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SCREENING OF ANTIBACTERIAL ACTIVITY OF THE ESSENTIAL OIL FROM SEED OF ARTOCARPUS HETEROPHYLLUS

SHIPRA JHA & A K SRIVASTAVA

Amity Institute of Biotechnology, Amity University, Noida,Ghaziabad , U.P., India

ABSTRACT

The objective of this work is to investigate the antibacterial activity of Artocarpus heterophyllus plant. The antibacterial activity of essential oil obtained from plant was examined. To evaluate the antibacterial activities of these extracts; their in vitro antibacterial activities were determined by disk diffusion testing and minimum inhibitory concentration (MIC). Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus were used as test bacterial strains. The analysis of seed part resulted in representing 93.21% of the total oil and the yield were 2.34%. The bacterial strains tested were found to be sensitive to essential oils studied and showed a very effective bactericidal activity with minimum inhibitory concentration (MIC) ranging from 1.50 to 5.20 mg/mL.

KEYWORDS: Artocarpus heterophyllus, Essential oil, Antibacterial activity, Gram-positive, Gram- negative.

INTRODUCTION

The genus Artocarpus, which belong to the Moraceae family (Chandrika et al., 2002).The tree is high up 20m & its fruits are known as jackfruit .Jackfruit is the largest tree born fruit in the world, reaching 80 pounds in weight & up to 36 inches long & 20 inches in diameter. The exterior of the compound fruit is geen/ yellow when ripe (Gulcin et al., 2006). The interior consist of large edible bulbs of yellow, bananaflavoured flesh that encloses a smooth, oval, light- brown seed. The seed is ¾ to 1-1/2 inches long and ½ to 3/4 inches thick and is white and crisp within. There may be 100 or up to 500 seeds in a single fruit, which are viable for no more than three or four days. It is reported from the study that plants of Artocarpus species have been used by traditional folk medicine in Indonesia against malarial fever, stomachache, ulcers, dysentery, diarrhoea & defective urinary secretion. They are a rich source of phenolic compounds such as geranylated flavones, which are being investigated for their phytochemical and biological properties (Shizuo et al., 2006).

Essential oils are gaining increasing interest because of their relatively safe status, their wide acceptance by consumers, and their exploitation for potential multi-purpose functional use (Ormancey et al., 2001; Sawamura et al., 2000; Gianni et al., 2005). Screening of Antibacterial Activity of the Essential Oil from Seed of Artocarpus Heterophyllus Essential oils are widely used in medicine as constituents of different medical products, in the food industry as flavouring additives and also in cosmetics as fragrances (Cowan et al., 1999) and pharmaceutical industries (Reische et al., 1998).Volatile compounds obtained from plants, have known antimicrobial, antifungal and insecticidal activities (Janssen et al., 1987; Kurita et al., 1981; Oka et al., 2000). Essential oils have many therapeutic and they aid the distribution of drugs and antiseptics (Palevitch et al., 1994). Their most important characteristics are their anti-infection, antibacterial, antifungal, allelopatic and antioxidative effects (Altanlar et al., 1999). Moreover, the screening of such plant extracts for antimicrobial activity has always been of great interest to scientist looking for new sources for drugs for the treatment of various diseases. (Sokmen et al., 1999).

MATERIALS AND METHODS PLANT MATERIAL

The fruits of Artocarpus heterophyllus were collected in June 2012 at Delhi. The seed were then isolated from the ripened fruit and conserved for extraction.

ESSENTIAL OIL EXTRACTION

Thoroughly washed seeds of Morus plant were shade dried and then powdered with the help of a blender. Thirty grams of the powder was filled in the thimble and extracted successively with ethanol using Soxhlet extractor for 48 h at temperature not exceeding the boiling point of the solvent (LIN, 1999). The solvent was removed by distillation under reduced pressure in a rotary evaporator at 35 ºC and pure oil kept at 4 ºC in the dark, until the moment of analysis. The seed oil extract was subjected to antibacterial activity.

With the agar disc diffusion assay, oils were found to be active against Escherichia coli at a minimal inhibitory concentration (MIC) of 1.50mg/ mL. Against Pseudomonas aeruginosa and Staphylococcus aureus, the oil from the flower was found to be more active; the oils showed MIC values of 2.93 and 5.20 mg/ mL respectively. The data indicated that Escherichia coli were the most sensitive strain tested to the oil of Artocarpus heterophyllus with the strongest inhibition zone (29.78mm).The Pseudomonas aeruginosa was found to be more sensitive among bacteria with inhibition zone of 17.44mm. Modest activities were observed against Staphylococcus Aureus, with inhibition zones of 5.23mm. These results are similar to those found by Ghalen et al., 2008; Trivedi et al., 2004; Gamal et al., 2007.The antimicrobial activities, in general have been mainly explained through terpenes with aromatic rings and phenolic hydroxyl groups able to form hydrogen bonds with active sites of the target enzymes, although other active terpenes, as well as alcohols, aldehydes and esters can contribute to the overall antimicrobial effect of essential oils 70.

CONCLUSIONS

Present study was conducted to investigate the antibacterial and pesticidal activity of essential oil extracted from Artocarpus heterophyllus seeds. The bacterial strains gram- negative: Escherichia coli and Pseudomonas aeruginosa, gram- positive: Staphylococcus aureus tested were found to be sensitive to essential oils studied and showed a very effective bactericidal activity with minimum inhibitory concentration (MIC) ranging from 1.55 to 5.20 mg/ mL.

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