IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

PLANT SECONDARY METABOLITIES AGAINSTANTIBIOTIC RESISTANT PATHOGEN *STAPHYLOCOCCUS AUREUS*

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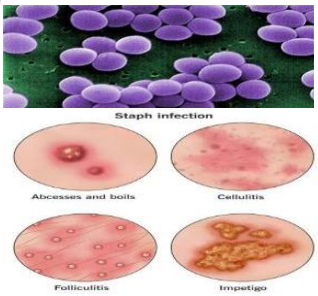
Abstract: Now a days *Staphylococcus aureus* is most important concerning bacteria which causing diseases in both humans & animals leading to skin infections (abscesses, furuncles & cellulites) respiratory diseases that occurring mainly due to food poisoning by its enterotoxins. By the observations of some patients with antibiotics as over dosage or misuse may lead to toxoids and sometimes antibiotics kill some germs that cause infections but they also kill helpful germs that protect our body from infections and become antibiotic resistant. This *S.aureus* became an Antibiotic resistant to Methicillin (MRSA), Ampicillin, Cefozolin, tetracycline, penicillin and even to Vancomycin . Even Vaccination for the Antibiotic resistant *S. aureus* is failed. So this studies identified Plant Secondary metabolites having fewer chances than antibiotics in creating side effects. Plants possess antioxidant activities effective in reducing toxicities of toxic agents (or) other drugs. We studied that *S.aureus* causes a benefit of interest to medicinal plants as an effective means of control by the study of local medicinal plants like Cranberry, Azadiracta indica, Digitaria sanguinalis. The role of flavonoids, isoflavones, phytosterol, and plant hormone-related chemicals are examined for their physiological effect. We propose that plant alkaloids will inhibit the antibiotic resistant *S.aureus* bacterial growth..

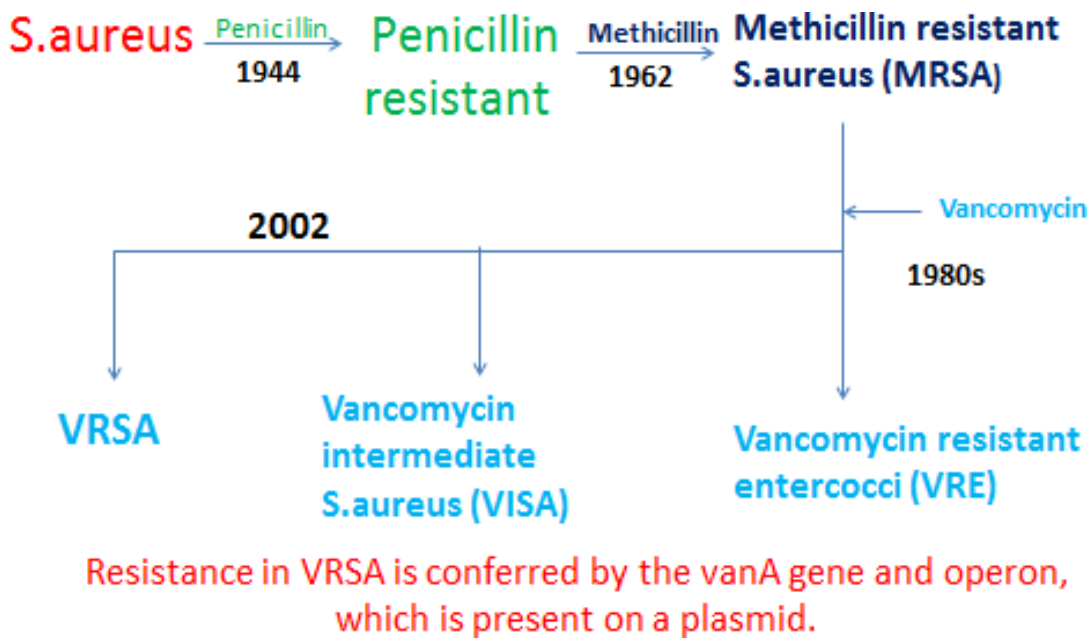
Index Terms - Staphylococcus aureus, antimicrobial, flavonoids, isoflavones, phytosterol, antioxidants of plant alkaloids.

I. INTRODUCTION

Antibiotics defense against the pathogens that enter in our body. But utilizing these antibiotics as over dosage or misuse may lead to toxoids and sometimes antibiotics kill some germs that cause infections but they also kill helpful germs that protect our body from infections and become antibiotic resistant. *S.aureus* was discovered in Aberdeen, Scotland in 1880 by the surgeon Sir Alexander Ogston in pus from surgical abscesses in a knee joint (Giancarlo Licitra 2013)Now a days *Staphylococcus aureus* is most important concerning bacteria which causing diseases in both humans & animals leading to skin infections (abscesses, furuncles & cellulites) respiratory diseases that occurring mainly due to food poisoning by its enterotoxins (Franklin D. Lowy 1998) *S.aureus* colonize Skin, nose & pharynx of anterior nares of human. The presence of Bacteria on skin is usually a consequence of nasal carriage. *S.aureus* having unique ability to escape from the Innate immune response such as phagocytic complement, mediated killing blood cells during persistent infection (Shamshul Ansari et.al., 2015)This *S.aureus* became an Antibiotic resistant to Methicillin (MRSA), Ampicillin, Cefozolin, tetracycline, penicillin and even to Vancomycin & β-lactam (Steve Y.C. Tong 2015).



In early years Methicillin Resistant *S. aureus* (MRSA) having higher mortality rate than Methicillin Susceptibility (MSSA) (Sara E. Cosgrove et al 2003). But in recent times Nearly 120,000 *S.aureus* blood stream infections & 20,000 deaths in U.S 2017 due to MSSA than MRSA (3.9% annually 2012-17) - in MMWR 2019 (Morbidity & Mortality weekly report).



Even Vaccination for the Antibiotic resistant *S. aureus* is failed. Although some vaccines have protective efficiency like rAT & rLuks-PV vaccination in Pre/Early Clinical phase is not approved (Chicago microbial department 2016). The Use of Novel antibody-based passive immunization strategies promising efficacy in pre-clinical phase of valuation.

Staphylococci are Gram-positive, non-spore forming, facultatively anaerobic, nonmotile, and catalase-positive or negative, small, spherical bacteria from pairs to, grape-like clusters. *S aureus* expresses many potential virulence factors:

(1) Surface proteins that promote colonization of host tissues.
(2) Factors that probably inhibit phagocytosis (polysaccharide capsule, immunoglobulin binding protein A).
(3) Toxins that damage host tissues and cause disease symptoms.

Herbal drugs generally are considered to be Safe in contrast to Synthetic drugs are regarded as unsafe to human & environment (Ali Karimi 2015) Plants possess antioxidant activities effective in reducing toxicities of toxic agents (or) other drugs. *S. aureus* causes a benefit of interest to medicinal plants as an effective means of control by the study of 12 selected Cameroonian medicinal plants [Leonard Sama tonkeng (2015)]. Cranberry is a potent antimicrobial against *S. aureus* because of using its c18 Solid phase inhibiting the bacterial growth. at early identification [Ken Ng et al 2012)

A review of some of the more commonly used dietary supplements and their chemistry and topical use confirms that there is merit in using these plants both internally and externally. The role of flavonoids, isoflavones, phytosterol, and plant hormone-related chemicals are examined for their physiological effect (Anthony C Dweck 2009)

S.aureus grows well aerobically (or) anaerobically over a wide range of temperature, at high salt concentration because of its Polysaccharide capsule that protects the bacteria from phagocytosis. Also VRSA leads to some characteristic infections like Ototoxicity, Red man Syndrome, Nephrotoxicity, Chills, Fever. (Yanguang Cong et.al. 2019). Hence Plant Secondary metabolites having fewer chances than antibiotics in creating side effects.

AIM

Primary Screening of Alkaloids (Secondary metabolites) of plant sources against *S. aureus* towards skin infections in humans.

OBJECTIVES

- To identify the patients with *S.aureus* infection.
- To collect samples like Blood, Sputum, Urine, Nasal secretion or the materials responsible for Infection.
- To Identify the pathogen and its Antibiotic resistant
- To Isolate the activity compounds from plants
- Study the Crude extract from plants against *S. aureus.*

METHODOLOGY

I. **COLLECTION AND IDENTIFICATION OF MEDICINAL PLANTS WITH ANTI BACTERIAL ACTIVITY:** Through literature: Digitaria sanguinalis (Ibrahim et. al, 2018), Moringo oleifera, Azadiracta indica (P. A. Abinduti 2022) Cranberry extracts [Moussa S Diarra 2013]**.**

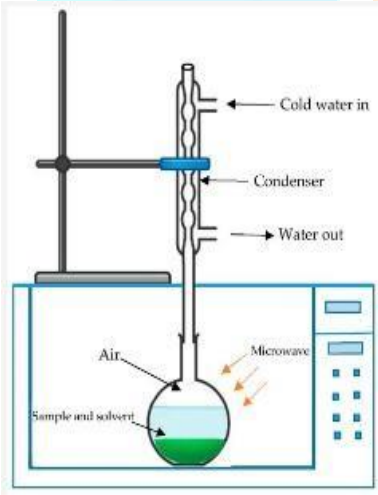
II. **MICROWAVE ASSISTED EXTRACTION OF SECONDARY METABOLITES FROM PLANTS** (Hus-Feng Zhang et.al, December 2011)

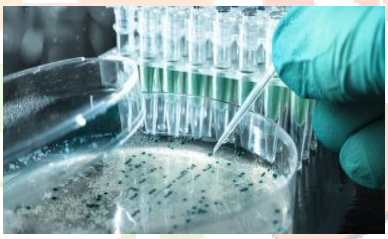
III. **ANTIMICROBIAL SUSCEPTIBILITY TESTING:** (Leonard 2015)

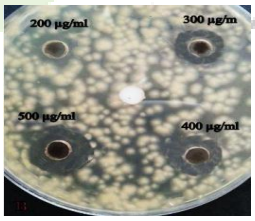
a) Luria-Bertani Agar used for up keeping of the isolate

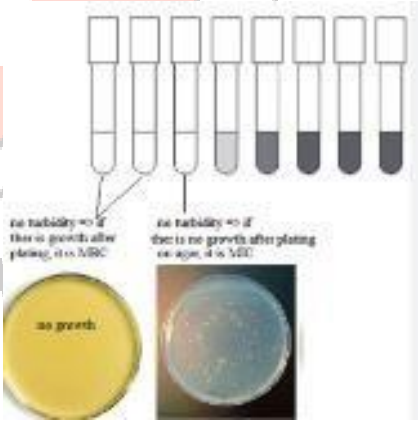
b) Luria Bertani broth (LBB) was used for Antimicrobial susceptibility testing- microdilution

IV. **IN VITRO STUDY OF PLANT EXTRACT FOR *S.aureus* ACTIVITY.**Sunitha Jagalur Doddanna 2013**.**









EXPECTED OUTCOMES:

Inhibition of *S.aureus* bacterial growth is observed by Gibco Cell culture, dye uptake.

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