2.7e	3.1b	3.4f	1.9d	1.3b	0.6d	8.4c
Fura da nunu	5.2b	10.1b	1.3180a	10.7a	0.3c	21.8a	7.5a	1.1b	6.4a	17.5b
Nunu	5.6b	7.5c	1.1653b	7.8b	0.0c	11.4b	2.2d	1.9a	0.3d	5.8cd
Omi wara	5.8ab	4.5d	1.0712c	1.2f	0.0c	2.9f	0.2e	0.1d	0.1d	2.5d
Adoyo	4.2c	9.4b	1.0546d	5.5cd	0.2c	6.8d	2.9d	2.0a	0.9d	32.0a

Value with the same letter in the column are not significantly different ( $p \leq 0.05$ ) from each other

work was to examine the physico-chemical properties of ten local drinks produced commercially in Osun State, Nigeria.

## MATERIALS AND METHODS

Ten Nigerian local beverages were bought at different locations at Ada, Ikirun and Osogbo, Osun State, Nigeria. The beverages were zobo, kunnu zaki, ogogoro, nunu, fura da nunu, omi wara, adoyo, palmwine, burukutu and pito. P<sup>H</sup> of the products was determined with a digital pH meter at ambient temperature. The method of AOAC (1990) were used for soluble solids, specific gravity, total soluble solid, titratable acidity, alcohol content, total sugar and ascorbic acid.

## RESULTS AND DISCUSSION

The result in Table 1 revealed that Adoyo and palmwine had lower P<sup>H</sup> values of 4.2 and 4.3 respectively. This showed that they are more acidic than the other local drinks evaluated. Burukutu had P<sup>H</sup> value of 4.8 which was higher than the values 3.9 and 4.2 reported for burukutu and pito respectively (Kolawole *et al.*, 2007). Also, Igyor *et al.* (2006) recorded P<sup>H</sup> value range of 3.36-4.86 for burukutu and this was within the range of value obtained. The P<sup>H</sup> obtained for zobo was lower than the value (6.58) reported by Sowonola *et al.* (2005). Ogogoro had P<sup>H</sup> of 6.3 which showed that the acid content was very close to neutrality. There was no significant difference ( $p \geq 0.05$ ) in the P<sup>H</sup> values of ogogoro and omi wara.

Burukutu had the highest value (11.7) in titratable acidity and the lowest value (0.8) was in ogogoro. Burukutu was significant difference ( $p \leq 0.05$ ) different from other drinks while there were no significant difference ( $p \geq 0.05$ ) in the values for kunnu zaki, palmwine, fura da nunu and Adoyo. Higher value in titratable acidity of burukutu may be due to the traditional methods of production which are non standardized in terms of raw materials, equipment and finished products quality and handling (Wonang and Opoefe, 1999). The amount of acid present in burukutu was higher than those present in the other drinks since total titratable acidity gives a measure of the amount of acid present in a particular product. The

titratable acidity of zobo and pito cannot be quantified because the colour of the two makes determination unfeasible. Fura da nunu was significantly different ( $p \leq 0.05$ ) from other local drinks in specific gravity. It had the highest value of 1.3180 while ogogoro had the least value of 0.9897.

Fura da nunu had highest value of 10.7% in total soluble solid followed by nunu, zobo and burukutu. There was no significant difference ( $p \geq 0.05$ ) in the values of zobo, burukutu, kunnu zaki and Adoyo. Fura da nunu had the highest suspension of soluble solid when compared with the other drinks. Out of the ten local drinks examined, ogogoro had the highest alcoholic content (37.6%) while there were no traces of alcohol in nunu and omi wara. There were traces of alcohol in zobo, kunnu, pito, fura da nunu and Adoyo. Ababio (1990) reported the percentage alcohol ranging from 2-4% in burukutu, 2-8% in palmwine and 30-60% in ogogoro. Fura da nunu had higher total solids and total sugar content. These were significant different ( $p \leq 0.05$ ) from others. There were no traces of sugar and ascorbic acid in ogogoro. Adoyo was rich in ascorbic acid (32.0 mg/100 g) while the values for fura da nunu and kunnu zaki were 17.5 mg/100 g and 15.0 mg/100 g respectively.

**Conclusion:** This study showed the physico-chemical properties of commercial local drinks in Osun State, Nigeria. Consumption of ogogoro should be avoided because ogogoro had higher alcoholic content which can be absorbed into the blood stream and affect the nervous system. Burukutu, pito and palmwine could be taken in small quantities while adoyo, kunnu zaki, fura da nunu, nunu, zobo could be taken in large quantities but the sugar content must be reduced especially for diabetic patient.

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