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Volume 7 Number I January 2013

Science Papers

Withania coagulans – An overview with special reference to Diabetes mellitus 1-6
Dr Amit Vaibhav, Dr O. P. Singh and Dr S.K. Tiwari

Yoga Nidra in Pregnancy 7-11
Meenakshi Pathak S.N, Manjari Dwivedi, Awadhesh Pandey, Tushar Pathak and Mudita Pathak

Role of Kshara Pichu and Leech Therapy in Chronic Non Healing Wound 12-16
Anil Kr. Tripathi, S. J. Gupta and S.C. Varshney

A Comparative Diagnostic Evaluation of Rheumatoid Factor by Different Immunological Techniques: Latex Agglutination, Gelatin Agglutination, Turbidometry and ELISA in Rheumatoid Arthritis 17-21
Pramod Kumar Verma, Usha, Niladri, Nand Kumar Singh and Shyam Kumar Saraf

Effect of Yogic Practices on Pregnancy and its Outcome 22-28
Meenakshi Pathak S.N., Prof.Manjari Dwivedi, Dr. Neeru Nathani and Awadhesh Pandey

Physico-Chemical investigation on the Pollution Potential of River Ganga Water at Mirzapur, Uttar Pradesh (India) 29-36
Kshama Singh

Syudy of Spin Selective Wave Guide 37-41
Deepak Kumar, Dilip Kumar and Dr. S.S.P.Singh

Noise Minimization in Wireless Network 42-46
Gopal Singh and Dr. H.N.Mishra

Some New Exact Solutions to the Einstein Equations With Magnetofluid 47-50
Dr. S.S.Upadhyay

Study of Low Power Tunable Mosfet 51-55
Dilip Kumar, Deepak Kumar and Dr. S.S.P.Singh

Occurrence of Algae in the Waste Water 56-58
Umesh Kumar Tiwari

Study of Different Theorem of Linear Programming for Mathematical Applications 59-61
Manoj Kumar Verma

Synthesis of Trifluoromethyl, Containing 1-(3,5-dialkyl-4-hydroxybenzyl) -Pyrazole and Pyrazol-5-one Derivatives, as Potential Fungicides 62-66
Amrendra Kumar Singh and Nitin Singh Solunkey

Interpretation of Linear Programming Duality: An Overview 67-69
Sanjeev Kumar Singh

Synthesis of Benzimidolyl Chalcones into N¹-Substituted Pyrazolines and Evaluation of Their Antimicrobial Activities. 70-75
Nitin Singh Solunkey and Amrendra Kumar Singh

OCCURRENCE OF ALGAE IN THE WASTE WATER

UMESH KUMAR TIWARI*

Declaration

The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, *Umesh Kumar Tiwari* the author of the research paper entitled OCCURRENCE OF ALGAE IN THE WASTE WATER declare that, I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal, This research paper is my original work and no part of it or its similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Abstract

A total of 29 algal species under 20 genera were reported from the wastewater. Their percentage occurrence and seasonal variations has been studied with respect to the possible input of nutrients and heavy metals. Application of using algal indicator species in pollution monitoring programmes has been emphasized.

Introduction

The study on the floristic pattern, particularly algae, and ecology of wastewater is of prime concern to understand the impact of various pollution causing elements of which nitrogen, phosphorus and heavy metals are more important. In an earlier study Gupta (1990) has given a more realistic approach to assay the toxicity of natural water and its impact on productivity. Although, viruses of water and wastewater (Gupta and Nayar, 1988) have been reported, little attention has been given to study the algae in wastewater and role of various environmental stresses.

Materials and Method

Wastewater samples alongwith algal populations were collected in different seasons and were analysed, identified and documented as per standard phycologica! methods (APHA, 1975). Seasonal variations in the algal flora were noted in 3 different seasons and an average range of percentage of individual species of algal flora have been computed.

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Result and Discussions

Table 1 shows seasonal variations and ranges of percentage occurrence in the individual algal species. A total of 29 sample species under 20 genera belonging to Cyanophyceae, Chlorophyceae and Bacillariophyceae have been reported. The study reveals the dominance of Cynophycean members followed by Bacillariophyceae and Chlorophyceae members. The number of Cyanophycean species was maximum in summer due to input of nutrients. Nutrients like nitrogen and phosphorus plays an important role in luxuriant growth of many planktonic cyanophyceae like species from Microcystis, Phormidium and Oscillatoria. Similarly in an earlier study in the Hooghly estuary (Gupta 1996), number of different genera in a group follows the following trend:

Cyanophycean < Bacillariophyceae < Chlorophyceae

TABLE 1 % Occurrence of algae and their seasonal variations

Group	Algal taxa	Percentage occurrence	Summer Season	Winter Season	Rainy Season	
Cyanophyceae	Anabaena iyengarii	70-77	+	+	+	
	Anabaena unisporea	10-15	+	-	-	
	Aphanothece microscopica	80-90	+	+	+	
	Chrococcus turgidus	10-15	+	+	+	
	Lyngbya aerugineoerula	14-18	+	+	+	
	Lyngbya allorgei	15-16	+	-	-	
	Merismopedia glauca	70-76	+	+	+	
	Microcystis aeruginosa	90-95	+	+	+	
	Phormidium muciola	85-90	+	+	+	
	Oscillatoria Sp.	40-47	+	+	+	
	Oscillatoria curviceps	70-76	+	+	+	
	Oscillatoria chalybea	85-90	+	-	-	
	Oscillatoria obscura	30-51	+	-	+	
	Oscillatoria subbrevis	80-85	+	-	-	
	Spirulina major	27-29	+	-	+	
	Chlorophyceae	Closterium acerosum	19-25	+	-	-
		Euastrum bombayense	75-80	+	+	+
		Pediastrum simplex	16-19	-	+	+
		Pediastrum tetras	22-24	-	+	+
		Scendesmus acutiformis	32-35	-	-	+

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Bacillariophyceae	Scendesmus dimorphos	35-40	-	+	+
	Spirogyra Sp.	30-35	+	-	-
	Acanthes microcephala	45-50	+	-	-
	Cymbella affinis	75-85	-	-	+
	Cymbella	40-45	-	+	+
	Cymbiformis				
	cymbella tumida	42-49	+	+	+
	Gomphonema Sp.	30-35	-	-	+
	Naviaula Sp.	76-80	+	+	+
	Nitzschia obtusa	82-85	+	+	+

Percentage value of algal ranges from 14 to 95%. Palmer (1969, 1980) depicted the use of algae as reliable indicators of pollution whereas Whitton (1975) has emphasized algae and higher plants as indicators of river pollution. Herein, percentage value of which was above 75 should be considered as indicators of wastewater as they are able to grow profusely, most probably due to high nutrient concentrations. Gupta (1989) has already reported their impact on heavy metal toxicity. Heavy metal inputs to waste water are mainly due to effluent discharge from industries, urban run-off. Their presence may cause in shifts in phytoplankton composition, mainly algal species. More recently, use of indicator cyanobacterial species for removal of toxic heavy metals from the waste water has also been reported (Gupta 2002), but limitations are there. In conclusion, algae in waste waters may serve as an indicator species but both qualitative and quantitative biological data should also be analyzed.

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