

Vol 7 Issue 2 Nov 2017

ISSN No : 2249-894X

*Monthly Multidisciplinary
Research Journal*

*Review Of
Research Journal*

Chief Editors

Ashok Yakkaldevi
A R Burla College, India

Ecaterina Patrascu
Spiru Haret University, Bucharest

Kamani Perera
Regional Centre For Strategic Studies,
Sri Lanka

Review Of Research Journal is a multidisciplinary research journal, published monthly in English, Hindi & Marathi Language. All research papers submitted to the journal will be double - blind peer reviewed referred by members of the editorial Board readers will include investigator in universities, research institutes government and industry with research interest in the general subjects.

Regional Editor

Dr. T. Manichander

Sanjeev Kumar Mishra

Advisory Board

Kamani Perera Regional Centre For Strategic Studies, Sri Lanka	Delia Serbescu Spiru Haret University, Bucharest, Romania	Mabel Miao Center for China and Globalization, China
Ecaterina Patrascu Spiru Haret University, Bucharest	Xiaohua Yang University of San Francisco, San Francisco	Ruth Wolf University Walla, Israel
Fabricio Moraes de Almeida Federal University of Rondonia, Brazil	Karina Xavier Massachusetts Institute of Technology (MIT), USA	Jie Hao University of Sydney, Australia
Anna Maria Constantinovici AL. I. Cuza University, Romania	May Hongmei Gao Kennesaw State University, USA	Pei-Shan Kao Andrea University of Essex, United Kingdom
Romona Mihaila Spiru Haret University, Romania	Marc Fetscherin Rollins College, USA	Loredana Bosca Spiru Haret University, Romania
	Liu Chen Beijing Foreign Studies University, China	Ilie Pinteau Spiru Haret University, Romania
Mahdi Moharrampour Islamic Azad University buinzahra Branch, Qazvin, Iran	Nimita Khanna Director, Isara Institute of Management, New Delhi	Govind P. Shinde Bharati Vidyapeeth School of Distance Education Center, Navi Mumbai
Titus Pop PhD, Partium Christian University, Oradea, Romania	Salve R. N. Department of Sociology, Shivaji University, Kolhapur	Sonal Singh Vikram University, Ujjain
J. K. VIJAYAKUMAR King Abdullah University of Science & Technology, Saudi Arabia.	P. Malyadri Government Degree College, Tandur, A.P.	Jayashree Patil-Dake MBA Department of Badruka College Commerce and Arts Post Graduate Centre (BCCAPGC), Kachiguda, Hyderabad
George - Calin SERITAN Postdoctoral Researcher Faculty of Philosophy and Socio-Political Sciences Al. I. Cuza University, Iasi	S. D. Sindkhedkar PSGVP Mandal's Arts, Science and Commerce College, Shahada [M.S.]	Maj. Dr. S. Bakhtiar Choudhary Director, Hyderabad AP India.
REZA KAFIPOUR Shiraz University of Medical Sciences Shiraz, Iran	Anurag Misra DBS College, Kanpur	AR. SARAVANAKUMAR LAGAPPA UNIVERSITY, KARAIKUDI, TN
Rajendra Shendge Director, B.C.U.D. Solapur University, Solapur	C. D. Balaji Panimalar Engineering College, Chennai	V. MAHALAKSHMI Dean, Panimalar Engineering College
Awadhesh Kumar Shirotriya	Bhavana vivek patole PhD, Elphinstone college mumbai-32	S. KANNAN Ph.D , Annamalai University
	Awadhesh Kumar Shirotriya Secretary, Play India Play (Trust), Meerut (U.P.)	Kanwar Dinesh Singh Dept. English, Government Postgraduate College , solan

More.....



WASTEWATER TREATMENT – A METHODOLOGY



Arun kumar

ABSTRACT: -

As the human population is growing at an alarming rate, technological and industrial sectors have brought enormous troubles and degradation of the environment. The wastewater produced due to industrialization and urbanization is needed to be purified to clear the sewage and to provide water for some household purposes particularly in urban areas.

Wastewater treatment combines biological, chemical and physical processes to purify large volume of sewage. Wastewater treatment mainly takes place in two main stages i.e primary and secondary treatment. But in some cases it needed to undergo tertiary treatment to provide drinking water supply to some arid areas where there is not enough water is available.

KEYWORDS: Human Population, wastewater.

INTRODUCTION :

Due to large scale industrialization and urbanization, enormous production of domestic and industrial sewage has occurred in the last few decades which has posed serious water pollution problem particularly in urban areas. The millions of gallons of untreated or inadequately treated a wastewater from

domestic and industrial sewage is discharged into streams, lakes and seas. Discharge of untreated sewage wastewater into freshwater bodies particularly in urban areas can cause severe health problems. The untreated wastewater contains a variety of infectious pathogens which if ingested or enters the body can result into outbreaks of gastroenteritis, salmonellosis, typhoid, dysentery and infectious hepatitis.

Wastewater treatment is needed to prevent and maintain sources for use as domestic water supplies i.e to provide clean waters for bathing and other recreational purposes. Besides, it also aimed to conserve and protect water for industrial and agricultural uses.

The most appropriate wastewater treatment to be applied before effluent use in agriculture is that which will produce an effluent meeting the recommended microbiological and chemical quality guidelines both at low cost and with minimal operational and maintenance requirements.

METHODOLOGY OF WASTEWATER TREATMENT

The methodology of wastewater treatment includes a combination of physical, chemical and biological processes and operations to remove solids, organic matter and sometimes nutrients from waste. General terms used to describe different degrees of treatment, in order of increasing treatment level, are preliminary, primary, secondary, and tertiary and/or advanced wastewater treatment.

Preliminary treatment:- The objective of preliminary

treatment of wastewater is the removal of coarse solids and other large materials often found in raw materials .It is done to prevent clogging or damaging of pumps or interfere with subsequent treatment processes.Preliminary treatment of wastewater includes screening, comminutors, grit removal and skimming tank.

Screening:-Screening is the removal of large sized floating material by a series of closely placed screen bars placed across the flow inclined at 30 degree to 60 degrees.If it is not removed it can lead to choking of pipes .Screens should preferably be placed before the grit chambers and may be cleaned manually or mechanically. The waste accumulated so by screen bars can be used as fertilizers.

Comminutors:- Comminutors are used in wastewater treatment to shear and grind larger particles into smaller sizes so as to ease the downstream operations and to prevent clogging of pipes.

Skimming tanks:- Skimming tanks are chambers so arranged that the floating matter like oil, fat , grease etc. rise and remain on the surface of wastewater until removed while the liquid flows out continuously under partitions or baffles. Compressed air is pushed from the floor of the tank raising air bubbles coagulate and solidify oily and greasy matter present in the side compartment called as stilling compartment from where it can be removed manually or mechanically.

Grit chambers:- Grit chambers are meant for removal if heavy inorganic materials like sand , ash and others .This technique is based on the process of sedimentation due to gravitational force. Grit chambers kept either before or after the screens.

Primary treatment:- After screening and grit removal, the waste water is run directly into settling or sedimentation tanks. Now the suspended solids are removed by settling under gravitational force. The sewage contains 95 to 99 percent water along with suspended solids. Primary treatment reduces 60% suspended solids, 35% BOD , 30% COD, 20% nitrogen and 10% phosphorus. Sometimes some chemicals are added to aid sedimentation and this process is referred to as chemical aided sedimentation. Chemical aided sedimentation involves three stages viz. Flocculation, coagulation and sedimentation.

Secondary treatment:- Secondary wastewater treatment uses microorganisms to eliminate contaminants from sewage biologically. Based on the type of microbial community, secondary treatment is categorized into aerobic or anaerobic.Depending on the nature of the use of the microorganisms , the biological processes are categorized as suspended growth systems and attached growth systems.

1.Activated sludge process:- In an aeration tank the organic matter contained sewage alongwith microorganisms is aerated. Under aerobic conditions the microorganisms metabolize the soluble and suspended organic matter.Some part of organic matter is used for the synthesis of the bacterial cells while the remaining gets oxidized as CO₂ and H₂O.The newly formed microorganisms form sludge.The activated sludge is separated from settling tank and returned to aeration tank and recycled.

2.Sequencing batch reactor(SBR):- In SBR sedimentation and aeration are carried out sequentially in the same tank unlike activated sludge process.The treatment consists of a cycle of five stages: fill, react , settle, draw and idle.

3.Aerated lagoons:- An aerated lagoon is a basin in which wastewater is treated either on a flow through basis or with solids recycle.Aerated lagoons are meant for promoting the biological oxidation of wastewater. An aerated lagoon falls between algal pond and activated sludge systems.

4. Trickling filters:- Trickling filters also known as sprinkling filters are used for biological treatment of sewage.

They are the oxidation units in the real sense. Trickling filter is an attached growth process i.e. the microorganisms responsible for treatment are attached to an inert packing material. Packing material used include rock, gravel, sand and a variety of plastic and other synthetic materials. The sewage in trickling filter is sprinkled over the top area of a vessel containing non-submerged packing material. The air circulation in the void space, either by natural way or blowers provides oxygen for the microorganisms growing as an attached biofilm. The organic matter present in wastewater is metabolised by bacterial community attached to the medium. As the layer thickens through microbial growth, oxygen cannot penetrate the medium face, and anaerobic organisms develop. Due to further growth of the biological film, the surface microbes lose their ability to cling to the medium and a portion of the slime layer falls off the filter. This process is known as sloughing. The sloughed solids are picked up by the underdrain system and transported to a clarifier for removal from the wastewater.

5. Anaerobic digestors:- Anaerobic digestors are meant for anaerobic digestion of the sludge to stabilize it. The process of anaerobic digestion is carried out in an air tight reactor. The sludge is introduced continuously or intermittently. By heating the contents of the digester are mixed completely. It takes about 15 days for the process to complete.

The biological digestion process of degradation of organic matter of sludge takes place in three stages- hydrolysis, acidogenesis and methanogenesis.

Tertiary treatment:- After the secondary treatment, 85 to 95 % BOD and TSS and small portions of nitrogen and phosphorus are removed. After secondary treatment tertiary treatment of wastewater comes into action. This treatment is also called advanced treatment. The purpose of this treatment is to provide a final treatment to wastewater before it is being received by the environment. This treatment removes the remaining inorganic compounds and substances such as nitrogen and phosphorus. Bacteria, viruses and parasites which are harmful to humans are also removed. It includes sedimentation, ion exchange, activated charcoal adsorption, reverse osmosis, nitrification, denitrification, electro dialysis, coagulations, membrane processes and filtration.

CONCLUSION

In this paper all the treatment methods of wastewater are mentioned which on applying makes the wastewater useable for domestic, industrial and agricultural purposes. Industrialization and urbanization along with rapidly growing population has raised the serious problem of deficient useable water. Moreover the sewage coming out of houses, industries and agricultural effluents are dirtifying freshwater bodies, causing outbreaks of many water borne diseases particularly in developing countries. To fulfil fresh water demand as most of the countries are facing water crisis, efficient waste water treatment is needed. Wastewater treatment industries have a good prospect in the future with the help of new technologies. By using all those new technologies, waste water treatment can be done efficiently with lower overall lifecycle costs, lesser energy and equipment needed. We are sure that there is more new technologies will be invented in order to improve the wastewater treatment.

REFERENCES:-

- Kaur R, Dhir G, Kumar P, Laishram G, Ningthoujam D and Sachdeva P. 2012b. Constructed wetland technology for treating municipal wastewaters, ICAR News (Jan-Mar) 18(1), 7-8.
- www.epa.gov
- www.wikipedia.com
- www.MPCB.co.org
- <http://www.cpcb.nic.in>
- Tchobanoglous, George; Burton, Franklin L.; Stensel, H. David; Metcalf & Eddy, Inc. (2003). Wastewater Engineering: Treatment and Reuse (4th ed.). McGraw-Hill.
- Reviews in Environmental Science and Bio/Technology. Springer. 13 (3): 285–299.
- Davis, Mackenzie L., Masten, Susan J. (2004) Principles of Environmental Engineering and Science New York, McGraw-Hill

Publish Research Article

International Level Multidisciplinary Research Journal For All Subjects

Dear Sir/Mam,

We invite unpublished Research Paper, Summary of Research Project, Theses, Books and Books Review for publication, you will be pleased to know that our journals are

Associated and Indexed, India

- ★ Directory Of Research Journal Indexing
- ★ International Scientific Journal Consortium Scientific
- ★ OPEN J-GATE

Associated and Indexed, USA

- DOAJ
- EBSCO
- Crossref DOI
- Index Copernicus
- Publication Index
- Academic Journal Database
- Contemporary Research Index
- Academic Paper Database
- Digital Journals Database
- Current Index to Scholarly Journals
- Elite Scientific Journal Archive
- Directory Of Academic Resources
- Scholar Journal Index
- Recent Science Index
- Scientific Resources Database

Review Of Research Journal
258/34 Raviwar Peth Solapur-
413005, Maharashtra
Contact-9595359435

E-Mail-ayisrj@yahoo.in/ayisrj2011@gmail.com