AN REVIEW: A NOVEL TECHNIQUE FOR RICE MILLS TO SOLVE WASTE WATER POLLUTION

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Abstract:

Rice factories discharge gigantic volumes of wastewater and other side-effects while handling paddy rice. The wastewater frequently contains poisonous inorganic and natural toxins which cause ecological harm when delivered. Appropriately, savvy procedures for eliminating toxins are required. This article surveys current cycles for checking contamination and furthermore reusing and reusing byproducts.

Keyword: Rice mill industry, Waste Water characteristics, Novel Technique

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Introduction

Since water is most vital for all kinds of life on the earth, the entire global life stands to be paralysed due to its pollution. The total availability of fresh water is more or less static. Therefore the need to ensure fresh water to an expanding population, increasing industry and agriculture is becoming a global problem. Due to pollution of water, several objectionable materials are introduced into the body with water causing irregularities in various physiological functioning. Water is considered to be polluted when there is an undesirable change in the physical, chemical or biological characteristic of water so that its composition or condition is altered and it becomes harmful to human and other lives, unsuitable for industrial, agricultural, recreational and other legitimate use. Water pollution may be accidental but more often it is due to uncontrolled disposal domestic, agricultural and industrial waste containing a variety of pollutants. Ultimately these pollutants undergo microbial decomposition resulting in the production of odoriferous smell, chromatic appearance, unacceptable / taste of water and these altogether make water harmful for living organism. A large degree of water pollution are caused by the alkaline wastes from textile industries, lime wastes from tanneries, starchy wastes from distilleries, acidic wastes from steel plants, obnoxious smelling wastes from sugar mills etc., as these wastes are allowed to pass directly into river water without any prior precaution and treatment.

The social, natural and monetary effects of different ventures have prompted unavoidable struggles between modern advancement and ecological supportability (Manogari et al., 2008, Mukherjee et al., 2015a). Squander effluents negatively affect biodiversity, principally because of their versatile nature. At the point when they are released into normal water bodies without significant remediation, there can be serious, unfavorable effects (Gálvez et al., 2003, Alderson et al., 2015). Rice creation is a quickly developing industry that assumes a prevailing part on the planet economy. Appropriately, rice plant wastewater remediation is a significant issue. Rice is the most well-known staple food ate all through the world. Rice factory numbers are extending to fulfill the rising need for food coming about because of human populace development. Paddy handling plants create tremendous amounts of fluid waste as rice factory emanating. Release of this emanating presents likely dangers to the climate and, thusly, is an issue that requires an answer.

Literature Review

L. Louis Jesudass[6] etal have studied the physico-chemical characteristics of raw and treated effluent of Dharini Sugar factory, Vasudevanagar, Tamilnadu. The study revealed pH , DO, Free CO2 ,total CO2 , TDS,.total alkalinity, chloiinity, nitrate content, phosphorous, carbohydrates and oil and grease

content shaved or marked difference between the raw and treated effluent.

The results of the analysis of Siikrishna jute mill situated at Elum, AP by N.V.V.S. Prasad1-71 etal revealed that the raw water of the jute mill are of poor quality because they contain high TDS, electrical conductance, permanent hardness, chloride, BOD and COD. The final effluent samples are almost same quality as that of raw water except COD values. Irrigation quality results indicate these water to be medium quality.

K.R. Chakravarthi[8] etal have analysed the effluent samples of R.R. Paper mill, Nuzvid for various effluent quality parameters. The results indicate BOD, COD, suspended solid values of the samples were very high and well above the permissible limit proposed by ISI for industrial effluent that could be discharged into land surface water, into public sewers or on land for irrigation . Discharge of pulp and paper mill effluents has increased the concentration of cellulose and lignin in the bottom sediments by 10.8 - 12.6 % and 4.6 - 4-9 % respectively as reported by Nomikas[9] etal. The water quality of a river which receives wastes from a paper mill and a synthetic fiber plant was also studied by Shishkim[10] etal. There were largest seasonal variations in SS. DO varied insignificantly and unlike SS, it did not depend on the flow rate or the temperature of die water.

The characteristics of wastewater generated where different raw materials are used for pulp and papermaking was studied by Raghuveer[11] etal, which found to contain the pollutants. The pollution abatement at Mysore Paper Mills Limited was also studied by Ladd[12] etal. The estimation of physico-chemical parameters of the textile dyeing effluent by Santhana Lakshmitl3] etal showed higher value of temperature, pH, total alkanity, BOD, COD, SS, TDS, nitrate, sulphate, sodium, copper, hexavalent chromium, zinc and iron as compared to ISI tolerance limit. The effluent showed a hazardous, injurious and fatal impact on fish. It was seen that weighty metal overwhelmingly collect in various organs of fish and the request for organs as far as copper focus was digestive tract > muscle > mind > gills > kidney > liver.

The post released varieties in pH , conductance and sulfate in the material plant emanating have been examined by Shomesh Pervez[141 etal. The expansion in sulfate and conductance values in the gushing has been viewed as an immediate capability of corrosiveness created in the emanating. The presence of natural sulfur and reactant metal particles [Cr(III), Mn (II), Hg(II) etc.] bringing about the oxidation of sulfur to sulphuric corrosive has been viewed as the reason for decline in pH and expansion in sulfate in profluent medium has been found to upgrade the sulfate levels in ground water nearby the emanating stockpiling lake.The sulphate levels in the effluent polluted soils are found to be high. Pradhan[15] etal have studied the steel plant effluents and reported the occurrence of microbes. Moitra[lD] etal have also studied the steel foundry effluents and found out the pollutants present in it.

Maini[17] etal have reviewed the problems arising out of water pollution from the coal based thermal power station. They found that the wastewater contains various natural salts, acids and alkalis, which change the pH index of water. An important constituent in regenerated effluent was chloride. The wastewater also carried slime, coarse dispenses particles, organic substances, iron, aluminium compounds, magnessium hydroxide and calcium carbonate, which raise the BOD and COD levels. Increase in rate and extent of chemical reaction, changes in ionic strength, dissociation, conductivity, solubility and corrosion were inevitable in thermal pollution. A case study was made by Rambabu[18] etal on the characterisation of tannery waste water which showed it to be high in suspended and dissolved solids. BOD and COD values were also very high. Chromium metal was found in high concentration in the effluent.

Work on the characterisation and treatment of thread rubber plant effluents by Moitra[19] etal and characterisation of match industry effluents in Sivakasi and correlations among its water quality parameters by Kananp0] etal have also been carried out. Waterways are the main assets on the planet overall and in India specifically. Extraordinary civilisations created along the banks of streams and, surprisingly, today the vast majority of the advancement has occurred in the urban areas situated close to the waterways. The streams give water to enterprises, agribusiness, hydroponics, business and homegrown purposes. Sadly, unpredictable removal of sewerage and modern waste and a

plenty of human exercises are contaminating similar waterways. Contamination of stream first impacts its physico-compound quality, then, at that point, methodicallly obliterates the local area upsetting the sensitive food web.R.C. Dast21] etal have studied the physicochemical parameters of Mahanadi water system at different stations to assess the pollution load. Industrial pollution due to paper mill was reported at Brajrajnagar and Choudwar. Pollution due to municipal effluents was reported at Sambalpur and Cuttack. The effect of the discharge of effluents from the Rourkela Steel Plant on the quality of river Bramhani at Rourkela was investigated by S. N. Nanda[22] etal. The samples were collected from the upstream and downstream of the discharge point and were analysed. The results have indicated that the quality ofwater detonates significantly after the discharge of industrial effluents into the river. Occurance of benthos at different locations was also studied by Ashok Kumar Chatterjee[23).]. The review ndicates at Rourkela and Talcher, the release of effluents to stream Braihhani has severly impacted the benthic networks. BMWP score and benthic variety list plainly show the level of detoriation of water quality at these places. After a specific stretch ofthe contaminated zones the stream recaptures its unique quality by regular refinement. Pollution ofriverBhadar caused by dyeing and printing industries in the belt of Saurastra region was studied by S.G. Ruparelia[24] etal. The BOD and COD values were recorded high in winter than monsoon.

S.R. Krishnamurthy[25] etal have evaluated the water pollution in the river Kali near Dandeli of Kamatak and found that on the outskirts of DandeliFerroAlloys Limited , the plastic factory Indian Plywood manufacturing company Limited and West Coast Paper Mill. Among the above industries, the West Coast Paper Mill effluents play an important role in alternating the river water quality around Dandeli area.

The Central Pollution Board has also done an exhaustive study of the Ganga river basin. The study indicated it to be highly polluted, salinity being very high in the lean season due to low flow. The major contribution was from the discharge of untreated or partially treated sewage, dumping of municipal solid wastes and cattle wastes. The industries also add variety of metallic and non-metallic harmful substances. The pollution was with respect to sediments, organic loads and inorganic chemicals affecting the water quality adversely in several respects[30]. A study was undertaken by AvasnMurthi[31] etal to assess the levels of pollution in Sarada river at Anakapalli, Andhra Pradesh. The brownish black colour of water near Tummapala drain was due to the discharge of sugar mill effluents into the river and the high BOD value indicated that the river was under heavy pollution load.

Krinlov and Kaplan [40] reported that solar radiation plays an important role in the self-purification of the natural water from the pollutants introduced with the effluent of pulp and paper mills. The exposure to ultraviolet light degraded the lignin in four days by the absorption of oxygen. The degradation products include methyl alcohol, volatile monocarboxylic acid and volatile as well as non-volatile phenols. Contamination of ground water by toxic substances, pathogens, cationic and anionic contaminants and pesticides poses a serious problem in many parts of India. Over the years the quality of these water sources has detonated, which could be due to deforestation, urbanisation, cultivation, industrialisation and other human activities. The ground water contamination by the industrial effluent exposed to porous medium has been reported. Nemade[41] etal have investigated the metals in distillery effluents and their impact on surrounding ground water. The investigation revealed that the distillery effluents are highly contaminated with metallic pollutants. A major portion of pollutants get precipitated and settled at the bottom of the pond. Soluble metallic species percolate through soil strata and contaminate ground water of the area. Plants grown on such type of environment assimilate the metallic species in different parts.

Methodology

Parboiling process

Conventional strategies for parboiling differ starting with one topographical district then onto the next, and furthermore rely upon the functional innovation utilized (Araullo et al., 1976). Rice in parboiled structure is created, consumed and sent out from various Asian nations. Nigeria, Ghana, Egypt, Niger and Benin,

in Africa, are additionally significant makers of rice. They generally use parboiling as a method for keeping away from hunger, food deficiencies and food misfortunes (Tomlins et al., 2005).

Different treatment processes for rice plant gushing

Rice plant wastewater is described by high centralizations of Body, COD and variety, which unfavorably influence regular waterbodies. Table 2 sums up the exhibition of various rice plant wastewater treatment frameworks that have been accounted for in ongoing examinations. In the current review, a few physicochemical treatment advances relating to rice plant wastewater relief are surveyed.

Valorisation of wastewater

Wastewater treatment frameworks have encountered a change in perspective. Though they once simply expected to eliminate poisons, they presently additionally endeavor to recuperate assets while limiting energy utilization. These recuperation advances are known as water asset recuperation offices (WRRFs) (Gude, 2016).

Conclusion

Fruitful and savvy treatment of wastewater and the protected release of slop are fundamental assuming that rice factories are to meet the inexorably rigid guidelines of regulation, wellbeing and climate maintainability. Traditional compound treatment strategies have a few downsides relating to the age of non-dischargeable ooze, which generally speaking causes ecological issues like eutrophication and bio amplification.