

## **1.0 INTRODUCTION AND LITERATURE REVIEW**

### **1.1 INTRODUCTION**

Medicinal plants represent a rich source of antimicrobials and many other drugs. The potential of higher plants as a source for new drugs is still largely unexplored. Antibiotic resistance has become a global concern (West *et al.*, 2004). The clinical efficacy of many existing antibiotics is being threatened by the emergence of multidrug-resistant pathogens (Bandow, 2003). Many infectious diseases have been known to be treated with herbal remedies throughout the history of mankind. Natural products, either as pure compounds or as standardized plant extracts, provide unlimited opportunities for new drug leads because of the unmatched availability of chemical diversity. There is a continuous and urgent need to discover new antimicrobial compounds with diverse chemical structures and novel mechanisms of action for new and re-emerging infectious diseases (Rojas *et al.*, 1992). Therefore, researchers are increasingly turning their attention to local herbs, looking for new leads to develop better drugs against microbial infections (Benkeblia, 2004).

The increasing failure of chemotherapeutics and antibiotic resistance exhibited by pathogenic microbial infectious agents has led to the screening of several medicinal plants for their potential antimicrobial activity (Kapila, 2005; Runyoro *et al.*, 2006). The rising prevalence of antibiotic-resistant pathogenic microorganisms raises the demand for finding new alternative antimicrobial agents. The drugs already in use to treat infectious diseases are of concern because drug safety remains an enormous global issue. Most of the synthetic drugs cause side effects and also most of the microbes developed resistant against

the synthetic drugs (Chanda and Rakholiya 2011). To alleviate this problem, antimicrobial compounds from potential plants should be explored. These drugs from plants are less toxic; side effects are scanty and also cost effective. They are effective in the treatment of infectious diseases while

simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials (Harishchandra *et al.*, 2012).

Published studies in medical journals show that coconut in one form or another may provide a wide range of health benefits. The coconut plant *Cocos nucifera* (family Arecaceae) is considered as an important fruit crop in tropical countries. It is a commonly available plant with a wide variety of applications in food, drinks, fibers, building materials and various chemicals finding their way into a huge range of modern day products. Being highly nutritious, coconuts have also been studied for medicinal qualities.

Modern medical science is now confirming the medicinal qualities of *Cocos nucifera* which are used for the treatment of a wide range of infections. Based on the knowledge of the traditional herbs used for the treatment for local application, coconut husk can be used as a topical antimicrobial. As preliminary investigation of the use of coconut husk, the antimicrobial activity can be evaluated.

## 1.2 AIM AND OBJECTIVES

The specific objectives are to:

(a) Evaluate the phytochemical and antimicrobial activities of Methanolic extract of young *Cocos nucifera* husk on selected pathogenic microorganisms.

(b) Evaluate the antimicrobial activities and young *Cocos nucifera* water on selected pathogenic microorganisms

### **1.3 JUSTIFICATION OF THE RESEARCH**

*Cocos nucifera* husk and *Cocos nucifera* water are traditionally used in the treatment of wide variety of diseases, it has been used from time immemorial for the treatment of carcinogenic infections. This study scientifically justifies the use of young Coconut husk and young Coconut water in traditional folk medicine and to compare their antimicrobial potency with the commercial antibiotics.

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### **1.4 LITERATURE REVIEW**

#### **1.4.1 MEDICINAL PLANTS AS ANTIMICROBIAL AGENT**

Medicinal plants have always been considered as a source for healthy life for people. Therapeutic properties of medicinal plants are very useful in healing various diseases and the advantage of these medicinal plants are natural (Kalemba and Kunicka, 2003). In many parts of the world, medicinal plants have been used for its antibacterial, antifungal and antiviral activities for hundreds of years (Ali *et al.*, 1998; Barbour *et al.*, 2004; Yasunaka *et al.*, 2005). Researchers are increasingly turning their attention to natural products and looking for new leads to develop better drugs against cancer, as well as viral and

microbial infections (Ibrahim,1997; Towers *et al.*,2001; Koshy *et al.*, 2009). Several synthetic antibiotics are employed in the treatment of infections and communicable diseases. The harmful microorganisms can be controlled with drugs and this has resulted in the emergence of multiple drug resistant bacteria and it has created alarming clinical situations in the treatment of infections.

In general, bacteria have the genetic ability to transmit and acquire resistance to synthetic drugs which are utilized as therapeutic agents (Murray,1992; Madunagu *et al.*,2001; Koshy *et al.*, 2009; Senthilkumar and Reetha, 2009) Therefore, actions must be taken to reduce this problem, such as to minimize the use of antibiotics, develop research of resistance among microorganism and to continue studies to develop new antibiotic and immune modulating compounds with diverse chemical structures and novel mechanisms of action, either synthetic or natural to control pathogenic microorganisms because there has also been an alarming increase in the incidence of new and re-emerging infectious diseases (Ikenebomeh and Metitiri, 1988; Rojas *et al.*,2003)

Antimicrobial studies have shown that Gram-negative bacteria show a higher resistance to plant extracts than Gram-positive bacteria. This may be due to the variation in the cell wall structures of Gram-positive and Gram-negative bacteria. More specifically, Gram-negative bacteria have an outer membrane that is composed of high density lipopolysaccharides that serves as a barrier to many environmental

## **ANTIMICROBIAL AND PHYTOCHEMICAL PROPERTIES OF YOUNG *Cocos nucifera* (COCONUT) WATER AND METHANOLIC EXTRACT OF THE YOUNG *Cocos nucifera* (COCONUT) HUSK**

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