

MICROBIOLOGICAL AND SENSORY ATTRIBUTES OF GINGER FLAVOURED ZOBO DRINK

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Introduction

Zobo drink is prepared from the flowers of *Hibiscus sabdariffa*. Traditionally, the red calyx is soaked in cold water for some time and then boiled to extract its red pigment. The extract is then filtered, flavoured (optional) and sweetened (to taste, may be chilled) then served. The non alcoholic nature of the beverage has received a wider acceptability as it is a common drink served during festive periods (naming ceremonies, marriages, etc) most especially among the low income earners. The drink is now becoming very popular among people of various socio-economic classes in West Africa and in Nigeria in particular. The drink does not stay overnight unrefrigerated without spoilage [1].

Ginger has an ancient history as a culinary and as a medicinal herb. It is widely exploited in flavouring both alcoholic and non alcoholic beverages giving its characteristic flavour. Some of its physiological benefits include: anti-microbial, anti-inflammatory, anti-blood clotting, circulatory stimulant among others.

If well managed, a lot of income can be generated from the production of the drink as a result of its economic, nutritional and aesthetic values [2]. Most non-alcoholic beverages consumed in Nigeria have their roots in foreign countries from where they are shipped as concentrates. Their formulation into ready-to-drink beverages requires considerable use of food additives. This has led to increased public outcry most especially the Consumer Protection Council (CPC) on the use of synthetic chemicals as additives in foods due to their health threats. Consequently, this research work evaluated the effects of the inclusion of different levels of ginger on the microbial growth and sensory attributes of the drink.

Materials and Methods

Dark red calyces and granulated sugar were purchased from Minna Central market, Niger state. Three different formulations were obtained using different concentrations of ginger (100 ml, 200 ml and 300 ml) per 2000 ml volume of the juice extract (v/v) per 200 g of granulated sugar and packaged in air-tight transparent glass bottles. The three formulations were designated B, C and D respectively. The control sample (A), had granulated sugar as a sweetener (2000 ml juice extract per 200 g of sugar). The juice was obtained by soaking sorted dried red calyx (200 g) in 2000 ml of clean water over-night (8 - 12 hours) in a stainless steel container. It was then boiled for 5 min. for further extraction. Fresh ginger (100 g) was peeled, washed and blended; the juice was then extracted with 100 ml of water and the extract blanched and kept under refrigeration before product formulation. The samples were analyzed for Total Viable Count (TVC), Yeast Count (YC), and Coliform Count (CC) using standard methods described by [3]. Organoleptic attributes (taste, appearance, mouth feel and general acceptability) were examined using 9-point Hedonic scale. Analysis was conducted on the first day of product formulation and thereafter on weekly basis for one month duration at ambient temperature. Data collected were subjected to analysis of variance (ANOVA).

Result and Discussion

Microbial evaluation of samples revealed that, the control sample (A) had the highest total viable count, yeast and coliform count. The pattern of microbial growth in various samples had an inverse relationship with the level of ginger inclusion. The higher the level of ginger inclusion, the lower the

value of microbial counts. These further buttress the anti-microbial properties of ginger. It can be further asserted from this study that, ginger has more effect on bacteria (coliform) than yeast. Organoleptically, the samples were significantly different ($P < 0.05$) in terms of taste, mouth feel and general acceptability except for appearance. Samples with higher ginger, most especially sample D received least acceptability. This could be due to pronounced bitter flavour that negatively influenced its acceptability. Sample B has the highest overall acceptability score. It could be due to mild flavour impacted by the ginger used at this level.

Table 1: Total microbial count and Organoleptic attributes of zobo drink

Sample	Total Viable Count (cfu/ml)	Microbial Count		Coliform Count (cfu/ml)
		Yeast Count (cfu/ml)		
A	1.80×10^6	1.50×10^5		2.29×10^5
B	2.50×10^4	1.66×10^5		4.0×10^4
C	7.30×10^3	1.94×10^4		6.15×10^1
D	1.0×10^2	3.14×10^3		1.88×10^2
Sensory attributes				
	Taste	Appearance	Mouth Feel	General Acceptability
A	5.00 ^b	8.10 ^a	5.50 ^{bc}	6.00 ^{bc}
B	6.80 ^b	7.70 ^a	7.80 ^a	8.10 ^a
C	7.40 ^a	8.00 ^a	7.20 ^{ab}	7.60 ^{ab}
D	6.20 ^{ab}	6.90 ^a	5.90 ^{ab}	6.60 ^{abc}

*Values followed by different superscript in the column are significantly different at ($P < 0.05$). Values are Mean \pm SEM of triplicate determination.

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