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COMPARATIVE ANTIBACTERIAL ACTIVITY OF TROPICAL MEDICINAL PLANTS AEGLE MARMELLOS, PHYLLANTHUS NIRURI AND ALOE BARBEDENS AGAINST GRAM POSITIVE AND GRAM NEGATIVE BACTERIA

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Abstract

Many antibiotics are available in market, but emergence of bacterial resistance toward these antibiotics is a very important concern for physicians. The way of overcoming these resistances is to provide new antibacterial agent and/or, to provide combination of antimicrobial agent. There is a feeling among natural-products chemists and microbiologists alike that the multitude of potentially useful phytochemical structures which could be synthesized chemically is at risk of being lost irretrievably. Use of herbal antimicrobial agent is good answer for both of these hurdles. Since ancient time many medicinal plants were used by traditional healers to treat various infectious disease. Still we are lacking scientific proof that would provide an evidence for said therapeutic use of medicinal plant. In this concern present investigation was designed to comparatively assess antibacterial potential of methanolic extract of heart wood of *Aegle marmelos*, leaves of *Aloe barbadensis* and whole plant of *Phyllanthus niruri*.

Keywords – Antimicrobial Agent, Natural Products, *Aegle marmelos*, *Aloe barbadensis*, *Phyllanthus niruri* etc.

Introduction –

Herbal medicine is still the mainstay of about 75–80% of the world population, mainly in the developing countries, for primary health care because of better cultural acceptability, better compatibility with the human body and lesser side effects. The World Health Organization (WHO) has recently defined traditional medicine (including herbal drugs) as comprising therapeutic practices that have been in existence, often for hundreds of years, before the development and spread of modern medicine and are still in use today (Fahn, 1989). Ever since ancient times, in search for rescue for their disease, the people looked for drugs in nature. The beginnings of the medicinal plants use were instinctive, as is the case with animals (Stojanoski, 1999).

In time, the reasons for the usage of specific medicinal plants for treatment of certain diseases were being discovered; thus, the medicinal plants usage gradually abandoned the empiric framework and became founded on explicatory facts. Until the advent of iatrochemistry in 16th century, plants had been the source of treatment and prophylaxis (Kelly, 2009).

The medicinal plants generally contain number of compounds that may be potential natural antimicrobial agents which may serve as alternative, effective, cheaper and safe antimicrobial agents for the treatment of common microbial infections (Schimmer *et al.* 1994). The use of plants extracts in medicinal treatment got a great popularity in late 1990s (Cowan, 1990).

The emerging infectious diseases account for 26 per cent of annual deaths worldwide. Nearly 30 per cent of 1.49 billion disability-adjusted life years (DALYs) are lost every year to diseases of infectious origin (Taylor *et al.*, 2001). The burden of morbidity and mortality associated with infectious diseases falls most heavily on people in developing countries, and particularly on infants and children (about three million children die each year from malaria and diarrhoeal diseases alone) (Fauci, 2001).

Materials and method –

Heart wood of *Aegle marmelos*, whole plant of *Phyllanthus niruri* and leaves of *Aloe barbedensis* were collected from (M.P.) region in the month of February, July and December respectively. Special precaution was taken to collect healthy plant materials and foreign materials were avoided.

Collected plant materials were washed under running tap water and kept in shade for drying. Avoidance of any microbial growth on plant material was done by visual observation. Dried plant materials were pulverized using mechanical grinder. Pulverized plant materials were observed for colour, odour, and texture, and were packed in air tight container and labeled till any further proceedings.

Methanolic extract prepared of these plants by soxchlation method.

Antibacterial Screening

Test organisms: The microorganisms used for antibacterial activity, were *Staphylococcus aureus* *Escherichia coli*, *Bacillus subtilis*, *Klebsiella pneumoneae* .

Antibacterial activity –

The disc Diffusion assay was used to determine the growth inhibition of bacteria by plants extract. The nutrient agar (Muller Hinton) plates were prepared and seeded with the test organisms. Four holes of 6.0 mm diameter each were made in the plates with a sterile cork borer and filled with 400,200,100 and 50 mg/ml. The inoculated plates were allowed to congeal for 30 min to allow pre diffusion time and then incubated at 37 °C for 24 hrs. The plates were examined for evidence of zones of inhibition which appear as a clear area around the holes. (Cheesbrough, 2001). The diameter of such zone of inhibition was measured using a transparent meter ruler and the value was recorded and expressed to the nearest milli-meter.

Results –

The result of comparative antibacterial activity measured in term of diameter of zone of inhibition, the comparative antibacterial activity of methanolic extract of plants.

Aegle marmelos, *Phyllanthus niruri*, and *Aloe barbedensis* on the test organisms shown different activity.

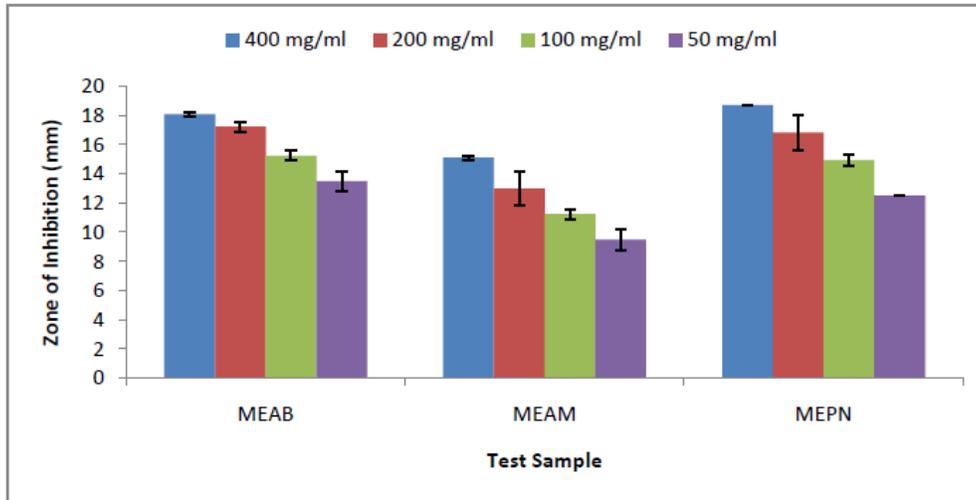


Fig 1 Zone of inhibition of plants extract against *E. Coli* at different concentration

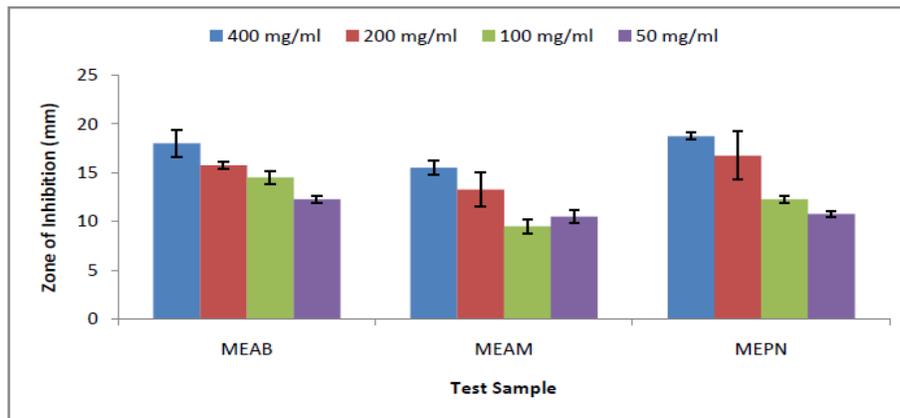


Fig 2 Zone of inhibition of plants extract against *S. Aureus* at different concentration

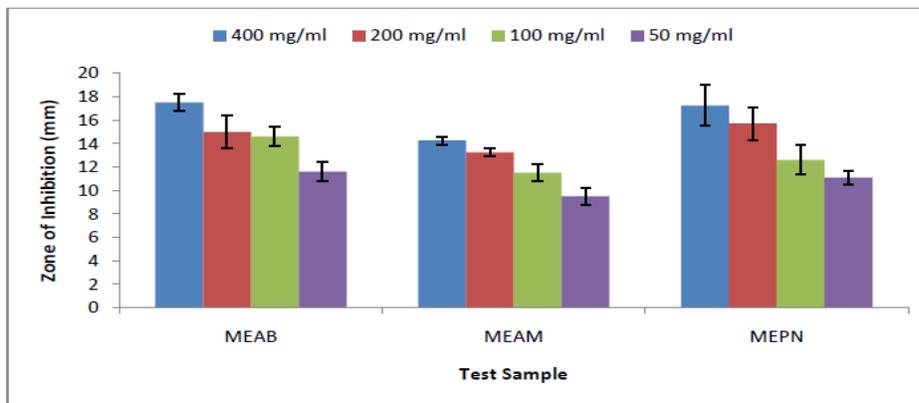


Fig 3 Zone of inhibition of plants extract against *B. subtilis* at different concentration

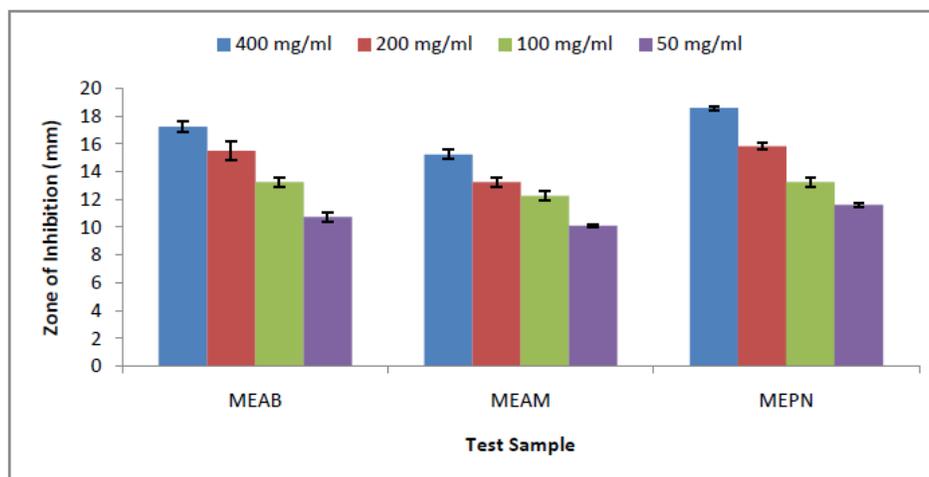


Fig 4 Zone of inhibition of plants extract against *K. Pneumoniae* at different concentration

Discussion –

The results shown at different concentration of methanolic extract of plants against organisms. Methanolic extract of Aloe barbadensis and Phyllanthus niruri were found to be more effective than *Aegle marmelos* extract. Phyllanthus niruri was found to be more effective against selected microorganisms.

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