

BACTERIA AND NAIRA NOTE (A CASE STUDY OF TWO OCCUPATIONAL GROUPS IN KEBBI STATE METROPOLIS)



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Abstract

Naira note has been ignored, despite the fact that it has been found to be a highly mobile inanimate within the human community, different naira denominations were obtained from two occupational groups in Birnin Kebbi metropolis and bacteria loads on the notes were assessed, the notes were analyzed for bacteria growth using nutrient agar. The strick plate method was employed for the isolation, nine bacteria isolates were discovered. Identification and characterization revealed the following organisms *Bacillus lentus*, *Bacillus alvei*, *Bacillus megaterium*, *Citrobacter diversus*, *Corynbacterium diptitheriod*, *Staphylococcus aureus*, *Proteus vulgaris*, *Staphylococcus saprophyticus* and *Salmonella typhi*, this result, therefore suggest that naira notes or paper currency is commonly contaminated with microbes and this may play a major role in the transmission of potentially harmful microorganisms.

Keywords: Bacteria, Naira Note, Occupational Groups

Background to the Study

The environment plays a critical role in the transmission of human parasites and bacteria agents to humans, with many environmental materials serving as vehicles. Microbial contaminations may be transmitted directly via food or inanimate objects (fomite). The transmission routes are great importance. Formites are inanimate objects capable of absorbing harboring and transmitting infectious microorganism (Oyero and Emikpe 2007). Contamination of objects by pathogenic microorganisms is much of public concern as contaminated material can be source of transmitting pathogens. Items that are passed from hand to hand are likely to be contaminated with disease-causing microorganisms, especially if handed with unclean hands kept in dirty surrounding (Umeh et al 2007).

Paper currency is widely exchanged for goods and services in all country in the world wide. Paper currency therefore presents a potential risk to public health, since disease can be spread through contact with formites (Pope et al, 2002; Russel, 2006 and Lalonde, 2007). Although, currency

notes are impregnated with disinfectant in order to inhibit microbial growth, but still pathogens are isolated from these materials (Talaro, 2005). A variety of microorganisms associated with Tuberculosis, Meningitis, Pneumonia, Tonsillitis, and Peptic Ulcer, Genital tract infections, gastroenteritis, thorax infections and lungs abscesses had been identified in damaged or soiled notes (Siddique, 2003).

These currency notes may be subjected to contamination via bare hands, raw products, foods or poor (personal) hygiene. Humans and animals have abundant normal flora that usually do not produce disease but achieved a balance that ensures the survival, growth and propagation of both the bacterial and the host. Some bacterial that are important causes of disease are cultured commonly with the normal flora (e.g. *Streptococcus pneumoniae*, *Staphylococcus aureus*) (Brooks et al 2002).

Money is used for every type of commerce, from buying milk at the corner store to trafficking in sex and drugs. All these commercial centers are made possible through the use of currency notes; especially with the smaller, most heavily handled denomination. What will be obvious by now is that anything that gets on hand can get on money and hands are hardly germ-free (Sydney, 2001). Currency may be contaminated by microorganisms when they fall on the ground. It can also be contaminated when kept in a Wallet, purse, Wardrobe, during spray in a ceremony, by food hawkers (especially the butchers) by the market women, by the kabu-kabu/taxi drivers that squeeze and fold the currency notes any how (Oyetero and Emikpe, 2007).

This is because, some leather purse may favour the growth of the microorganism; hence any currency kept in the wallet will be contaminated when kept close to the skin, in under wears, tip of wrapper and place that are always dirty (Oyetero and Emikpe, 2007) currency may undergo microbial contamination inside a wardrobe due to high humidity of the wardrobe that could favour the growth of microorganism. The butchers plays a major role in contaminating currency with enteric bacteria a found in cattle when they handle money before washing hands as well as the taxi drivers, food sellers also contaminate the currency, because of the practice of poor hygiene (Egan and Brehery, 2002).

Objectives of the Study

The objective of this research work is:

- 1 To isolate and identify the bacteria those are associated with the Nigeria currency note (Naira).
- 2 To know the level of contamination of Nigerian currency note (Naira).

Methodology

Collection of Sample

A total of 18 soiled naira samples were collected from commercial motorcycle rider, and food sellers. The domination of the notes ranges from N5-200 notes; (mint) was obtained from Central Bank of Nigeria (CBN) Kebbi to serve as control. The notes were placed in a sterile polythene bags and transported to the laboratory for analysis.

Microbiological Analysis

The samples were swabbed with swab stick moisture with sterile distilled water and inoculated on Nutrient agar plates. The plates were then incubated at 37°C for 24 hours. After the incubation period the isolated were repeatedly subculture on fresh media to obtain pure culture.

Determination of Microbiological Characteristics

From the colonies that developed nutrient agar a smear was made on clean glass slide using sterile wire loop. It was dried and heat fixed the smear was flooded with crystal violet solution for 60 seconds. This was then tipped off logol's iodine was added for 60 seconds and washed. Then smear was then decolorized with 70% ethanol and washed. This was counter stained with staining solution for 1 minutes followed by rising with distilled water. This was then allowed to dry before viewing under the microscope using oil immersion objective (X100).

Biochemical Test

The isolates were biochemically characterized and identified according to the method of Cheesbrough (2002). The following biochemical test were carried out i.e Catalase, Coagulase, urease, motility, gas, spore staining, Carbohydrate and Indole, test to identify the organisms to species level.

Result and Discussion

The results of the morphological and biological characteristics of the isolates from various currency notes obtained from this research work are presented in tables.

Table 1: Presents; the isolates from currency notes obtained from food sellers. The isolates were *Bacillus* and *Corynebacterium* have the highest occurrence, *Salmonella* was detected only in N50 notes and *Proteus* was also detected from N100 notes.

Table 2: Presents; the isolates from currency notes obtained from commercial motorcycle Riders (Kabu-Kabu). The notes were highly contaminated with *Staphylococcus aureus*, *Citrobacter diversus*, *Staphylococcus saprophyticus*, *Bacillus alvei* and *Bacillus megaterium*. No

Table 3: Presents; the comparison of the isolates based on the occupational group.

Table 1: Shows Bacteria isolates obtained from food sellers;

Sample RXN	Gram	Cat	Coa	Glu	Net	Ind	Gas	Spore	Isolates
S5	+ve Rod	+	-	+	+	-	-	+	Bacilluslentus
S10	+ve Rod	+	-	+	+	+	-	-	Corynebacteriumdiphtheroid
S20	+ve Rod	+	-	+	+	+	-	-	Corynebacteriumdiphtheroid
S50	-ve Rod	-	-	+	+	-	-	+	Salmonellatyphy
S100	-ve Rod	-	-	-	+	-	-	+	Proteusvulgaris
S200	+ve Rod	+	-	+	+	+	-	+	Bacilluslentus
SC	NG	NG	NG	NG	NG	NG	NG	NG	

Table 2: Shows Bacteria isolates obtained from commercial motor cycle Riders (Kabu -Kabu)

Sample RXN	Gram	Cat	Coa	Glu	Net	Ind	Gas	Spore	Isolates
S5	+ve Rod	+	-	+	-	-	-	-	Bacillusalvei
S10	+ve C	+	-	-	-	-	-	-	Staphylococcussaprophyticus
S20	+ve Rod	-	-	+	+	+	-	-	Citrobacterdiversus
S50	-ve C	+	+	+	+	-	-	-	Staphylococcusaureus
S100	+ve C	+	+	+	-	-	-	-	Staphylococcusaureus
S200	+ve Rod	+	-	+	+	-	-	+	Bacillusmegaterium
SC	NG	NG	NG	NG	NG	NG	NG	NG	

Keys

NG = No growth
 +ve = Positive
 -ve = Negative
 +vec = Positive Cocci
 Sugars (lac, suc and Glu)

Table 3: Shows the comparison table of the isolates based on the occupational group

Isolates	Food sellers	Commercial motor Cycle Rider
Bacillusalvei	-	+
Bacilluslentus	+	-
Bacillusmegaterium	-	+
Citrobacterdiversus	-	+
Corynebacteriumdiphtheroid	+	-
Proteusvulgaris	+	-
Salmonellatyphi	+	-
Staphylococcus aureus	-	+
Staphylococcusaprophyticus	-	-

Discussion

Base on the research conducted, the new currency were not contaminated with any kind of bacteria, and the other note collected from the general public food sellers and commercial motorcyclists were heavily contaminated with different kind of bacteria.

Little is known about whether micro organisms are merely transferred from one person to another by handling of the money. However, the isolation of some pathogenic bacteria from the naira notes in this research work is to public health significance. The Bacillus sp was having the highest percentage bacteria isolated from the naira notes in this research work. The Bacillus sp mostly causes anthrax (Nester et al, 2004), which is been acquired by inhaling endospores in soil, animal hides and work. This was followed by Staphylococcus sp. The staphylococcus sp mostly causes food poisoning, toxic shock syndrome and urinary tract infection (Nester et al 2004). Other isolate such as Corynebacterium diphtheria which is toxix producing strain course diphtheria which is a fatal throat infection (Nester et al 2004). Salmonella sp that grows in the intestinal tract of human and is transmitted via feces which mostly cause gastroenteritis and typhoid fever (Nester et al, 2004).

This research work is inline with the finding of Umeh et al (2007) were they also isolated Salmonella sp, and Staphylococcus aureus beside this organisms, they isolated Escherichia coli, Aerobacter sp yeast, cells, Staphylococcus faecalis and coagulate negative Staphylococci. Another research conducted by Oyero and Emikpe, 2007 in which they also isolated Bacillus sp, Proteus sp and Staphylococcus sp, in which other organisms include the Enterobacter sp, Klebsiella sp, Staphylococcus, aureus, Aspergills sp.

Conclusion and Recommendation

Although this study was restricted to Kebbi State metropolis only but the result may give an indication of the general level of bacteria contamination of naira notes in Kebbi State and Nigeria at large. The different isolates that were been isolated from the Nigeria currency (naira), some of which were pathogenic constituting a health hazard. The general level of contamination of the circulated Nigeria currency notes was found to be higher than the higher denomination, which may be an indication that the level of contamination is proportional to the duration of circulation. Money is one of the effective transfer agents. Bacteria infections and diseases are transmitted more rapidly by handling of money than possibly any other method on the planet, including the biological terrors. As known that the smaller denominations are more contaminated as compared to the larger one here in Nigeria, it may help to replace the N5, N10 and N20 notes with coin since metals have anti bacteria activity, often come off sterile, presumable due to copper (Gadsby, 1998).

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