

PHYSICO-CHEMICAL ANALYSIS OF FERTILIZER INDUSTRIAL EFFLUENT

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Abstract

The fertilizer industry today has attained the status of a major industry in the country and is attracting considerable public attention and interest. In the present study effluent sample have been collected from outside the factory boundary of a fertilizer plant and various physico-chemical parameters are analysed to assess the pollution load of the effluents.

Key words : Fertilizers, Fertilizer Industry, effluent, pollution.

Introduction

The rapid growth of population, standard of living, resource utilization and industrialization is leading to the serious problem of environmental degradation which is great threat to all types of animal life, Vegetation and other living organisms. Industries are discharging various pollutants into the atmosphere everyday and, thus, are the major sources of these pollution problems.

India has a good industrial infrastructure in core industries like chemicals, metals, fertilizers, petroleum, food products etc. Each industry has its own water requirements. The importance of fertilizers in developing countries where half of the population is yet to be properly fed, cannot be underestimated. In spite of fertilizer production and its import, the per hectare consumption of fertilizer in India is still on the lower side i.e. 15.3 kg/hect., in comparison with 355.3 kg/hect. In South Korea, 163.9 kg/hect. in France and 265 kg/hect. in West Germany (Pandey 1999). These data amply justify the increased production of fertilizers in India. However, this increases the pollution load on natural streams.

India occupies a central position in fertilizer manufacture and like any other chemical industry, fertilizer industry too produces some gaseous/liquid effluent untreated. These effluents cause harmful diseases and disastrous effects to living organisms when disposed off directly to water bodies (Sharma & Kaur 1997).

Considering these problems study has been made to monitor the quality of such effluents and results are presented in paper.

Materials and Methods

Indian farmer's Fertilizer's Co-operative Ltd. (IFFCO) Selected for the study is one of the fastest growing industry of India. At present its four plants are operating in the country. IFFCO was established on 3rd November 1967, the plant is situated at a distance of 28 km South west of Bareilly on Bareilly Aonla road in Uttar Pradesh.

The total capacity of Aonla unit in including both phases is 8,91,000 MTPA for ammonia and 14,52,000 MTPA for Urea (EMIAU-2000).

Samples were collected from outside the factory boundary for the analysis of physico-chemical parameters. These parameters were analysed by using standard methods as per (APHA-1998) and (Trivedi and Goel 1986).

Table 1: Observation of Physico-Chemical parameters of a fertilizer plant

PARAMETERS	SITE I	SITE II	SITE III	AVERAGE
pH	6.80	7.20	7.60	7.20
Velocity (m/s)	0.19	0.21	0.26	0.22
Total dissolved solids (mg/l)	2150.00	2015.00	1980.00	2060.33
Total suspended solids (mg/l)	75.43	72.19	69.80	72.47
BOD (mg/l)	18.80	16.42	12.60	15.67
COD (mg/l)	83.22	79.63	75.00	79.47
Dissolved oxygen (mg/l)	4.90	6.30	6.95	6.05
Nitrate (mg/l)	3.13	2.52	1.67	2.44
Total Kjeldahl nitrogen (mg/l)	37.22	31.69	23.69	30.86
Free Ammonia (mg/l)	2.12	1.63	0.99	1.58

Results and Discussion

The values of various physio-chemical parameters for effluent of fertilizer plant is shown in Table-1. The average value of BOD in effluent was found to be 15.67 mg/l, the value is found within the limits prescribed in (Minas, 1985). The observed value of free ammonia was found minimum at site III i.e. 0.99mg/l. as per the findings of (Melin *et.al.*, 1975), the concentration of ammonia in treated effluent vary from 5-100 mg/l, the average value of nitrates in different fertilizer industry ranges between 10-135 mg/l, the average value of total dissolved solids (T.D.S.) was found to be 2060.33 mg/l, the observed average values for Total Suspended Solids (T.S.S.), Dissolved oxygen (DO) and COD was found to be 72.47 mg/l, 6.05 mg/l and 79.47 mg/l respectively. The average value of pH was recorded as 7.20 (Hutton and Larocca 1975) observed that

values of pH is important because reduction of nitrate is optimum between 6.5-8.5 pH. The average value of Kjeldahl nitrogen was observed as 30.86 mg/l, (Saxena & Mehra 1989) found Kjeldahl nitrogen in the effluent of GNFC (Gujarat) as 150 mg/l.

The results of the present study, when compared with the standards as prescribed in (Minas, 1985) are found within the range.

Conclusion

The present study shows that all the parameters are within the prescribed limit of (Minas 1985), so it may be concluded that industry has installed adequate effluent treatment plant. The absence of chromium shows the better utilization of chromate sludge. It is therefore concluded that the final discharge of effluent of this industry after treatment into the river Aril has no/less effect on the quality of river water.

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