

## Effect of Redeemer's Natural antibiotics on selected clinical isolate from Minna General Hospital, Niger State, Nigeria.

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**Abstract:** The antimicrobial activity of Redeemer's Natural antibiotic was tested against five clinical isolates from Minna General Hospital, Niger State (*Salmonella typhi*, *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonasaeruginosa* and *Candida albicans*), using tube dilution techniques. It was found that *Salmonella typhi* was markedly affected by the herbal drug at a concentration of 2mg/ml, while *Pseudomonasaeruginosa* and *Escherichia coli* were also affected at a concentration of 3mg/ml, all the three organisms were inhibited with zone of inhibition ranging from 5.0mm-14.0mm, while the herbal drug showed no effect on *Staphylococcus aureus* and *Candida albicans*. The inactivity of the herbal drug on *Staphylococcus aureus* and *Candida albicans* can be due to resistivity development to drugs.

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### 1.Introduction.

Traditionally, the use of plants in curing illness has deep roots in man's history. The history of traditional medicine is glorious and has been maintained since 300 years ago. Ethno-pharmacological use of plants prevails among Nigerians and some African countries like Zimbabwe, Botswana, Niger and Kenya, where about 60 – 65% of their populace rely on herbal medicine which they believe is natural and does not contain additives (WHO, 1999).

Traditional medicine as defined by World Health Organization (WHO), refers to “sum total of all knowledge and practical application, whether explicable or not, used in diagnosis, prevention and elimination of physical, mental or social imbalance and relying exclusively on practice and experience and observations handed down from generation, whether verbally or in writing” (WHO, 1978).

Over the years, the knowledge of herbal medicine has grown. In modern times, a wide range of herbs have been sought for their healing effects and used more and more, while the resort to black magic has been in steady decline (Saisang, 2006). It is most likely that early men learnt about the healing values of some herbs by observing habits of animals. It is well known that some carnivores eat particular plants to cure certain ailments. The principle of using plants was tried, and the good results were passed on to succeeding generations. The succession has led to irregular exploitation of such herbs and has resulted to a continuous increase in fake drugs production and inappropriate usage of herbs (Kuta, 2008).

Medicinal plants are those plants that contain chemical compounds that possess established therapeutic action (Culei,1982, Sofowora, 1984). Medicinal plants are also defined as “those plants in which one or more of their organs contain substances that can be used for therapeutic purposes” (Tyler *et al*, 1981.). It has been established that there is a variety of local herbs which are used against various diseases, and often the traditional medicine practitioners do not know the composition and mechanism of action of the plants they use. The plant extracts are normally used in their crude form and they have not been chemically purified (Tyler *et al*, 1981).

Traditional medicament is relatively cheaper than orthodox medicine; as such it enjoys wider patronage and acceptability among people than Western medicines. This could be due to the fact that, traditional practices blend easily with the socio-cultural life of the people (Sofowora, 1989). The array of active compounds derived from plants are impressive materials for the development of drugs used for the treatment or prevention of heart ailments, parasitic, bacterial infections etc among the many examples. Every plant has medicament potential naturally except where such knowledge is unavailable (Sofowora, 1989).

Some drugs of plants origin are not pure compounds but extracts or plant materials that have been suitably

antimicrobial activity and a large number of these plants have been documented to contain substances capable of inhibiting the growth of

pathogenic microorganisms with high selective toxicity (Midiawiki, 2008).

Although the efforts of scientists in identifying plants with promising antimicrobial activity are yielding fruitful result, currently about 50% of all pharmaceutical drugs have their origin from plants and these plants are believed to hold a potential “treasure trove” of treatment and cures for various human diseases. The treatment of cancers and AIDS appears to rest in the discovery of a miracle plant (Sylvia, 1996, Teresa *et al*, 2003).

However, lack of quality control, undefined dosages associated with locally prepared herbal medicine, coupled with legislative inadequacies are some of the impediments hindering the development of traditional medicine in Nigeria (Sofowora, 1981). Based on the statistics of medical research involving plants, only about 5000 of the estimated 250,000 species of flowering plants have their pharmaceutical potentials tested and only a few of these have been acknowledged to have therapeutic values (Lewington, 1990).

The importance of herbal medicine has been increasingly recognized by the public, (locally or internationally), as well as national organizations. Systematic research is being carried out by several local laboratories with the purpose of supplementing modern medicine (Saisang, 2006).

The yearly herbal medicine fair in Nigeria and the increasing publicity and patronage, irrespective of the social, educational or religious background of the people involved, are an indication of the acceptability of herbal medicine (Ukwuomah and Da Costa, 1997). The setting up of Traditional Medicine Board by some State governments in Nigeria and the on-going registration of herbal products by National Agency for Food, Drug Administration and Control (NAFDAC) signify recognition of traditional medicine by the government (Abereet *al*, 2007).

It has been established that economic and demographic projections for most African countries including Nigeria offer little or no grounds for the use of orthodox medicine by the teeming human population, who are living below the poverty level. This ugly situation necessitates the research for alternative to orthodox medicine whose common sources are plants (Kuta, 2008).

“Redeemer’s natural antibiotics” is a formulation that is made from numerous plants. The manufacturers claim to have produced the drug from 34 African plants roots, herbs, flowers, barks, fruits and leaves including *Zingiberofficinale*(ginger), *Alluimsativum*(garlic) and *Aloe vera*. The product was tested for its efficacy on five clinical isolates.

The clinical isolates were *Salmonella typhi*, *Pseudomonas aeruginosa*, *Escherichia coli*,

*Staphylococcus aureus* and *Candida albicans*, isolated from patients attending General Hospital Minna, Niger State, Nigeria. The isolates are representation of array of pathogenic microorganisms, known to cause infections to humans.

## 2. Materials and Methods.

### 2.1 Preparation of the herbal product.

Three grams (3g) of the herbal product were dissolved in 90ml hot distilled water for 10 minutes as prescribed by the producer of the herbal drug, and was stirred using an applicator stick in order to ensure homogeneity of the mixture. The mixture was filtered using grade one (no.1) Whatman filter paper. The mixture was stored at lower temperature in the refrigerator for further use.

### 2.2 Preparation of herbal concentrations

A serial dilution technique was used to prepare varying concentrations of 1mg/ml, 2mg/ml, 3mg/ml, 4mg/ml and 5mg/ml under aseptic conditions.

### 2.3 Susceptibility test.

Petri dishes containing nutrient agar were separately inoculated with *Staphylococcus aureus*, *Escherichia coli*, *Salmonella typhi* and *Pseudomonas aeruginosa*, while dextrose agar was inoculated with *Candida albicans*. A sterile cork borer of 6mm in diameter was used for boring wells on the agar plates. Different concentrations of the herbal drug were introduced into the wells and the plates were incubated at 37°C for 24 – 48 hours for bacteria and 72 hours for *Candida albicans*. The zones of inhibition were measured using a ruler (Kuta, 2008).

### 2.4 Determination of minimal inhibitory concentration (MIC).

The tube dilution technique was used in determining the MIC of the test product. Varying amounts of the herbal product, ranging from 1-5mg/ml, were aseptically introduced into the five test tubes containing nutrient broth, Sabouraud dextrose broth and test organism. The tubes were incubated at 37°C for 24 hours. The lowest concentration of the test material that inhibited the growth was considered as the MIC (Kuta, 2008).

### 2.5 Determination of minimal bactericidal concentration (MBC).

The minimal bactericidal concentration (MBC) of the herbal product was determined by culturing part of the tube that showed no visible growth in the MIC on an appropriate fresh agar medium devoid of any antibiotic or the herbal product. The plates were incubated for 24 hours at 37°C. The plates were

observed for any growth of the test organisms. The lowest concentration of the herbal product from which the organisms failed to recover and grow on the fresh medium is taken as the MBC (Kuta, 2008).

### 2.6 Determination of minimal fungicidal concentration (MFC).

The minimal fungicidal concentration (MFC) of the herbal product was determined by culturing part of the tube that showed no visible growth in the MIC on an appropriate fresh agar medium devoid of any antibiotic or herbal product. The plates were incubated for 48 hours at 37°C. The plates were observed for any growth of test organisms. The lowest concentration of the herbal product from which the organism failed to recover and grow on the fresh medium is taken as the MFC(Kuta, 2008).

## 3. Result and analysis.

### 3.1 Susceptibility test.

The result of the herbal drug tested against five different Hospital isolates (as shown in Table 1) indicates that, the herbal drug had activity on *Salmonella typhi*, at concentration of 3-5 mg/ml with zone of inhibition of 9.0mm, 11.0mm and 14.0mm respectively, that of *Pseudomonas aeruginosa*, at concentration of 2-3 mg/ml with zone of inhibition of 6.0mm each, and 4-5 with zone of inhibition of 12.0mm each and that of *Escherichia coli* at different concentration ranging from 2-5mg/ml and zones of inhibition ranging from 5.0mm, 8.0mm, 11.0mm, and 14mm respectively were observed.

TABLE 1: Susceptibility of selected microorganisms to the activity of Redeemer's natural antibiotic

Test Organisms	Diameter of zones of inhibition (mm)				
	Varying concentrations (mg/ml) of herbal antibiotic				
	1	2	3	4	5
<i>Salmonella typhi</i>	-	-	9.0	11.0	14.0
<i>Pseudomonas aeruginosa</i>	-	6.0	6.0	12.0	12.0
<i>Escherichia coli</i>	-	5.0	8.0	11.0	12.0
<i>Staphylococcus aureus</i>	-	-	-	-	-
<i>Candida albicans</i>	-	-	-	-	-

Key: “-” means there was no inhibition of growth of organism

### 3.2 Minimal inhibitory concentration (MIC).

The minimum inhibitory concentration (shown in Table 2) indicates the lowest concentration of the herbal drug that inhibited the growth of the test organisms. *Salmonella typhi* was inhibited at 2-

5mg/ml, *Pseudomonas aeruginosa*, was inhibited at 3-5mg/ml while, *Escherichia coli* was inhibited at 3-5mg/ml, *Candida albicans* and *Staphylococcus aureus* were not inhibited.

Table 2: Minimum inhibitory concentration of Redeemer's natural antibiotics on selected microorganisms

Test Organisms	concentrations of Redeemer's natural antibiotic (mg/ml)				
	10 <sup>-1</sup>	10 <sup>-2</sup>	10 <sup>-3</sup>	10 <sup>-4</sup>	10 <sup>-5</sup>
<i>Salmonella typhi</i>	-	+	++	++	++
<i>Pseudomonas aeruginosa</i>	-	-	+	++	++
<i>Escherichia coli</i>	-	-	+	++	++
<i>Staphylococcus aureus</i>	-	-	-	-	-
<i>Candida albican</i>	-	-	-	-	-

Key: + = MIC, - = no effect on the organism

### 3.3 Minimal Bactericidal Concentration (MBC).

The minimal bactericidal concentration of the herbal drug against *Salmonella typhi*, was 3-5mg/ml, *Pseudomonas aeruginosa* and *Escherichia coli* was 2mg/ml and 3mg/ml respectively.

### 3.4 Minimal Fungicidal Concentration (MFC).

There was no activity observed on *Candida albicans* as growth of the organism was observed after culturing on fresh media.

## 4. Discussion

The research revealed the activity of the herbal formulation (Redeemer's natural antibiotics) on three test organisms, *Salmonella typhi*, *Pseudomonas aeruginosa* and *Escherichia coli* which were affected by the herbal formulation at concentrations of 2mg/ml - 3mg/ml and a zone of inhibition of 5.0mm - 14.0mm. The herbal formulation did not show any activity against *Staphylococcus aureus* and *Candida albicans*.

The inactivity in this study of the herbal formulation on *Staphylococcus aureus* and *Candida albicans*, after so many reports showing the activity of *Aloe vera* on *Candida* spp and *Staphylococcus* spp, could be due to the fact that the herb can be more effective if used singly rather than in combination with other herbs. It could also be because the concentration of the herb (*Aloe vera*) used in the formulation of "Redeemer's Natural Antibiotics" was not enough to inhibit the growth of *Candida albicans* and *Staphylococcus aureus*. The resistance of *Staphylococcus aureus* and *Candida albicans* can also be as a result of genetic events that can be responsible for drug resistance.

Onyeagbaet al (2004) researched on the antimicrobial effect of garlic, ginger and lime as a herbal formulation and stated that the crude extract of garlic and ginger applied singly and in combination did not exhibit any *in vitro* inhibition on *Salmonella* spp, *Escherichia coli*, *Bacillus* spp and *Staphylococcus aureus*. But in a similar assessment a herbal formulation which contained ginger, garlic and *Aloe vera* showed activity against *Escherichia coli* and *Salmonella typhi* as a representative of enteric microorganisms, though the researchers reported that the synergistic effect depended on the solvent used during the extractions (Ekwenye and Eligalam, 2005).

### Conclusions.

This research on "Redeemer's Natural Antibiotic" revealed the antimicrobial activity of the herbal antibiotic on *Salmonella typhi*, *Pseudomonas aeruginosa* and *Escherichia coli*. It has, therefore, broadened the information base on herbal

medicine. This work has also shown that there may be good prospects in the use of the "Redeemer's Natural Antibiotic" for infections caused by *Salmonella typhi*, *Escherichia coli* and *Pseudomonas aeruginosa* and possibly other members of enteric microorganisms.

The antimicrobial activity of "Redeemer's Natural Antibiotic" on *Staphylococcus aureus* and *Candida albicans* was found to be not effective. But more investigation can be carried out on the organisms, because the current research might have used resistant strains.

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