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# A Review of Impact of Fertilizer Industry Effluent on Ground Water

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**Abstract-** *This paper reviews Impact of Fertilizer Industry Effluent on Ground water. Paper summarizes the study done by the various researchers. Chemical Fertilizers are used in large manner in modern agriculture for improving crop yield. Waste waters from chemical Fertilizer industry mainly contain ammonia, nitrates, phosphorous, organics, alcohols, heavy metals such as suspended solids and cadmium. These harmful impurities leaching from soil into ground water and surface water cause a major environmental and public health concern. Due to increase in population, uses of chemical fertilizers, pesticides, and anthropogenic factors, water from various sources becoming polluted in large manner day by day. During last decades, it has been observed that the ground water gets polluted drastically because of increased uses of chemical fertilizer. In order to overcome ground water pollution problems, proper management of chemical fertilizer has to be implemented.*

***Key words***: Chemical Fertilizer, Ground water, ammonia, pesticides

## I. INTRODUCTION

Groundwater is the important source of water for Agricultural, Industrial and Domestic purposes in many countries. India has 2.2% of global land, 16% of world population. It is estimated that one third of the world's population uses groundwater for drinking and other purposes. Therefore in developing countries it is necessary to give an attention on water quality issues and its management. In India intensive agricultural activities have increased the demand of groundwater resources. Now a day's water pollution is a serious problem, in India 70% of surface water resources have been contaminated by organic, inorganic and biological pollutants. Life cannot exist without water because it is important component for all living things.[1]

The quality of ground water mainly depends on various chemical constituents and their concentration, which are mostly derived from the geological data of the particular region. Municipal solid waste and industrial waste are the main cause of pollution of ground water and surface water. In many parts of the country available water is non-potable because of the presence of impurities and heavy metal in excess. Contamination of water resources which are available for drinking purposes and household with metal ions, heavy elements and harmful microorganisms is one of the serious major health problems. The recent research in Haryana (India) concluded that it is the high rate of exploration then its recharging, inappropriate dumping of solid and liquid wastes, lack of strict enforcement of law and loose governance are the cause of deterioration of ground water quality.

The availability of good quality water is an essential feature for preventing diseases and improving quality of life. Natural water contains different types of impurities are introduced in to aquatic system by different ways such as leaching of soils and weathering of rocks.

In last few years, uses of chemical fertilizer and pesticides increases rapidly for improving crop yield, because of that production of pesticides and chemical fertilizer also increases. But in so many fertilizer plants there is no proper arrangement of treatment of fertilizer plant effluent. Due to pesticides, insecticides, heavy metals and fertilizer residues with water groundwater has been polluted by leaching process. Consumption of polluted water may cause water borne diseases like dysentery, typhoid, diarrhea, liver and intestinal infection, hepatitis, skin rash etc. consumption of chemically contaminated water may not cause immediate problem but their long time intake may be very harmful for human health.[2]

## II. LITERATUTRE REVIEW

Many Researches has been done on the Impact of Industries effluent on ground water. Here we summarized some of them after studying the works done by them. The literature Review of the work done by the various researchers are presented below.

Gurusimran Singh, Dapinder Deep singh, prof. S.K. Sharma (2013) [3] studied untreated waste water from the industries and human settlements are found to be the major cause for deterioration in the water quality in Ludhiana. The surface water analysis of Budha Nullah reveals high values of Total Dissolved solids up to 1642 mg/L, Chloride up to 400 mg/L, Chemical Oxygen Demand values up to 448 mg/L, Biochemical Oxygen Demand varying between 52-195 mg/L, Most Potable Number varying from 240+ up to 2400= per 100 ml, heavy metal like Cr in the Budha Nullah has value 0.084 mg/L, Fe 0.913

mg/L, Mn 0.095 mg/L and Ni 0.222 mg/L. Amount of calcium in soil ranges from 298.2 to 508.4 mg/kg, sulphur from 8.43 to 89.14 mg/kg, nickel ranges from 0.076 to as high as 8.746 mg/kg.

Jitendra Giri, Anjana Srivastava, SP Pachauri and PC Srivastava (2014) [4] observed that The values of total solids (TS), total dissolved solids (TDS) and total suspended solids (TSS) in effluents were much higher in comparison to the tube well water and generally decreased with the increasing distance from the outlet. Considering 200 mg total suspended solids L-1 and 1000 mg total dissolved solids L-1 as the threshold values for irrigation, except for the location L-4 (480 mg) which was 11 km away from the site of origin. The COD values also decreased downstream due to settling of some lignin residues in the natural drain.

K. Brindha, K.V. Neena Vaman, K. Srinivasan, M. Sathis Babu, L. Elango (2014) [5] studied as per the BIS standards of 45 mg/l which is the maximum permissible limit, 18% of the groundwater samples did not comply with the standard, thus making it unfit for drinking purposes and domestic use. Field analysis of 97 soil samples showed that most of the soil is basic in nature. Nitrate nitrogen was low, i.e., about 10 kg/ha in most parts of the area. The sources of nitrate in ground water of this area were the fertilizers and animal wastes. If animal waste was used in the agricultural fields as manure and the application of fertilizers was reduced, more pollution to ground water could be curtailed. This study gave an understanding on the present status of nitrate in groundwater and soil of this area.

Y.N. Jolly, A. Islam and A.I. Mustafa (2012) [6] observed the irrigation with 5% treated effluent was the best for this purpose and could fulfill the fertilizer requirements of crops. But a negative effect was observed from the irrigation with 10% to 50% treated effluent. Soil pH is raised in the treated effluent irrigated soil than the untreated effluent one with the increasing percent of effluent. The soil pH shows an alkaline tendency in both the cases. Hence the treated dyeing industry effluent may be suitable for fields with acidic soils. Thus the use of the effluent after treatment not only solves the disposal problem but also serves as an additional source of fertilizer in liquid form.

Patil P.N., Sawant D.V., Deshmukh R.N. (2012) [7] observed the higher pH values observed suggests that carbon dioxide, carbonate- bicarbonate equilibrium is affected more due to change in physic-chemical condition, pH and hardness affect the toxicity of many substances in the water. In the progress of summer, dissolved oxygen decreased due to increase in temperature and also due to increased microbial activity. It also studied high DO in summer is due to increase in temperature and duration of bright sunlight has influence on the % of soluble gases.

Delia Teresa Sponza (2003) [8] resulted clearly that bioassay tests provide additional information on the toxicity potential of industrial discharges and effluents. Enrichment toxicity tests are novel applications and give an idea of whether there is potential toxicity or growth-limiting and stimulating conditions. Different organisms were used such as bacteria, algae, protozoa, and fish to represent four trophic levels. Furthermore, chemical oxygen demand (COD) fractionation results were compared with these tests to assess the effect of COD subcategories on the determination of possible toxicity. The toxicity test results were assessed with chemical analyses such as COD, biochemical oxygen demand (BOD), color, absorbable organic halogen (AOXs), and phenol. It was observed that the toxicity of the effluents could not be explained by using physicochemical analyses in four cases for the Fertilizer industry.

Mahajan Saroj (2014) [9] concluded that pH value revealed that the maximum pH was recorded in summer season and minimum pH values were recorded in winter season. Total alkalinity value of the study year unfold that the maximum total alkalinity values recorded in summer and minimum values recorded in rainy. The chloride content of soil revealed that maximum chloride values recorded in summer season and minimum chloride values recorded in rainy season. The maximum concentration of chloride because of high temperature, evaporation, recedes water and minimum concentration due to dilution of pond water. The chloride level indicates pollution level. The observation recorded during study year 2008-09, the minimum value 0.90 mg/lit. in the month of july. The nitrate content of soil blazoned that maximum nitrate values recorded in summer season and minimum nitrate values recorded in rainy season.

A.K. Satone, J.R. Bajoria, P.V. Tekade and N.P. Mahubansi (2011) [10] observed that Ph value of drinking water is an important index of acidity, alkalinity and resulting value of the acidic basic interaction of a number of its minerals and organic components. pH below 6.5 causes corrosion in pipes, resulting in release of toxic metals. pH of water in the studied region was found to be 7.2, which lies in the range prescribed by APHA. TDS values should be less than 500 mg/lit. for drinking water. In the present study, TDS was calculated to be 800 mg/lit. the findings indicate that the sample of MIDC just crosses the permissible limit suggested by WHO and Indian standards. The hardness values was not within permissible limit. However, temporary hardness was found to be 25.64 mg/lit. which can be removed by boiling. Permanent hardness was found to be 974.32 mg/lit.

Kiran D. Ladwani, Krishna D. Ladwani, Vivek S. Manik and Dilip S. Ramteke (2012) [11] highlighted Impact of Industrial Effluent Discharge on Physico-Chemical Characteristcs of Agricultural soil. When the physico-

chemical parameters are taken into consideration, the physical parameters shows that the Ph, TSS are more, while the turbidity is far more as compare to the normal values. The decreases in chloride content means some quenchers are there in effluent. The high COD value from the effluent of the steel industry suggests that this industry is producing lots of organic substances. The level of sulfide was very high than the normal values. The heavy metals present in the effluent may come from the various metallurgical processes. The data suggest at near about concentrations of all the metals goes on decreasing which indicate that the effluent may contains metal quenchers.

## III. CONCLUSION

From the above reviews conclusion can be drawn that, The improper Disposal of effluent from industries affect the quality of Ground water like pH, TDS, Hardness found above permissible limit. To overcome this problem it is necessary that careless disposal of the effluent wastes should be discourage and there is need for industry to install a waste treatment plant to treat effluent waste before being discharge on ground or into stream.

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