Int J Pharm Bio Sci 2012 Oct; 3(4): (B) 1181 - 1185

Research Article **Microbiology**

International Journal of Pharma and Bio Sciences **ISSN 0975-6299**

PRELIMINARY OBSERVATIONS ON MICROBIAL DIVERSITY FROM KRISHNA MANGROVES AT PALAKAYATIPPA, HAMSALADEVI IN ANDHRA PRADESH ON THE EAST COAST OF INDIA

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ABSTRACT

The present study reports the occurrence of different microbial population at Palakayatippa, Hamsaladevi of Krishna mangrove area which is the first of its kind. Rhizosphere soil and sediment samples were collected and used for microbial isolation through pour plate method. The different groups were observed bacteria, fungi and actinomycetes. The study reveals that different types of pigment producing fungi and actinomycetes were predominant.

KEY WORDS: **Diversity, Microbes, Mangroves, Pigments, Bio active compounds.**

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INTRODUCTION

Mangroves contain a rich diversity of inter tidal fauna and flora. Fungi, actinomycetes and bacteria constitute a very important part of the ecosystem along with other microbes in turnover of the biomass (Jones and Hyde, 1988). Marine microorganisms have become an important source of pharmacologically active metabolites, more specifically fungi for pigments and actinomycetes for antibiotics. Marine microbes play a major role in decomposition of dead plant tissues (cellulose & lignin) and to a lesser extent animal tissues such as keratin and chitin. The decomposition liberates nutrients back into the ecosystem. Fungi, actinomycetes and bacteria have evolved biologically and biochemically in a diverse manner that has allowed them to utilize various solid substrates. Marine microbes have proven themselves as valuable sources of natural products for agriculture as well as biomedical development for over a half century (Turner, 1971; Turner and Aldridge, 1983; Biabani and Laatsch, 1998). Marine derived fungi are a source of significant chemical diversity and this fact is supported by 272 new compounds that have been isolated (Bugni *et al.,* 2000). Similarly, mangrove actinomycetes and bacteria were also known to produce a number of bioactive compounds. Studies on mangrove microbes were initiated recently as these mangrove plants harbour an extremely diverse endophytic micro flora (Petrini *et al.,* 1992; Suryanarayanan and Kumaresan, 2000; Ananda and Sridhar, 2002).

MATERIALS AND METHODS

Study Area

The study area (Fig.1), Palakayatippa mangrove forest which is located at Hamsaladevi, Krishna District, Andhra Pradesh (15° 58'-15° 02'N 81° 6' 6.88'E) on the east coast of India.

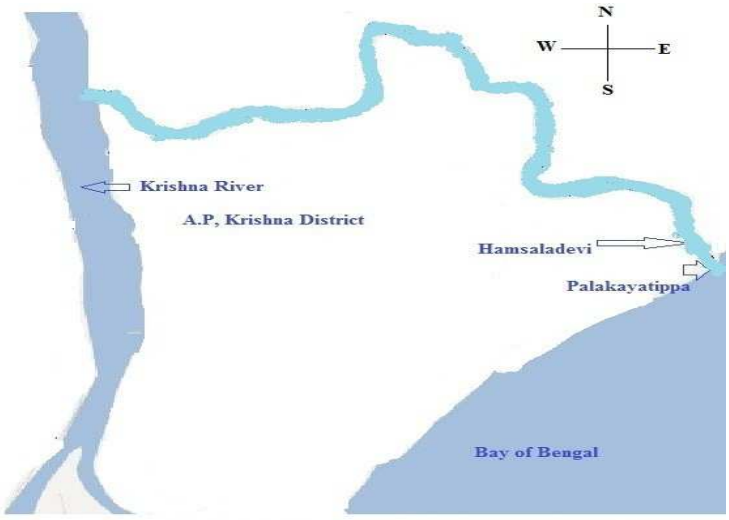

Fig 1: Palakayatippa,Hamsaladevi,Krishna District,Andhra Pradesh,India

Sources, collection and transportation of samples from Mangrove area

The samples of rhizosphere soil and sediments were collected by using sterile sampling kit prepared at laboratory. All the samples collected, and were transported to laboratory by sterile poly bags immediately.

Isolation of micro flora from samples

All the rhizosphere soil and sediment samples were serially diluted. From these different dilutions, plating was carried out for bacteria, fungi and actinomycetes. SCDA, NAM, PDA and ISP Medias were used for isolation. Media preparation was carried out by adding

50% seawater (sterile). Nalidixic acid and Nystatin were added to media for controlling other contaminants for isolation of actinomycetes. All the plates were incubated at required temperatures i.e., 37^0 C for bacteria, 27^0C for fungi and actinomycetes for 7 days. After incubation, all the plates with colonies were observed under microscope.

RESULTS AND DISCUSSION

The study revealed that the mangrove area from where the samples were collected has a wide range of microbial diversity. Different types of bacteria, fungi and actinomycetes were isolated from rhizosphere and the sediment samples (Fig. 2, 3,4). Among these, fungal organisms were predominant compared to the other groups. Different kinds of pigment producing fungi (Fig 3) and antibiotic producing actinomycetes (Fig.4) showing a variety of antibiotic zones were observed. Based on preliminary microscopic observations and staining technique, the major genera observed were *Aspergillus* sp. *Alternaria, Fusarium sp., Nigrospora sp, Penicillium sp.* Some strains showed the antibiotic resistance towards standard antibiotic discs which belong to actinomycetes group.

Fig2: Bacterial colonies (Different Colour and morphology)

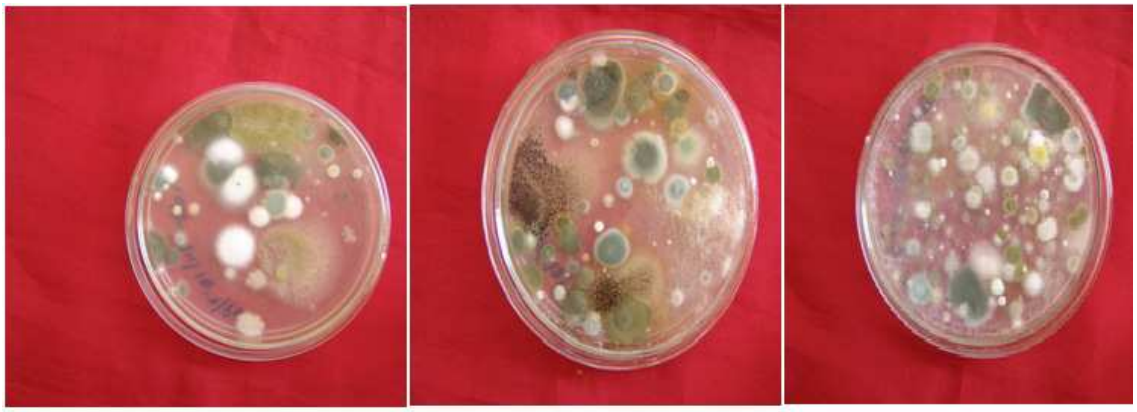

Fig 3: Fungal colonies

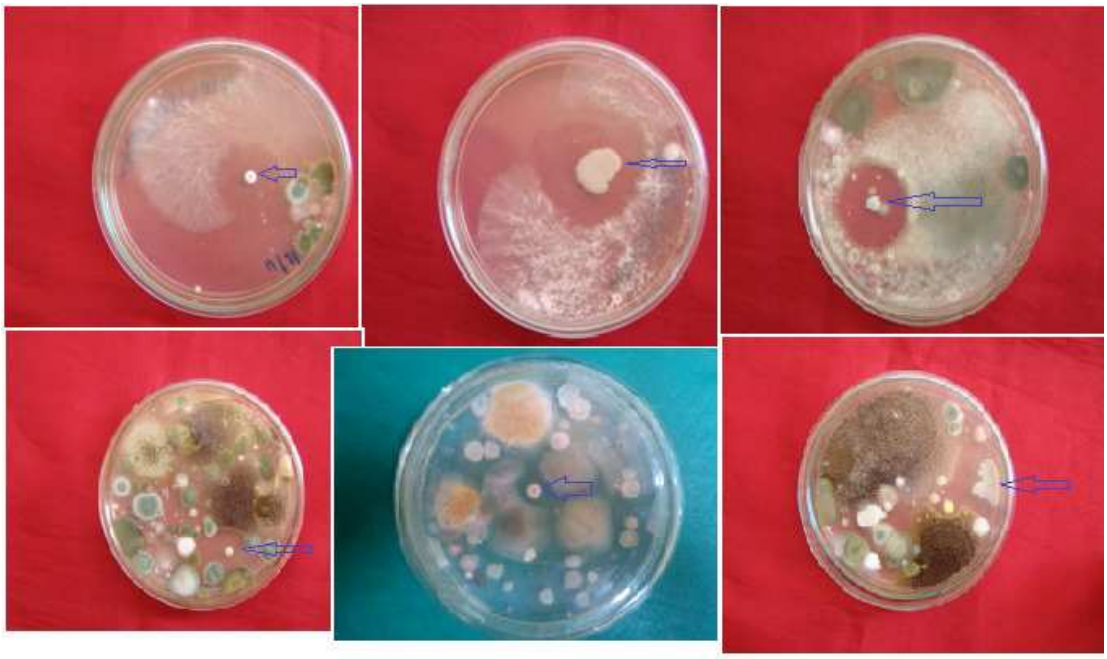

Fig 4: Actinomycetes showing Antimicrobial actvity

Marine microorganisms as a whole represent a vast essentially untapped source of new and potential biologically active natural products (McConnell *et al.,* 1994). With marine macro organisms receiving so much attention in the last 20 years and difficulties connected with collecting them becoming more of an issue, many research groups are finding it more attractive to investigate the microbes associated with them, such as epibionts, symbionts or those directly in water column and or marine sediments. Marine microorganisms have developed unique metabolic and physiological capabilities that not only ensure survival in extreme habitats, but also offer potential for production of metabolites, not seen from terrestrial microorganisms. Marine microorganisms have proven to produce a variety of chemically interesting and biologically significant secondary metabolites and some of them are expected to serve as lead compounds for drug development or pharmacological tools for basic studies of life sciences (Kobayashi, 1989).

CONCLUSION

This study significantly contributes to the diversity and density of mangrove micro flora and helps in extending the taxonomical significance through chemotaxonomy depending on the type of metabolites produced. Since natural colours are safer than synthetic ones, the pigment components may have applications in food industry, textile and cosmetics. In understanding of the metabolism of mangrove microbes through enzymatic studies, they can help to increase the fertility of soil and isolate commercial enzyme producers etc.

ACKNOWLEDGEMENT

We are thankful to Dr.D.V.Subhashini for providing good laboratory facilities at Central Tobacco Research Institute and authorities of Adikavi Nannaya University, Rajahmundry, India.

REFERENCES

1. Ananda K, Sridhar KR. Diversity of endophytic fungi in the roots of mangrove species on the west coast of India. Canadian Journal of Microbiology 48:871-878, 2002.
2. Bugni, T.S., Abbanat, D., Bernan, V.S., Maiese, W.M., Greenstein, M., Wagoner, R.M.V. and Ireland, C.M Yanuthones: novel metabolites from a marine isolate of *Aspergillus niger*. Journal of Organic Chemistry 65: 7195-7200, 2000.
3. Hyde K. D. & E. B. G. JONES. Marine mangrove fungi. - P. S. Z. N. I. Marine Ecology, 9: 15-33, 1988.
4. Kathiresan K. A review of studies on Pichavaram mangrove, Southern India. Hydrobiologia 430:185-205, 2000.
5. Kumar RS. A review of biodiversity studies of soil dwelling organisms in Indian mangroves. Zoos' Print Journal 15:221-227, 2000.
6. Kumaresan V, Suryanarayanan TS. Occurrence and distribution of endophytic fungi in a mangrove community. Mycological Research. 105:1388-1391, 2001.
7. Kumaresan V, Suryanarayanan TS, Johnson JA. Ecology of mangrove endophytes. In: Hyde KD, ed. Fungi of Marine Environments. Fungal Diversity Press, Hong Kong. 145-166, 2002.
8. Kobayashi, Calphostin C (UCN-1028C), a novel microbial compound, is a highly potent and specific inhibitor of protein kinase CBiochemical and Biophysical Research Communications,Volume 159, Issue 2, 15 March 1989, Pages 548–553,1989.
9. Maria GL, Sridhar KR. Diversity of filamentous fungi on woody litter of five mangrove plant species from the southwest coast of India. Fungal Diversity 14:109-126, 2003.
10. Nambiar GR, Ravindran K, Changxing Z, Jaleel CA. A glimpse of lignicolous marine fungi occurring in coastal waterbodies of Tamil Nadu (India). Comptes Rendus Biologies 331:475-480, 2008.
11. Rajendran N, Kathiresan K. Microbial flora associated with submerged mangrove leaf litter in India. Revista de Biología Tropical 55:293-400, 2007.
12. Sridhar KR. Mangrove fungi of the Indian Peninsula. In: Sridhar KR, ed. Frontiers in Fungal Ecology, Diversity and Metabolites. IK International Publishing House Pvt Ltd, New Delhi. 28-50, 2009.
13. Kumaresan, V. and Suryanarayanan, T.S. Endophyte assemblage in young, mature and senescent leaves of *Rhizophora apiculata*: evidence for the role of endophytes in mangrove litter degradation. Fungal Diversity 9: 81-91, 2002.