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# The Effect of Fura De Nunu on Selected Clinical Isolates of Bacteria

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***Abstract:*** **Three clinical Isolates comprises of Gram-negative and Gram positive bacteria were invitrobially impregnated in agar-cup diffusion sensitivity of fura de nunu, a non-alcoholic fermented cow milk product. The undiluted samples of the locally fermented milk appreciably inhibited the growth of all the bacteria tested including, remarkably, *Salmonella, Staphylococcus aureus and Pseudomonas aeruginosa,*The bacteria however varied in their sensitivities to the fractional dilutions of the samples. This antimicrobial effect represents another property for fura de nunu and obviates the possibility of public health risk in its consumption.**

***Keywords:*** **Fura de nunu, clinical isolates, antibiotic sensitivity.**

## 1. INTRODUCTION

Fura de nunu is a local drink derived from fresh cow milk. It is popular in the northern part of Nigeria and a choice brand for most people. It is made from unpasteurized milk). It is a bulky curdy locally fermented drink mostly vendored by the Fulanis of the Northern Nigeria and normadic Chadian and Nigerien resident in Southwest Nigeria.

Fura de Nunu (fermented milk cereal mix) is highly nutritious beverage which is a two in one product consisting of a cereal"fura" made from millet and "nunu" a fermented milk product similar to yoghurt. Fura de nunu is sold from calabash converted with mat using scopes made from calabash. In the market, fura is mix with nunu in a bowl for customers. Usually one bowl is used in mixing for all customers without cleaning. Depending on the consistency, the product is used as food, refreshing drink and a weaning food for infants. The product is in high demand especially in the months of November in July (Belewu, 1999).

Ingredients used for home or personal preparation are; 'one and half cups of millet or guinea corn flour, half cup of soya bean flour, one teaspoon of dried ground pepper, one teaspoon of ground cloves, half teaspoon of African pepper (ground), one teaspoon of dry ginger root, one tablespoon of corn flour, two litters of water, one litter of nunu and sugar to taste.

The scales of operation for the processing units surveyed varied based on the quantity of millet processed daily. The amounts ranged from about 6 kg to 27 kg,with an average of about 12 kg.

Typically, fresh cow milk is collected in the morning in calabashes, sieved and left to ferment for a minimum of 24 hours or a maximum of 48 hours depending on the season (Frank,2001).

During the hot season which is usually from March to June, high ambient temperatures of 35oC promote acidification of the milk within 12–24 hours yielding the desired product, while in the cold season (October to February) where temperature of 15-17$^{o}$C are recorded, the fermentation takes up to 48 hours.

The fermented milk is then churned using a wooden ladle. Fat accumulates as a result of the churning andis removed. Excess whey is drained off to obtain a product with a thick consistency which is the 'nunu', consumed alone or with 'fura'

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Milk from its natural source is a sterile product but its rich nutritional composition makes it af ertile ground for microbial inhabitation.Contamination may come from external sourceslike air, soil and milk handlers. Psychrotrophic microorganisms (coliforms, lactobacilli and alcaligens) represent a substantial percentage of the bacteria in raw milk, with pseudomonads and related aerobic (Adebolu, 2007).

On the health benefits of fura de nunu ; it's a complete food, containing proteins, carbohydrates, fats, vitamins, minerals, enzymes, cholesterol and beneficial bacteria (probiotic).

Fura de nunu is a raw milk that has all of the 8 essential amino acids. And raw milk is rich in colloidal minerals and enzymes which are necessary for the absorption and utilization of natural sugars and fats present in milk.

The aim of this study was to invitrobially assessed the antimicrobial potential of fura de nunu on selected clinical isolates of bacteria.

## 2. MATERIALS AND METHODS

**Sample Collection:**

The sample of fura de nunu was collected from various sales point in Sagamu predominantly occupied by the Hausas. They were collected and transported in a sterile specimen bottle. They were clearly labeled and stored in refrigerator before analysis.

**Preparation of different concentrations of fura de nunu:**

Five different concentrations of fura de nunu were prepared into five different sterile McCartney bottles. The concentrations prepared are 4g/ml, 2g/ml, 1g/ml, 0.5g/ml and 0.25g/ml. The stock organisms were serially diluted in 12-folds and the dilution factors $10^{-10}$ and $10^{-12}$ were used for the experiment.

**Test organisms:**

Five isolates of bacteria;*Salmonella typhii, Staphylococcus aureus, Psuedomonas aeruginosa,* collected from the Department of Medical Microbiology, University College Hospital Ibadan Nigeria. They were re-isolated on their various selective media and subjected to conventional test and then preserved on fresh nutrient agar slants in a refrigerator at $40^0$C.

**Agar cup diffusion technique:**

***Sensitivity tests;***

Five wells were bored with a sterile cork borer (6mm) in Mueller Hinton Agar seeded with 24hrs culture of the test organism of various dilutions and 3-5 drops of the prepared fura de nunu concentrations (4g/ml, 2g/ml, 1g/ml, 0.5g/ml, 0.25g/ml) were impregnated in separate holes. The plates were incubated at $37^0$C for 24hours. The antibacterial activity was assayed by measuring the diameter of the zone of inhibition from the centre of the well.

## 3. RESULTS

Selected dilution produced varied concentration and varied zone of growth inhibition for every isolates. MIC 32mg/ml at $10^{-10}$ and MIC 15mg/ml at $10^{-12}$ dilution were recorded for *Salmonella typhi* , MIC 170mg/ml at $10^{-10}$ and MIC 85mg/ml at $10^{-12}$ dilution were recorded for *Staphylococcus aureus* while MIC 251mg/ml at $10^{-10}$ and MIC 14mg/ml at $10^{-12}$ dilution were recorded for *Pseudomonas aeruginosa*. Varied zone of growth inhibition were obtained for each bacterial isolates were recorded in this study.

**Table 1 Salmonella typhii**

| CONCENTRATION | | ZONE OF INHIBITION (mm) | |
|---|---|---|---|
| mg/ml | Log Conc | Mean of plate 1 and 2 ($10^{-10}$) | Mean of plate 1 and 2 ($10^{-12}$) |
| 4000 | 3.6 | 20 ± 0.00 | 24 ± 0.71 |
| 2000 | 3.3 | 18 ± 2.12 | 21 ± 1.41 |
| 1000 | 3.0 | 16 ± 2.83 | 20 ± 0.71 |
| 500 | 2.7 | 14 ± 1.41 | 17 ± 2.12 |
| 250 | 2.4 | 12 ± 0.71 | 15 ± 0.71 |

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***Staphylococcus aureus***

| CONCENTRATION | | ZONE OF INHIBITION (mm) | |
|---|---|---|---|
| **mg/ml** | **Log Conc** | **Mean of plate 1 and 2 ($10^{-10}$)** | **Mean of plate 1 and 2 ($10^{-12}$)** |
| **4000** | **3.6** | **20 ± 0.71** | **23 ± 0** |
| **2000** | **3.3** | **18 ± 1.41** | **22 ± 0.71** |
| **1000** | **3.0** | **15 ± 0** | **19 ± 0.71** |
| **500** | **2.7** | **11 ± 0.71** | **15 ± 1.41** |
| **250** | **2.4** | **6 ± 0** | **10 ± 0** |

***Pseudomonas aeruginosa***

| CONCENTRATION | | ZONE OF INHIBITION (mm) | |
|---|---|---|---|
| **mg/ml** | **Log Conc** | **Mean of plate 1 and 2 ($10^{-10}$)** | **Mean of plate 1 and 2 ($10^{-12}$)** |
| **4000** | **3.6** | **20 ± 0** | **21 ± 1.41** |
| **2000** | **3.3** | **18 ± 0** | **20 ± 0** |
| **1000** | **3.0** | **16 ± 0.71** | **18 ± 0** |
| **500** | **2.7** | **13 ± 2.12** | **17 ± 0.71** |
| **250** | **2.4** | **6 ± 0** | **13 ± 0.71** |

## 4. DISCUSSION

Fura de nunu is a fermented local milk products, produced by various indigenous fermentation methods. The consumers believed that the drink is nutritious and medicinal and the consumption rate has relatively increased in Nigeria because it is cheap and readily available. The concern for a public health risk in the consumption of Fura de nunu in Nigeria has been obviated in this study due to the encouraging inhibitory effect of the drink on all the bacteria tested. This however is subject to the hygienic preparation of the drink because it had been observed that application of corrective measures such as hand-washing practices, washing of processing areas and utensils, hygienic handling of materials during processing and pasteurization of final product proved effective in significantly reducing microbiological hazards associated with Fura de nunu (AkanbandaF, 2010). The non-inhibitory effect of its higher fractional dilutions is negligible because the drink is not normally diluted before consumption. Thus, Fura de nunu in its ready-to-drink form is effective in minimizing the risk of bacterial infection or intoxication. This apparently substantiated self-sanitizing role of Fura de nunu is attributed to its acid pH 3.9 to 5.6 (Belewu,1998), various fermentation products with antimicrobial activity, the volatile oils and constituent acids of the spices -tamarind, ginger and black pepper (Frank,2001)). The little difference in the effect of the dilution plate of the clinical isolates assessed could be attributed to the method of production in terms of dilution and ingredients which also is indicative of the microbiological status (Belewu, 1999).

A moderated consumption of Fura de nunu is advocated such that the general public would take advantage of its antimicrobial effect in addition to its acclaimed physiological roles-lactation in nursing mothers, purgative effect and cure for flatulence as well as nutrient composition (AkabandaF, Owusu-Kwarteng J., et.al.,2010).). The peculiar sweet-tainted sour taste of Fura de nunu is noteworthy. The results obtained showed that Fura de nunu has antimicrobial properties and further supports the claim that the drink is medicinal.

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