

BACTERIOLOGICAL QUALITY OF SOBO DRINKS RETAILED WITHIN ILORIN METROPOLIS

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Sobo drinks retailed within Ilorin metropolis were investigated for their bacteriological quality, in terms of the total bacterial count and types of bacterial species present. The sobo drinks were found to have an average pH of 3.2. The bacterial counts were generally high ranging from 5.0×10^4 to 24×10^4 CFU/ml. Six bacterial species; *Bacillus subtilis*, *Staphylococcus aureus*, *Streptococcus faecalis*, *Klebsiella spp*, *Enterobacter spp*, and *Escherichia coli* were isolated. Consideration of the distribution pattern showed that samples from Unilorin Main Campus and General Post Office contained all the isolates, while three of the isolates; *Escherichia coli*, *Bacillus subtilis* and *Staphylococcus aureus* were common to all samples. Possible sources of the contaminants and their public health implications are discussed and suggestions offered on ways of ensuring safety of the sobo drinks.

INTRODUCTION

Sobo is a drink produced from carefully selected bright red sorrels of Rossell hemp (*Hibiscus sabdariffa*). It is a hot water extract of sorrel of the Rossell hemp: a shrub with distinct bright red coloured sorrels that is fibrous, and is native to West Africa (1). The drink is commonly used as refreshment and in the entertainment of guest at social occasions. The sorrels are sorted and cleaned before soaking in water. It is then heated to boiling after which the plant materials are removed by sieving. Sugar and other additives (flavours) are then added as desired. The hot extract is allowed to cool after which it is dispensed into nylons or plastic containers. It is the cooled extract, which is usually refrigerated before retailing that is taken as

'sobo'. The consumption of sobo has continued to spread across Nigeria been helped mainly by the worsening economic fortune of the majority of people and the escalating price of soft drinks and beverages that are commonly patronized.

Foods frequently serve as vehicle for spread of several organisms some of which are pathogenic (2). Many picnic, suppers and banquets have come to a disastrous end when home-prepared foods and drink serve not only as food and drinks for guest but also as the vehicle for transmitting Staphylococcal food poisoning (3). In view of the fact that sobo is never subjected to any form of post-production treatment that can eliminate, or at least reduce the bacterial load in the drink, it could be a potential source

of health hazard. Also the activities involved in the cooling, and subsequent dispensing of the drink into containers also represent potential sources of health hazards. Some researchers (4) have reported that some gastrointestinal illness characterized by diarrhoea, abdominal cramps, and vomiting which may be assumed as been of unknown aetiology may arise from drinking drinks contaminated with microorganisms. In this study retailed sobo drinks were purchased from various location within Ilorin. They were analyzed for their bacteriological quality as indicated by the number (counts) and kinds of bacteria they harbour.

MATERIALS AND METHODS

Samples of sobo drinks were purchased from retailers from five locations within the metropolis; these were Unilorin Secondary School, Unilorin Main Campus, Ipata Market, Oja-Oba, and General Post Office. These were immediately taken to the laboratory for analysis. The pH of all the samples was determined using Pye Unicam pH meter (Model 292 MK2). The bacterial populations were determined by preparing tenfold serial dilution of the samples, and then plating 1 ml of desired dilution on nutrient agar using pour plate count

method (5). Representative colonies of bacterial isolates were selected and purified by subculturing on nutrient agar using the streaking method. Pure cultures were then characterized and subsequently identified according to Bergy's Manual of Determinative Bacteriology (6).

RESULTS

The pH of the samples ranged from 2.6 to 4.1 (Table 1), the mean pH was 3.04. The bacterial counts were generally high; it ranged from 5×10^4 to 24×10^4 CFU/ml (Table 2). A sample from Unilorin Secondary School had the highest count (24×10^4 CFU/ml) while a sample from Ipata Market had the lowest count (5×10^4 CFU/ml). A total of six bacterial species were identified. These were *Bacillus subtilus*, *Staphylococcus aureus*, *Streptococcus faecalis*, *Klebsiella spp*, *Enterobacter spp* and *Escherichia coli*. Their distribution among the collection points is shown in Table 3. Samples from Unilorin Main Campus and General Post Office were observed to contain all the isolates and three of the isolates; *Escherichia coli*, *Bacillus subtilus* and *Staphylococcus aureus* were common to all samples. *Klebsiella* was the least encountered; been found only in some samples from Unilorin Main Campus and General Post Office.

Table 1: pH of Sobo Samples Examined

Collection Point.	pH				
	Collection Time				
	1	2	3	4	5
Unilorin Secondary School.	2.6	3.0	3.2	3.3	3.0
Unilorin Main Campus.	3.2	3.2	3.3	3.2	3.1
Ipata Market.	3.2	3.1	4.1	3.1	3.2
Oja-Oba	3.0	3.2	3.2	3.2	3.2
General Post Office.	3.2	3.2	3.0	3.2	3.2

Table 2: Population of Bacteria in Sobo Samples Examined

Collection Point.	Mean Total Bacterial Count (cfu/ml) x 10 ⁴				
	Collection Time				
	1	2	3	4	5
Unilorin Secondary School.	9.0	16.0	24.0	14.0	13.0
Unilorin Main Campus.	21.0	12.0	6.0	13.0	11.0
Ipata Market.	5.0	16.0	8.0	11.0	7.0
Oja-Oba	16.0	9.0	11.0	16.0	8.0
General Post Office.	13.0	7.0	8.0	11.0	14.0

Table 3: Distribution of Bacterial Isolates Among Collection Points.

Bacterial species	Source of Sample				
	USS	UMC	IMT	OJA	GPO
<i>Staphylococcus aureus</i>	+	+	+	+	+
<i>Streptococcus faecalis</i>	+	+	+	-	+
<i>Bacillus subtilis</i>	+	+	+	+	+
<i>Klebsiella sp</i>	-	+	-	-	+
<i>Enterobacter sp</i>	-	+	-	+	+
<i>Escherichia coli</i>	+	+	+	+	+

Key

USS: Unilorin Secondary School.

UMC: Unilorin Main Campus.

IMT: Ipata Market

OJA: Oja Oba

GPO: General Post Office.

DISCUSSION

The pH values obtained indicate that the sobo drinks were acidic in nature and hence normally not favour the proliferation of bacteria. However pH alone is not a sufficient parameter to predict the chances of survival and proliferation of

bacteria in the sobo drinks. The high bacterial counts obtained are indicative of poor production conditions. In the light of the amount of heating that goes into sobo production, the presence of bacteria can only be as a result of post heating contamination. Similar

post treatment contamination of water has been reported (7). This can occur during cooling of the hot extract, addition of flavours and sweetener, or dispensing of the extract into nylons. Utensils and water used during the post heating stages can also serve as sources of contamination. Water used in processing has been identified as the major source of contamination of locally made drinks (8).

The presence of *Staphylococcus aureus* in all samples is indicative of human contamination after heating. This could be from direct human contact such as fingers dipped into the extract to taste the sweetness, or indirectly through additives or utensils. The organism is associated with enterotoxin characterized by short incubation period (1-8 hours), violent nausea, vomiting and diarrhoea. There is no fever (9). The presence of *Bacillus subtilis* is indicative of environmental contamination, which could have resulted from exposure of the extract to air or contact of utensils used with the soil or from the water used in the post heating stages. The presence of *E. coli*, *Klebsiella* and *Enterobacter spp* suggests faecal contamination, while the presence of *Streptococcus faecalis* particularly indicates a fairly recent faecal

contamination (10). Some strains of *E. coli* are associated with production of heat stable enterotoxins, hence, their presence constitute a health risk (11). Although there are no specific guidelines as at present to give a standard for assessing sobo quality, the WHO standard for drinking water could be used since sobo serves as a drink. The standard requires that drinking water should not contain pathogenic organisms and should be free of bacteria indicative of pollution with excreta (11). Hence it can be adjudged that the sobo drinks retailed in most location within Ilorin, as obtained in this study, are not bacteriologically fit for consumption.

Generally the drinks appear to have been contaminated due to poor sanitary conditions, unhygienic production practices and prolonged exposure to the environment. Therefore to ensure the safety of the sobo drinks, producers must maintain a clean environment, minimize contact with the extract and exposure to the environment after heating and also maintain a high personal hygiene level. Also utensils should be properly washed before use and clean water should be used at all stages of production. On a larger note further studies examining the chemistry of the extract and its effect(s) on visceral organs and

body system are desirable before an overall acceptability can be placed on the sobo drink.

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