

Antimicrobial susceptibility pattern of escherichia coli essay sample



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The leaves of *Chromolaena odorata* (commonly called siam weed) which is an ancient remedy for the treatment of wounds and many ailments was tested for its antimicrobial activities on *Staphylococcus aureus* and *Escherichia coli* at different concentrations. The agar pour plate method was used to test for its antimicrobial activity on the test isolate, the extracts of *Chromolaena odorata* was introduced directly into the well of the two tested organism. Laboratory study, shows that *Chromolaena odorata* (Siam weed) has antimicrobial action against these organisms. This research work establishes a good support to the use of these plants in herbal and as base for development of new drugs.

INTRODUCTION CHROMOLEANA ODORATA (SIAM WEED)

Chromoleana odorata (commonly called siam weed), is a diffuse rapidly growing and strongly scented perennial shrub (phan, et al 2001). It grows widely in the south and western part of Nigeria, as well as in other parts of west Africa. The plant is used by traditional medicine practitioners in the treatment of many ailments (Gill, 1992). Some of the traditional uses of the leaves of this plant includes treatment of dysentery and headache. The concoction of the leaves with *Azadracta indica*, is used for the treatment of malaria fever. The juice of the leave (sometimes mixed with water) is used to stop bleeding. The healing property of the medicinal plants is usually linked with the presence of secondary metabolites and these differ from one plant to another.

It has been reported that a substantial percentage (38%) of prescriptions, contained one or more of the natural product of plant origin, as the therapeutic agent (Farnsworth and bringel, 1997). The use of plant extracts

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chemically derived from plants to treat diseases has stood the test of time (Anwannil and atta, 2005). Suck(1989), had earlier reported that more than 75% pure compounds derived from higher plants are used in modern medicine and are now produced synthetically. In recent studies, extract of the various parts of the medicinal plants were found to have brought spectrum antimicrobial activities against pathogenic organisms (Sudhaka, et. al, 2006) (Khan et. al, 2006). BACKGROUND OF STUDY

Medical plants have contributed greatly to health care in Nigeria. This is due to the recognition of the value of traditional medicine system, particularly in Nigeria origin, and the identification of medicinal plants from local pharmacopoeias, which form significant healing power. This project work is basically concerned with the antimicrobial activity of chromolaena odorata on *Staphylococcus aureus* and *Escherichia coli*, since they have been known to be responsible for different diseases in man. The staphylococcus genus include 31 species, most of which are harmless, and resides normally on the skin and mucus membrane of humans and other organism found worldwide. They are small component of soil microbial flora (Holk; J. G. 1994).

Escherichia coli is a bacterium that is commonly found in the lower intestine of warm blooded animals. Most *Escherichia coli* strains are harmless, but some strains like serotype; 0157: H7 can cause serious food poisoning in humans. The harmless strains apart from the normal floral of the gut, can benefit from their host by producing vitamin K2, or by preventing the establishment of pathogenic bacteria within the intestine (Vogt R. L. Dippold 2005). PURPOSE OF THE STUDY

The aim and objectives of this project work are:

- i. To know if the leave extracts of chromolaena odorata will be inhibitory to the growth of Staphylococcus aureus and Escherichia coli.
- ii. To evaluate the antimicrobial activity of the plant extracts.
- iii. To be able to recommend the use of this plant as treatment therapy.

SIGNIFICANCE OF THE STUDY

The significance of this work is to:

- i. Show the antimicrobial activity of the plant
- ii. Establish a good support to the use of the plant in herbal medicine and as a base for the development of new drugs.

LITERATURE REVIEW

Chromolaena Odorata (Siam weed) is on the alert list for environmental weeds , consisting of a list of 28 non-native plants that threaten biodiversity and cause other environmental damage. Siam weed is recognized as one of the world's worst tropical weed. It has an extremely fast growth rate (up to 20mm per day) and prolific seeds production. In the tropics of Africa and Asia, it is a major pest of crops such as coconuts, rubber, tobacco and sugar cane. It is also toxic to stock. It also has the potential to increase fuel load in bush fire, and can cause allergic reactions. Siam weed was discovered in Australia in 1994, and is believed to have entered Australia as a contaminant of pasture seed used on a grazing property in the 1960s and 1970s. Siam weed has a very limited distribution in Australia and is confined to a small area in the coastal northern Queensland. Siam weed is perennial upright shrub growing up to about 5m tall, forming dense spreading thickets or sprawling and scrambling plants growing up to 20m high when climbing vegetation. Its stems are slender and woody towards the base, with many

stems produced from a long lived root stock. Side branches are usually in pairs.

The leaves are narrow-head- shaped of 50-120mm long and 30-70mm wide, with three characteristic veins in a “ pitch fork” pattern as the species name “ Odorata” suggests. It emits a pungent odor when crushed. Description: Perennial bush to 7m tall growing in the open or 20m as a climber. Leaves triangular of 15-12cm long, with forward facing serration’s on the margin stems. The pitch seed is brown to black, of 4 -5mm long with white parachute-like hairs (pappus) at the top of the seed. Distinguishing Features: Distinguished by the pungent odor of the leaves when crushed, and soft green opposite leaves with three prominent veins. Dispersal: Seeds are dispersed by wind and water, and by movement of stem and root fragments. Seeds may be blown to long distances and also moved in mud on machinery and recreational vehicles. Growth: Siam weed is a perennial that can compete and smother crops of native vegetation because of its phenomenal growth rate (20mm a day or 5m per year), and ability to scramble up into taller plants to a height of 20m.

It also produces huge numbers of wind-borne seeds (> 80000 seeds per plant per season). Siam weed will grow in similar area to lantana, so it readily invades remnant particles of rain forest, creek and river bank vegetation. It can also grow under dense rain forest canopies, but less vigorously. Toxicity: Young re-growth siam weed contains very high nitrate levels and in other tropical countries, has caused cattle deaths and abortions where stock have been hand fed with contamination. Folder stock usually avoid eating the leaves (bitter taste), but will nip off flower and seed heads. <https://assignbuster.com/antimicrobial-susceptibility-pattern-of-escherichia-coli-essay-sample/>

Health Issues: Siam weed may also cause skin complaints and asthma in allergy-prone people. Descriptive Habit/Form: Siam weed looks similar to blue top or Billy goat weed (*Ageratum* species), but has a growth habit similar to (*Lantana camara*). Several stems develop from the crown, and the root system is fibrous and shallow in moist soils. The plant also develops an enlargement at the junction of the stem and root, referred to as the "basal ball".

Siam weed dies back in the dry season but reshoots after rain. Re-growth also occurs rapidly. Leaf and Stem: The leaves of Siam weed are soft green, hairy, roughly triangular in shape, with a distinctive "pitch fork" three-vein pattern. They can emit a distinctive odor when crushed. New leaf growth can have a purple coloration. Flowers and Seeds: There are two forms (phenotypes) of Siam weed in Queen's land. The most common form are flowers from May to July and again in September to October, producing masses of pale lilac flowers that appear white from a distance. These turn a darker pink when mature. The less common form, are flowers earlier during February and March and then appear to be isolated to one sub-catchment. Most seeds germinate immediately after rains, though some seeds appear to remain dormant for several years. Seed longevity research is continuing. Siam weed has spread throughout the tropical and sub-tropical areas of central and western Africa, tropical America, India and South-east Asia.

COLLECTION OF SAMPLES AND IDENTIFICATION OF TESTED ORGANISMS

Urine and fecal samples were collected from few students of Auch

Polytechnic, Auch, using sterile containers. These samples were cultured

respectively. Two strains of gram-negative bacteria, *Escherichia coli*, and <https://assignbuster.com/antimicrobial-susceptibility-pattern-of-escherichia-coli-essay-sample/>

four strains of gram-positive bacteria of *Staphylococcus aureus* were obtained. Pure cultures of bacteria were maintained in their appropriate agar at 40c throughout the period of work and were used as stock cultures and inoculated into nutrient broth and then incubated at 30c in an incubator. The bacterial isolates were subsequently identified using culture characteristics and biochemical test.

COLLECTION/PREPARATION OF CHROMOLAENA ODORATA (SIAM WEEDS)

The leaves of *Chromolaena Odorata* was collected locally along Sabo off Iyakpi road in Auchi. 35cm of the leave extract was poured into a sterile container and then sealed with cover. The leave extracts was then kept in the laboratory for 24hrs for use. Using agar diffusion method, the leave extract was introduced into the sub-cultured organism by using inoculating loop to make a well to a considerable depth on the nutrient agar prepared. The plates were left at room temperature till the leave extracts seeped into the agar and the incubated at 30c in the incubator.

SENSITIVITY TEST

After incubation for 24hrs, there was a clear zone of inhibition on the area containing the extract. The zones of inhibition were measured using meter rule. The end point of the anti-microbial activity of the extract in each zone was defined as the lowest-concentration producing an inhibition zone with the control organisms. Base on the work (experiment) performed, the extract was identified to have potent antibacterial activity and the minimum inhibition was then determined.

BIOCHEMICAL TEST

Some of the test carried out on the tested organism are:

1. Catalase test

2. Oxidase test
3. Coagulase test
4. Sugar fermentation test, and
5. Motility test

RESULT TABLE II
Antimicrobial activity of Chromolaena Odorata (zone of inhibition) against staphylococcus aureus Chromolaena Odorata (leave extract) Samples of test micro organisms Zone of inhibition (mm) Partially Neat Plate 10. 3

Partially Neat Plate 20. 4

Partially Neat Plate 30. 3

Partially Neat Plate 40. 3

TABLE II

Antimicrobial activity of chromoleana odorata leave extract (zone of inhibition) against Escherichia coli Leave extract Sample of Micro organisms Zone of inhibition (mm)

Neat Plate 10. 5

Neat Plate 20. 5

Neat Plate 30. 5

Neat Plate 40. 5

DISCUSSION Chromolaena Odorata (siam weed), has been known for many years to have antibacterial properties. The plant is used by traditional medical practitioners in the treatment of many ailments resulting from infection by microorganisms, and for dressing wounds (Sudhakan Khan 2006). In this study, extract of siam weed exhibited action against the selected microbial strains. Staphylococcus aureus and Escherichia coli of

different samples, were susceptible to the extract of siam weed. Generally, the species of bacteria from different urine sample have been tested for their sensitivity to the antimicrobial activity of the extract of siam weed and were examined separately. The two-tested organism were found to be sensitive to the leave extract but at varying degrees.

Plate 1 and 2 of *Staphylococcus aureus* showed a minimum cleared zone in the agar well diffusion plates, indicating a partial inhibition of growth. While strains of *Escherichia coli* showed a complete clear zone which indicates a total inhibition of growth. This shows that the organism have resistance to certain antibiotic found in the leave extract. This variations could be as result of the quantity of the extract that was used on each well of the agar. All samples on the pure culture shows zone of inhibition. *Chromolaena Odorata* (siam weed) that can be used in treatment of infected wounds and disease can also be a threat to human life in causing infections such as asthma and skin complaints in allergy-prone people

CONCLUSION/RECOMMENDATION

From this study (experimental work), it can be concluded that *Chromoleana Odorata* (Siam weed) posses antimicrobial activity. This investigation, together with previous studies, provide support to the antimicrobial properties of *Chromoleana Odorata* (siam weed). It can be used to treat various kinds of ailments and infected wounds. Attempt has been made to assess the value of siam weed as an antimicrobial therapeutic agent. Studies also show that, some organisms are sensitive to siam weed while others are resistant. However, much remains unknown, which make this a fertile field for further research on the effectiveness of *Chromoleana Odorata* (siam weed) at different levels of dilution against the growth of microorganism.

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This is needed to justify and further evaluate the potentials of Chromoleana Odorata (siam weed) as an antimicrobial agent in tropical oral application.

I therefore recommend that scientist should show more interest in carrying out further research finding in the use of siam weed as medicine in the treatment of infected wounds, various kinds of ailment and other diseases.