ANTI-BACTERIAL ACTIVITY OF JASMINUMGRANDIFLORUM LINN
ANDTECTONIAGRANDIS USING COCONUT OIL AS MEDIA OF EXTRACTION

Adiga Shripathi H1, Kranthi2 Kamath Madhusudhan1

1 Assistant Professor, Dept. of Ayurveda, KMC, Manipal University, Manipal
2 Assistant Professor, Dept. of Microbiology, KMC, Manipal University, Manipal

ABSTRACT

The oil extracts of Jasminumgrandiflorum Linn and Tectoniagrandidis are well known for their therapeutic action on wounds. Previous studies have also established their antimicrobial activities, with different extracts. However, this is an attempt to show the same, using oil as media of active principle extraction, comparing it with their base, utilizing the standard strains of Staphylococcus aureus, Escherichia coli and Pseudomonas aeruginosa as test organisms. By the end of this study antibacterial activity of Tectoniagrandidis established, while that of Jasminumgrandiflorum demands much more attention. Thus, the research promises to create a new horizon in the field of biomedical sciences.

Key Words: Antibacterial, Wound healing, Traditional, Oil base

Introduction

Ayurveda, the science of life and the kernel of the ancient Indian wisdom has never been far behind in dealing with the practical utility of a diversified variety of drugs of plant, animal and mineral origin. Thus, the versatility of the drugs with wound healing properties is also worth mentioning. And also, studies have proved plants to be a potential source of antimicrobial compounds, the secondary metabolites of which serve as plant defence mechanisms, (Cowan, M.M, 1999) In the modern era, though many of the drugs have been scientifically screened and various pharmacological models been proposed, the need to explore their potentiality with respect to antibacterial activity is evident to a greater extent. This is primarily due to the limited effective lifespan of synthetic antibiotics and the concept of drug resistance.

The plants, Jasminumgrandiflorum,(Sharma, P.C., Yelne, M.B., & Dennis, T.J. (Eds.), 2005) and (Sandeep, P., Paarakh, M., &Gavani, U., 2009) and Tectoniagrandidis,(Asim J.&Jasem E., 2011) and (Majumdar M., Nayeem N., Kamath J. V., &Asad M., 2007) are well known for their antimicrobial, anti-inflammatory and wound healing property. Various studies have showed the antimicrobial activity of the
drugs, in several mediums of extracts. Traditionally, however, the oils prepared out of Jasminumgrandiflorum and Tectoniagrandis are long familiar for their action on wounds. Oil, in this regard, is assumed not to be an inert base. The gigantic lacuna of lack of any authenticated documentation in this regard, utilizing oil base, even so persists.

Thus, the present study aims to establish the antibacterial activity of Jasminumgrandiflorum and Tectoniagrandis, in their oil extract form, and also, compare them with their base. Ayurveda identifies the drug Jasminumgrandiflorum by the name ‘Jati’ and explains its action as vranaropana (~wound healing), Vranashodhana (~wound cleansing), kushtaghna (~curing skin ailments), kandughna (~antipruritic), vedanasthapana (~analgesic) etc. (Pandey .G.,2002)

Ayurvedic classics refer Tectonia grandisas ‘Shaka’ and ascribe the actions of vedanasthapana, shothahara (~anti-inflammatory), kushtaghna etc., (Pandey .G.,2004)

Materials and Methods

Collection of drugs:
The frontal fresh leaves of Tectoniagrandis and fresh green leaves of Jasminumgrandiflorum were collected locally. Owing to its utility in traditional medicine, coconut oil was selected as the base, for all practical purposes

Preparation of the oil: Finely grounded paste of the individual drug, coconut oil and water were taken in the ratio 1:4:16 and the mixture was heated on medium flame with constant stirring. Continued stirring was done until the water completely evaporated; the paste turned over to a wick on rolling and burnt on fire without making any sound. (Hiremath G Shobha , 2000). It was allowed to cool down on its own and filtered through a cloth and stored in a container. As this was very preliminary and pilot study, the standardization parameters for prepared oils from Indian pharmacopeia of medicines were not met.

Bacterial strains:
The standard strains of Staphylococcus aureus ATCC 25923, Escherichia coli ATCC 25922 and Pseudomonas aeruginosa ATCC 27853 were used as test organisms.

Testing method: Tube dilution method: Preparation of double dilutions of the medicine in oil was done and 10^5 cfu/ml inoculum of bacteria was added to every tube. Tubes were incubated at 37°C for 18-24hrs. Subcultures were made from each tube to detect the inhibition of growth. The lowest concentration of the drug which inhibited bacterial growth was noted respectively.

Results

Tectoniagrandis showed inhibition of E. coli and Staphylococcus aureus in a dilution of 1:2, but failed to evince any inhibitory activity against Pseudomonas aeruginosa. Jasminumgrandiflorum did not demonstrate inhibitory effect against any of the bacteria tested. Coconut oil did not show antibacterial activity. Thus, it can be inferred that the antibacterial effect exhibited by Tectoniagrandis, was purely due to the drug product itself.

Discussion

The corroboration of the antibacterial activity of Tectoniagrandis is worth appraising. Earlier studies have established the inhibition of the growth of Staphylococcus aureus (ATCC25923) and Klebsiella pneumonia (ATCC700603), using chloroform extraction of the leaf, by disc diffusion assay, (Krishna, M. S., & Jayakumaran, N. A., 2010).
The Minimum Inhibition Concentration (MIC) of methanolic extract of the frontal leaves of Tectoniagrandis, in combination with Tetracycline showed maximum synergistic action against *Salmonella typhimurium* (MTCC 98), *Klebsiella pneumonia* (MTCC 432), and minimum against *Pichiapastoris* (MTCC 34), *Escherichia coli* (Purushotham, K. G et al., 2010). This study demonstrates the antibacterial activity of the drug, against *E.coli* and *Staphylococcus aureus*, with oil base, and it is noteworthy that its inhibitory activity against *Pseudomonas aeruginosa*, in any of the mediums, still demands validation.

Considering *Jasminumgrandiflorum*, studies have revealed that, in Muller Hinton (MH) agar medium, the ethanolic extract of the drug exhibited highest inhibition against *Salmonella typhi* and lowest with *Proteus mirabilis*. (Joy, P., & Raja, D. P., 2008). In agar diffusion method, petroleum ether, methanol and aqueous extracts were found to be effective against *Staphylococcus aureus*, *Bacillus subtilis*, *Escherichia coli* and *Pseudomonas aeruginosa*; Chloroform extract was only effective against *Bacillus subtilis* and *Pseudomonas aeruginosa*; Acetone extract was most effective against *Pseudomonas aeruginosa* and *Escherichia coli*. (Sandeep, P., Paarakh, M., & Gavani, U., 2009)

On comparing the above results with the present study, the study lags behind in establishing the antibacterial property of the drug. This may possibly be due to the medium of experimentation, limited strains of test organisms used, their concentrations and the method adopted for the study. (Hood, J. R., Wilkinson, J. M., & Cavanagh, H. M., 2003) And also, it is opined that on considering the experimental approaches, standardization is required for intra- and inter-laboratory reproducibility as results may be significantly influenced by the method used. (Other variables which could possibly effect the test results include environmental and climatic conditions under which the plant grew and uniqueness in the medicinal actions of plants with respect to a particular plant species or group. (Parekh, J., Jadeja, D., & Chanda, S. 2005). They are also known to vary between tissues (higher concentrations occur in bark, heartwood, roots, branch bases and wound tissues), among species from tree to tree and from season to season. (Gottlieb, O. R., 1990). It is noteworthy that the plant extracts are generally richest in antibacterial agents after the completion of the flowering (sexual) stage of their growth. (Ncube, N. S., Afolayan, A. J., & Okoh, A. I. 2008). Thus, it is exceedingly difficult to compare the results obtained, when dealing with plant extracts, with published results in literature. Standardization of all the parameters like time of collection of the drug, area of collection and strains of bacteria which are selected for the study etc. can resolve the bias in the study.

Considering the World Health Organisation’s Technical report, which states that “80% of the world’s inhabitants’ problem should be treated by medicinal herbal drug for their primary health care” the scope for further research in the same is implicit.
References: