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Antimicrobial Activity of Poly Herbal Combination for Antibiotic Drug

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Abstract:- The present research work was done with traditional medicinal plants. The plant materials such as *Terminalia bellerica, Withania somnifera, Madhuca longifolia and Sygyzium cumini* was selected based on its potent antimicrobial activity. The best combination of the selected plants was evaluated for their antimicrobial activity. The extract showed significant activity towards the test organisms. The results recommended the use of selected plants at their best combination as a substitute to synthetic agents that can effectively prevent the microbial infestation.

Keywords:- *Antimicrobial Activity, Cross Infection, Medicinal Plant.*

I. INTRODUCTION

The emergence and dissemination of multidrug resistant bacteria has consequence towards the increased cost of medicines (Harbottle et al., 2006). The risks associated with synthetic antimicrobial drugs are their inefficiency to overcome the strains of resistant bacteria towards antibiotics. The use of such drugs is now a threatening factor for the patients who may result with harmful side effects (Cosgrove and Carmeli, 2003). Predate the introduction of antibiotics there was an efficient way to treat diseases with medicinal plants (Braga et al., 2005).To address this challenge the development of new antibiotics in pharmacology is vital (Cosgrove and Carmeli, 2003). Medicinal plant contains novel pharmaceutical compounds. One of the vital activities found in these plants are their antimicrobial nature (Demetrio et al., 2015). Antimicrobial or biologically active compounds from plants origin are efficient in the treatment of cross infections (Chanda et al., 2013, Jeyaseelan et al., 2012). Most of them offers broad spectrum of antimicrobial activity against microorganism due to their secondary metabolites. They also mitigate the side effects associated with the synthetic antimicrobials (Iwu et al., 1999). The present study was initiated to evaluate the antimicrobial property of the selected herbal extract in their effective combination and to analyze their phytochemical constituents.

II. MATERIALS AND METHODS

- *Materials*

The potent antimicrobial herbs *Terminalia bellerica, Withania somnifera, Madhuca longifolia and Sygyzium cumini* were collected in and around Coimbatore, India. All the chemicals and solvents were supplied by Himedia Chemicals Private Limited, Mumbai, India.

- *Herbal Extraction Method*

The selected herbs were dried under shade. The dried herbs were ground to fine powder and used for extraction (Sathianarayanan et al., 2010). *Terminalia bellerica, Withania somnifera, Madhuca longifolia and Sygyzium cumini* in the optimized combination 2:1:1:1 was used for further analysis. An ethanolic extract of the selected herbs in combination was done by maceration process at M: L ratio of 1:5 at room temperature for 48 h at 120 rpm (Perez et al., 1990). The ethanolic extracts were finally obtained.

- *Assessment of Antibacterial Testing*

The reference bacterial strains of *S.aureus* and *E.coli* was inoculated in nutrient broth and incubated at 37^{o}C. After incubation a sterile cotton swab was immersed into the bacterial suspension and swabbed aseptically on the sterile Muller-Hinton agar plates. Wells of 6 mm diameter were punctured on the agar medium. About 60µl of the selected herbal extracts combination was added to the wells. After which the plates were incubated at 37^{o}C for 24 hrs. After incubation, the zone of inhibition was measured and recorded.

- *Assessment of Antifungal Activity*

Potato dextrose agar plates were prepared and the spores of the fungi were inoculated into 50±2 ml of sterile distilled water containing few glass beads and shaken vigorously to bring the spores into suspension. The test specimens (3.8 ± 0.8 cm in diameter) were placed in contact with hardened agar medium over which 0.2±0.001 ml of the inoculums was evenly distributed by means of a sterile pipette. The plates were incubated at 27^{0}C for 5 days. After incubation the antifungal activity was measured by the zone of mycostasis.

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III. RESULTS AND DISCUSSIONS

➢ *Assessment of Antibacterial Testing of Selected Herbal Ratio*

The selected herbal ratio 2:1:1:1 was found to be more effective in inhibiting the clinical strains of test bacteria was represented in table 1. The ratio 2:1:1:1 exhibited 23 mm zone of inhibition against *A. baumannii* followed by *E. coli and S. aureus* (21 mm). Whereas the minimum zone of inhibition was found against *P. mirabilis* (18 mm). It is evident that the selected herbal combination showed enhanced inhibitory activity against most of the wound pathogens listed by the reported author.

S. No	Test Organisms	Zone of Inhibition of Selected ratio 2:1:1:1 (in mm)
1	*A.baumannii*	23
2	*B.cereus*	20
3	*E.coli*	21
4	*K.pneumoniae*	19
5	*P.aeruginosa*	22
6	*P.mirabilis*	18
7	*S.aureus*	21
8	*S.epi*	19
9	*MRSA*	20

Table 1:- Antibacterial Activity of Selected Herbal Combination

➢ *Assessment of Antifungal Activity of Selected Herbal Combination*

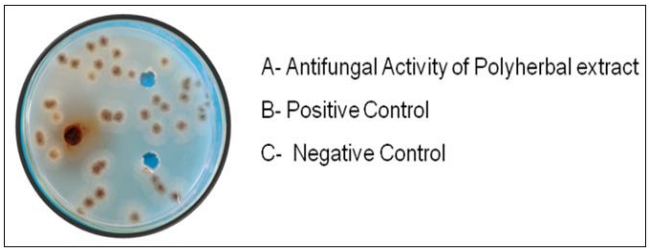

Fig 1:- Antifungal Activity of Polyherbal Extract

The figure1 represented the antifungal activity of selected herbal combination against *A.niger*. It was clearly seen from the figure that the selected herbal combination exhibited e antifungal activity about 11 mm zone of inhibition against *A.niger*.

IV. CONCLUSION

Availability of the selected herbal combination proves the possible implementation of the current study. Biologically active compounds found in the selected combination confirmed the presence of functional groups and their potent antimicrobial property. Thus the study initiates an alternative to expensive, synthetic and toxic antimicrobial agents.

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