

# RESEARCHES INTO BIOLOGICAL PLANTS: A PREREQUISITE FOR SOLVING THE PROBLEM OF RESISTANCE TO ANTIMICROBIAL DRUGS BY PATHOGENIC MICROORGANISMS IN THE 21<sup>ST</sup> CENTURY

*Iyobosa Benedicta Idahosa and Henrietta Obueh*

## Abstract

In this 21<sup>st</sup> century, more antimicrobial medicine need to be produced apart from the ones currently in circulation which are sometimes resisted by microbes. This paper therefore deals with the needs for researching into biological plants for new antimicrobial drugs. The uses of antimicrobial herbs in treating recent infections are explained. The highlight of the paper is the discussions involving some medicinal plants in wild and cultivated forms in Nigeria. In the health implication, attempt is made to bring out the fact that more antimicrobial drugs can be produced to combat many unfathomable illnesses like cancer and Human Immuno Virus (HIV).

## Introduction

In this 21<sup>st</sup> century, more antimicrobial medicine needs to be produced apart from the ones currently in circulation which may not be able to adequately take care of all human health problems. Many pathogenic microorganisms, among which are the malaria parasites, are becoming resistant to existing drugs, which have been used to control them. Therefore, the natural resources of the earth must be put together for coordinated fight against pathogenic microbes. Every health practitioners is to put bands on deck to achieve health for all in the 21<sup>st</sup> century. Recently, the use of local medicinal plants have been discovered to be safe, simple, available, affordable, effective, economical and uncomplicated method of curing diseases.

The government of Nigeria has almost neglected improving on plants and plants' produce as sources of revenue and researches. Attentions have been directed to crude oil and industrial proceeds. It has been found that plants and plants' produce have various uses for the material well-being of mankind. The scope for improvement to meet man's ever-increasing need is immense. The gifts of nature are almost unlimited and a variety of useful products are obtained from the plant kingdom. Nigeria as a developing country needs to research into biological plants. This will help to combat the rate at which microorganisms prove resistant to synthesized drugs so that new products can be discovered and produced. Many have died due to treatment that used to be sensitive to antimicrobial drug but are now resistant to them. Our focus should not only be the pursuit of material comfort: wealth, fame, power and pleasure.

Sofowara (1979) opines that the main purpose of encouraging research and development in the field of African medicinal plants is to ensure

- the scientific exploration of African fauna and flora for the benefit of the people of Africa,
- diversification in the resources of our medicaments and a reduction in our dependence on importation of drugs,
- codification of oral tradition in Africa which at present is confused with our culture and religious rites.

## The Biological Plants in Nature

Plants in their natural states grow in form of grasses, shrubs and trees. They are cultivated in form of cash crops like: timber, cocoa, rubber etc, and food crops in form of cereals, millets, vegetables, oil seeds, fruits, spices and condiments. Medicinal plants are between cash crops, food crops and the wild types. It may also be noted that the most important exchange earnings of Nigeria in the 60s were rubber, timber, cocoa, groundnut and palm oil. These have been abandoned for crude oil.

Food stored in flowering plants according to Stone and Cozen (1980) are as follows: onion (bulb) stores glucose, garlic (bulb) stores oil and glucose; lilies (bulb) stores starch; Ginger (Rhizome) stores oil and starch; Irish potatoes (stem tuber) stores starch; carrot (taproot) stores glucose; sweet potatoes (root tuber) stores starch, maltose and protein; sugar cane (stem) stores sucrose; cocoa (bean) stores fat, sweet corn (grain) stores cane sugar and protein; cereals and other grasses (grain) stores

protein and starch; groundnut and sunflower (seed) stores oil and protein and finally beans and peas (seed) stores starch and protein. However, food materials present in flowering plant could be in form of

*lyobosa Benedicta Idahosa and Henrietta Obueli*

fat/oil, vitamins and some minerals, protein, and carbohydrate.

### **The Need for Researching into Biological Plants for New Antimicrobial Drugs**

According to Kunin (1993) antimicrobial susceptibility is changing. Drugs like penicillin, ampicillin, streptomycin and kanamycin are highly resisted by most pathogenic bacteria. Richard and Riltman (1993) also report tetracycline's resistance by *Staphylococcus aureus* which could cause diarrhoea to children less than five years, They say that patients die due to this resistance of *Staphylococcus* in the gut. The increase in the range of antimicrobial drugs in use has been accompanied by an increase in the range of bacterial resistance to them. Ahonkhai and Monye (1996) indicate that more ciprofloxacin resistant bacteria are now present in our environment compared to when the drug was introduced in 1987. He also reports cases of *Staphylococcus aureus* resistance to ciprofloxacin whereas it was sensitive in the laboratory during culturing. *Salmonella's typhi*, *Shigella* and *Escherichia coli* cause death of children and adult due to their resistance to antibiotic (Trevor and Michael, 1993). Resistance of a pathogenic microbe to antimicrobial drug means that the sensitive cells have gradually been replaced by resistant cells. This could be as a result of genetic changes (Tomaz, 1994).

There are different ways medicinal plants could be discovered for treating some of these ailments which have proved resistant to synthesized drugs. Medicinal plants for treating pathogenic organism include one or combination of different plants' extracts from leaves, barks of plants, stem or root and fruits. Water (cold or hot) and alcohol are usually used for extraction. Some of these herbs are discovered locally from parents to offspring but the scientific discovering include using the plant fruit, leaf, bark or root to test different isolated pathogens from hospital wards. The ones that are sensitive to the herbs in question are noted and finding a way to producing such herb industrially is sought.

One can hardly avoid being contaminated through food, dirty environment, pets and people in our environment. Therefore, cures are needed for such microbial contaminants in all of its ramification because microbes are ubiquitous.

### **The Use of Antimicrobial Herbs in Treating Recent Infections**

Antimicrobial herbs are finished extracts of plants that act antagonistically against disease causing micro organisms. They are found to be abundant in plants. Many synthetic drugs have been recommended for control of diseases. However, they have not solved the problems. The drugs are not available and are very expensive. Many micro organisms have synthesized extra cellular enzymes that inhibit the antimicrobial substances of the synthetic drugs.

Most medicinal plants like garlic, ginger and other herbs have been found to be effective antibiotics. Studies have shown that some bacteria can evade the action of orthodox antibiotics. Hence, doctors talk of resistant strains of bacteria. In fact, there are some bacteria that are known to hide in the lining of the bladder, where they are safe from antibiotic action, so after the effect of an injected artificial antibiotic has worn off, the bacteria emerge, begin to multiply and within twenty-four hours may develop into millions. This scenario underscores the need for total bacterial clearance in infection management, a feat that can be achieved with the appropriate dose of the herb.

What is more, these herbs are immune boosters. For example, two to three garlic cloves daily helps to raise the quantity and quality of natural killer cells in the body within twelve weeks, and also total clearance of germs lurking in the lymphatic system as well as empowerment to neutralize bacterial toxins in the blood. It is such toxins that largely cause the symptoms of bacterial diseases (Odigbe 2004).

Odigbe (2004) citing Dixon says that a small microbe called a bacterium weighs as little as 0.0000000001 gm. A blue whale weighs about 100000000 gm, yet a bacterium can kill a whale. This explains the awesome power of bacteria and the need to achieve total bacterial clearance with an effective bacterial herb. Therefore, always realise that herbs are simple and cheap to prepare. One advantage of using antimicrobial herb is that it grows in our environment to which our body systems have been regulated. Also, it does not interfere with the friendly cum-unfriendly bacterial balance in the human gut. This is because antimicrobial herbs like garlic or ginger, has the innate intelligent to

selectively kill off only the unfriendly microbes and leave the friendly ones needed in the gut for biological reasons. For this reason, the therapeutic use of antimicrobial herb does not lead to a chemical warfare in the system which orthodox antibiotics unleash (Adodo, 2000). It is such a disorienting chemical warfare that leads to the alteration of the body's acid and alkaline balance followed by the growth of the pathogenic yeast infection like *Candida albicans* in women treating infertility infections with synthesized drugs.

### **Some Medicinal Plants in wild and Cultivated Forms in Nigeria that Need to be Researched into for Better Antimicrobial Drugs**

According to Dutta (1995) and Adodo (2000) medicinal plants have been used locally to handle some of these infections beyond the orthodox antibiotics. The need for researching into them is to solve the problem of dosage when handling a particular ailment. Actually, herbs are very powerful for managing infections. However, it is wrong to assume that because antimicrobial herbs like garlic is a natural substance, it has no overdose, side effects or contraindications. Some contain many chemical substances, which on being abused, may have uncomplimentary effects on the body. For instance, garlic can bring down blood sugar level because of its hypoglycaemic properties but makes one weak and drowsy when using it to treat infections in mega doses, although food can quickly replenish the adverse effect by one's consumption of food that sustain blood sugar level. According to Odigbo (2004), garlic is useful for treating kidney inflammation (i.e. nephritis) but, an overdose of it can damage the kidney. It is suicidal to ingest ten (10) garlic cloves at once. Therefore, there is need to research on it for natural doses. Other medicinal plants that need to be researched on for doses are the spices and condiments as well as fruits, vegetables, cereals, beans, seeds and other medicinal plants. Some of them are considered below:

#### **Ginger**

This is a rhizome of Ziegler officinate (family Zingiberaceal). The plant is a small perennial herb. Ginger is considered to be the most important of all spices and condiments. It is used for vegetable and fruit preservation due to its antibiotic nature. It also has essential oil responsible for its aroma. Medicinally, it is stomachic, digestive and carminative (Sofowara, 1982).

#### **Locust Bean Seed (dawa dawa)**

This spice has certain aroma that makes it useful for seasoning and flavouring food during cooking. It has been recommended to patients with high blood pressure medically, and industrially, its antimicrobial quality makes it useful in pharmaceutical companies. Its oil can be extracted for food. It removes toxins from the system caused by bacteria (Sofowara, 1979).

#### **Red Pepper**

This is the red-like fruit (berry) of *Capsicum annum*. It is stomachic, pungent, stimulating and carminative. It helps to secrete saliva and gastric juice and induce peristaltic movement. They are also used for fried rice and salads as flavoring. Their extracts have pharmaceutical uses (Duta, 1995).

#### **Onions**

Vegetables like onion, cabbage, lettuce, spinach are rich in vitamins (usually A,B,C and E). They need to be included in our diet daily. Much has not been said about their medicinal purposes. Traditionally, onions have been combined with garlic and ginger for irregular and painful menstruation. Onions has also been used to treat Insomnia (difficulty in sleeping) (Duta, 1995).

#### **Nutmeg (Myristicia Fragrant)**

. This is a big evergreen tree. The fruit has a hard shell which breaks into two pieces, exposing the seed. It is used for seasoning and flavoring curries and confections. It is also used in medicine. It contains a yellowish fat (a fixed oil) called nutmeg butter. Due to its aroma, it is used in perfume, hair lotions and ointments (Duta 1995).

## **Cinchona**

This is the famous quinine-yielding-plants (unknown for a long time). Linnaeus named i cinchona in 1742 after the Countess of Cinchona, wife of a Spanish viceroy in Peru. She was cured of an attack of malaria fever by the use of its bark in 1638. About 40 species of quinine-yielding ones a,-r cultivated. The bark of the root and stem are mostly used for the production of quinine (Adodo, 200i t.

## **Aloe Vera**

Aloe is from Liliaceael Aloeaceal family. There are over 325 species in this genus. *Aloe vera* has been in much use as perennial plant before the birth of Jesus Christ. Nicodemus brought a mixture of myrrh and aloes to wrap with linen the body of Jesus according to Jewish burial customs. It has attracted a lot of research recently. A lot of research on the ability of *Aloe vera* curing cancer of the breast was carried out locally by herbal practitioners but more scientific approaches will be better done. Let our medical health practitioners focus their attention on more intense research of medics plants which can save life of our generation (Adodo, 2000). We need not fold our hands that cancer cells cannot be cured or expect only the Americans and Europeans to research on them only. *Aloe-vera* has been used for impotency, intestinal ulcer, constipation and accident wound or sores (Awosika, 1993).

## **Bitter Leaf**

*Vernonia amydalma* is bitter in every part. Most young people of today do not like the bitterness but would rather prefer biscuit, ice cream, chocolate and other sugary products. This plant reminds us that life is not always sweet or "a bed of roses". It is better taken raw than cooked. It has been used to treat skin infection, stomach aches, loss of memory, pneumonia, stroke and general weakness (Adodo, 200).

## **Pawpaw**

*Carica papaya* is one of the plant that is a pharmacy in its own right. People die of common illness due to fake drugs which could be cured by pawpaw leaves, seed or fruit. The leaf can be used as soap, the seed and ripe fruit expel worms. It is rich in Vitamins A, B and C. It has been used extensively in treating malaria, diabetes, bronchitis, Asthma, Convulsion in children and chronic sores. In sores and external ulcer, a piece of unripe pawpaw fruit is tied directly to the wound, four times daily in traditional method (Awosika, 1993 & Adodo, 2000).

## **Coconut**

*Cocos micifera*. Every part of this plant is medicinal. The bark of the plant dried and burnt into ashes is an ailment for rashes, black spots, scabies and measles. Two tablespoons of the burnt powder are mixed with palm kernel oil and applied. It has successfully been used to treat breast cancer by mixing 4 litres of coconut water with I litre of honey to be taken half glass twice daily. The whitish pulp inside immature coconut is mixed with a little honey to help people suffering from memory defect (Adodo, 2000).

## **Lemon**

Generally, citrus such as grape, orange, Tangerine, Lime and lemon are common in our environment. These citrus plants need a lot of research from modern science into their seed, leaves, root, back and juice. Biological science need to use its complex techniques and apparatus to promote the medicinal value. Lemon leaves have medical values for nervous problem; the fruit skin when boiled expels worm; the juice cures scurvy due to the vitamin C in it. These citrus are never to be compared with synthetic juice like Five Alive or Bitter Lemon. Lemon juice therapy rejuvenates the body and clears it of all toxins and waste products (Adodo, 2000).

## **Mistletoes**

This is a parasitic plant that grows on cocoa, rubber, kolanut and guava branches instead of soil. *Viscum album* leaves contain chlorine and acetylcholine and belong to lorantacea family plant. Depending on the tree it grows, so is its effectiveness against a particular disease. The air dried leaves

**can be used to treat infertility, heart problem, insomnia (muscles and nerve disorder) arthritis, rheumatism and general health disorders (Adodo, 2000).**

### **Plantain**

*Musa paradisiacal.* The leaves, root and sap from the stem and root have been proved to be effective antibiotic against many diseases. The juice stops the flow of blood. One bottle of the extract juice from the trunk with half bottle of honey has been used to treat nervousness, epilepsy and prostate cancer which orthodox drugs have no remedy for. This is better handled than operation which may not be successful. Plantain root juice extract of one beer bottle mixed with half bottle of honey has been used to treat chronic infections that have caused childlessness to married couples.

There are so many other plants in the forest that can be extracted for present and future uses. This is one of the reasons for this paper.

### **Health Implication of Biological Plants' Researches in the 21<sup>st</sup> Century**

When researches are carried out, many **unfathomed** illnesses can then be handled for cure, like vaccine for malaria can be discovered and human immune virus (HIV) can be treated by using drugs that build the immunity of the body. Also, tumor or cancerous diseases can then be effectively treated with cheap drugs.

Problem of fake drugs kill everyday in Nigeria. One needs to research into new unadulterated drugs that can withstand the ones in pharmaceutical stores of which many can no longer treat infections that cause infertility, Malaria, Diabetes and so on. Life span has shortened due to toxic substances that accumulate in the body system. Researching into new drugs can help to clean the system of our body from toxins caused by microbes and some food substances, especially, the synthesized ones. Most of these synthesized drugs and food have preservatives and chemicals that could damage vital organs of the body and cause cancer, for example, most contraceptive drugs cause breast cancer.

### **Conclusion**

One needs to prevent untimely or sudden death from treatable illness. The world is fast developing. Therefore, a developing country like "Nigeria needs to advance into solutions for fake and adulterated drugs. Scientists need to improve on antimicrobial drugs in order to avoid resistance by infections in our environment. Health brings wealth to a nation thereby leading to advancement in science and technology of a nation. There is hope for treatment of recent unfathomable illnesses like stroke and cancer when researches are carried out on biological plants

### **References**

- Adodo, A. (2000). *Nature Power*. St. Benedict Monastery (Ed) 3<sup>rd</sup> Edition, 55-121.
- Ahonkhai, J. and Monye, A.C. (1998). *In Vitro* Effect of Ciprofloxacin on Methicillin Resistant Isolate of Staph Aureus. *Jn. Meet. Lab. Sc.* 5:69-72.
- Awosika, P. (1993). *Uses of Plants*. Ile-ife: University of Ife. P. 250.
- Dutta, A.C.** (1995). *The Economic Plant*. 6<sup>th</sup> Edition. Calcuta: Oxford University Press. 230-231.
- Kunin, C.M.** (1993). Resistance to Antimicrobial Drugs. A World Wide Calamity. *Ann. International Med* 557-561.
- Odigbo, M. (2004). Brief Treatise on Garlic. *The Nigerian Observer*, February 23. P. 15
- Richard, M<sup>^</sup>. and Rutonan, M.** (1993). Investigation of Staphylococcus Food Poisoning Outbreak. **JfcfrfcffoilthRep. 10S:** 765-771,

Sofowara, A. (1982). *Medicinal Plants and Traditional Medicine in Africa*. John Willy and Sons. P.500.

Stone and Cozen (1980). *New Biology For West Africa*. London: Longman Group Limited: 230-231.

Thomas, A. (1994). Multiple Antibiotic Resistant Pathogenic Bacteria Rockefeller University Workshop Special Report, *Engl. In med.*, 320 (120) 1247-1251

Treansor, D. and Michael, A. (1993). Increase in Sepsis Due to Multi-Resistant Enteric Gram-Negative Bacilli in Papua New Guinea. *Lancet*, 253 (220)2210-2211.

