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RESEARCH ARTICLE

DETERMINATION OF PHYSICOCHEMICAL PARAMETERS AND DIVERSITY PATTERN OF THREE DIFFERENT PLACES OF KANYAKUMARI DISTRICT.

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Abstract

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The current investigation suggests that the physicochemical parameters were analysed from three different places of Kanyakumari district. Population diversity of fungi also determined with reference to microfungi. The soil physicochemical parameters such as pH, electrical conductivity, organic matter, organic carbon, organic nitrogen, phosphorus, potassium, zinc, copper, iron, magnesium, calcium, manganese, nickel and potassium were analysed. Maximum amount of chemical parameters were recorded in the study site of Thengapattinam when compared to other places Erayumanthurai and Kollemcode site was 67, 44 and 36 total number of colonies recorded respectively. Minimum number of colonies was Kollemcode area represented due to the nutrient content of the study site. Maximum *Aspergillus* genera were presented. Some of the rare species of *Penicillium lanosum* also recorded from the all three different places of Kanyakumari District. The results were discussed in detail.

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Introduction:-

Soils are natural unconsolidated materials on the surface of the earth and are composed of solid, liquid and gas. They have organic and inorganic matter which are intimately mixed together by natural processes. That is aggregated into a porous body that accommodates air and water (Osman, 2013). Soil is an essential component of biosphere and it can be used sustainably or even enhanced, under careful management. Soil fungi play an important role as major decomposers in the soil ecosystem. They also provide mankind with very useful pharmaceutical product like antibiotics. The fungal derivatives like organic acids, enzymes, pigments and secondary metabolites are being used in the food industry and fermentation technology. In addition, some of the product from soil fungi and biological control agents for plant pathogens and insect pests. (Manoch, 1998). Fungi are not only beautiful but also play a significant role in the daily life of human beings besides their utilization in industry, agriculture, medicine, food, textiles, bioremediation, and many other ways.

Biological diversity encompasses the variety of living forms like animals, plants and microbes. According to Hawksworth (2002), fungi are a major component of biodiversity, essential for the survival of other organisms and are crucial in global ecological processes. Soil contains a vast array of microorganisms such as bacteria, viruses, fungi, actinomycetes, protozoa and algae (Alexander, 1977; Olowonihi, 2003) have been found that more number of fungi exist in soil than in any other environment (Nagmani, 2005). Contributing to the nutrient cycle and

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maintenance of ecosystem, fungi play an important role in soil formation, soil fertility, soil structure and soil improvement (Hao, 2008). The present study was planned to study the diversity and abundance of fungal species in the soil sample.

Materials And Methods:-

Soil physicochemical properties:-

Soil samples were collected from Thengapattinam, Erayumanthurai and Kollemcode Kanyakumari, District brought to the polyethene bag and sieved through 2mm sieve at field moist conditions and determination of soil moisture content and pH also analysed. Air dried ground and sieved (0.25mm) samples were used for the estimation of organic carbon, total nitrogen. soil pH was measured in a 1:5 water suspension using a portable digital pH meter. Colorimetric method (Anderson and Ingram, 1993), Micro kjeldhal distillation and titration method (Jackson 1967) were applied to estimate organic carbon, total nitrogen, available phosphorus and exchangeable potassium respectively. The soil parameters were tabulated.

Fungal population in the soil sample:-

For population of mycoflora by serial dilution plate method (Johnson and Curl 1972) was followed by Rose Bengal Agar Medium (Martin, 1950) was used. The inoculated petriplates were incubated at 25±1◦C. Colony Forming Units (CFU) were estimated by counting the number of colonies after five days. Fungi were identified according to their macroscopic and microscopic features. Identification at the species level was carried out according to the morphological characters found principally in publications by Gilman (1957), Barnett and Hunter (1972), Ellis (1993) pure cultures of fungi were maintained in test tubes slants containing Czapek Dox agar medium and preserved in deep freezer at -20^{o}C for future work.

Results And Discussion:-

Table 1:- Analysis of physicochemical parameters of three different places of Kanyakumari Distrcit

S.No	Parameters	Thengapattinam	Erayumanthurai	Kollemcode
1	pH	8.3	8.5	8.2
2	Electrical conductivity (dsm^{-1})	0.51	0.28	0.24
3	Organic matter (%)	0.52	0.46	0.48
5	Organic carbon (%)	0.26	0.23	0.24
6	Available Nitrogen (mg/kg)	126.2	102.2	104.5
7	Available Phosphorus (mg/kg)	4.62	4.52	4.16
8	Available potassium (mg/kg)	148	138	145
9	Available Znic (ppm)	0.87	1.08	1.15
10	Available Copper (ppm)	0.59	0.95	0.86
11	Iron (ppm)	4.06	4.36	4.56
12	Available Mn (ppm)	2.06	2.24	2.21
13	Calcium (C.mole^{+}/Proton)	14.6	13.5	14.2
14	Magnesium (C.mole^{+}/Proton)	8.6	7.5	7.3
15	Sodium (C.mole^{+}/Proton)	1.48	1.36	1.46
16	Potassium (C.mole^{+}/Proton)	0.32	0.27	0.31

Table 2:- Biodiversity pattern of different places of Kanyakumari District

S.No	Name of the fungi	Thengapattinam	Erayumanthurai	Kollemcode	Total no. of colonies
1	*Alternaria alternata*	5	2	-	7
2	*A.awamori*	11	8	4	23
3	*A.flavus*	6	-	-	6
4	*A.fumigatus*	5	8	10	23
5	*A.niger*	8	6	7	21
6	*A.nidulans*	2	-	1	3
7	*A.oryzae*	-	2	-	2
8	*Cladosporium sp*	-	1	-	1
9	*Fusarium sp*	2	-	1	3
10	*Fusarium oxysporum*	3	1	-	4

11	*Penicillium citrinum*	5	3	4	12
12	*Penicillium sp*	9	7	6	22
13	*P. lanosum*	4	3	3	10
14	*Trichoderma harzianum*	4	2	-	6
15	*T.viride*	3	1	-	4
	Total no. of colonies	67	44	36	147

In the present investigation analysis of physicochemical parameters such as pH, electrical conductivity, organic carbon, organic nitrogen, phosphorous, potassium, zinc, copper, iron, manganese, calcium, Magnesium, sodium and Potassium was 8.3, 0.51dsm^{-1}, 0.52 %, 0.26 %, 126.2 mg/kg, 4.62 mg/kg, 148 mg/kg, 0.87ppm, 0.59ppm, 4.06ppm, 2.06ppm, 14.6 C.mole^{+}/Proton, 8.6 C.mole^{+}/Proton, 1.48 C.mole^{+}/Proton and 0.32 C.mole^{+}/Proton from Thengapattinam area soil sample were recorded respectively. Where as in the case of minimum physico-chemicals of Kanyakumari district was observed. Similarly, the physico-chemical parameters recorded during the present study was not adversely affected the distribution of fungi. Salinity and temperature are the major factors affecting the diversity of marine fungi as well illustrated by Booth and Kenkel, 1986.

The organic layer at these sites could be attributed to the supply of raw materials and the different types of fauna presented. The evidence of soil fauna activity could be seen under a thick litter above the ground of the plantation site (Fisher, 1995). Macronutrient tends to be less available in soil with low pH, while the micronutrient tends to be less available with high pH. The pH of the soil samples was between 9.5 and 10.2; hence all soils were slightly alkaline in nature. According to Kadir *et al.*, (2001), the higher acidity in the surface soil was associated with hydrolysis of Aluminum which was released under strongly leaching conditions and which subsequently lower pH, causing toxicity.

In the present investigation diversity patterns from the Thengapattinam was 67 fungi, Erayumanthurai was 44 fungi and Kollemcode was 36 fungi recorded respectively. Totally 146 fungal colonies were represented and analysis of parameters vice versa. The rare species of *Penicillium lanosum* was 10 colonies recorded from the all three different sit of Kanyakumari district. So, the fungal diversity was more useful for the content of environmental conservation. The ocean of the world is varying greatly in intertidal amplitude and salinity of the waters, all features that can dramatically affect fungal biodiversity.

Afreen Arshi and Nasreen (2016) reported that the soil samples were analyzed with respect to different types of fungi. The most common fungi, *Aspergillus niger* and *Penicillium stoloniferum* are found in all three soil samples *Aspergillus niger*, *Penicillum stoloniferum*, *Penicillum* sp. and *Rhizopus* sp. are found in site A (Roadside soil). *Aspergillus niger*, *Aspergillus flavus*, *Aspergillus terrrus*, *Penicillium stolonigerum*, *Pencillium* sp. *Fusrium oxysoprum*, *Alternaria solani*, *Trichoderma viride*, *Trichoderma* sp and *Rhizopus* sp. was observed in site B (garden soil). *Aspergillus niger*, *Pencillium staloniferum*, *Allternair solani*, *Trichoderma* sp. and *Rhizopus* sp. was observed in site c (pot soil of rose plant).

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