# Industrial Effluent Quality of Bikaner District Rajasthan, India

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## ABSTRACT

Industrial development is an obvious process in the current world. But it is resulting in different kind of pollution to the water resources. Monitoring of industrial effluents quality and its serious analysis is very significant relative to access the human health hazards. This paper is an attempt for the same purpose. The samples were collected from main industrial areas of the Bikaner City and were analysed for the desired physiochemical parameters applying the internationally valid standard methods. Results were compared with the international standards. It was found that effluent quality is very poor leading to very dangerous health hazards as the most of the samples were not found to be fit on international and national standards. This study suggests a need to revise a more advance development and public health awareness policy as well as in depth research.

**Key words:** TDS, EC., chlorides, fluorides, nitrates, total hardness. BOD, TS, TSS, Physiochemical parameters, Effluent water quality.

## INTRODUCTION

Development process and its regular monitoring both are the parallel issues. Bikaner district is situated at NW Rajasthan in India and there are four major heavy industrial area containing thousands of industrial unit in this developing city. Day by day these industrial units are increasing in number therefore a keen monitoring and research is required so their impact on human health and environment could be justified with the blind industrial development. Industrial waste water, effluents are the major problem for the developing industries as well as for human settlements. A serious monitoring of

industrial effluent quality is very significant as this may lead to very dangerous human health and environmental hazards. However there are well defined environmental laws and guidelines provided by national agencies but it is very rare to see that these laws and regulation are being followed and these industrial units are generating the various early and delayed human health as well as environmental hazards.

## EXPERIMENTAL

Four major industrial area were selected for the effluent study purpose designated as (1)

Ranibazar, industrial area, (2) Beechwal industrial area, (3) Khara RIICO groth center, (4) Karni RIICO Industrial area. To analyse the effluent quality 12 samples from each of the above selected industrial area were collected during the time period of August 2012 to August 2013 and tested against 11 parameters in the high quality laboratory. These results were compared with the standard parameter permissible limits provided by Central pollution control board of India and further the conclusions were made. All the samples were collected and analysed using world wide acceptable methodology provided by international and national agencies like world health organization and central pollution control board of India(CPCB). All the reagents used of AR grade and the sampler as well as the glassware were used of standard quality.

## RESULTS AND DISCUSSION

pH was found to be within the permissible limits whereas the color of effluent was observed of different kind.TSS was found  highest in Khara industrial area , BOD and COD was found to be of highest value for Khara industrial Area again (3430mg/l). Oil and  grease content were found to be within the permissible limits for all areas except of  karni industrial  area(18.0), this  high value may be attributed to  the large  number of  wool scouring units in this industrial area. Total Chromium was found  highest  in Beechwal  industrial  area and

**Table 1: Final waste water effluent outlet on land riico, rani bazar, industrial area, bikaner-2012-2013**

| S.No. | Parameters | Result |
|---|---|---|
| 1. | Colour vis | Dark brown |
| 2. | P$^{H}$ | 5.950 |
| 3. | Total suspended solids | 288 |
| 4. | COD  [mg/l] | 1723 |
| 5. | BOD[3days at27$^0$C,mg/l] | 285 |
| 6. | Oil and grease [mg/l] | 9.0 |
| 7. | Total chromium asCr mg/l | 2.317 |
| 8. | Sulphides as S mg/l | 21.30 |
| 9. | Chloride as  Cl [mg/l] | 740 |
| 10. | Sulphate as So$_4$ mg/l | 765 |
| 11. | Total dissolved solids [TDS]mg/l | 3520 |

**Table 2: Final waste water effluent outlet on land riico, beechwaal bazar, industrial area, bikaner-2012-13**

| S.No. | Parameters | Result |
|---|---|---|
| 1. | Colour vis | brown |
| 2. | P$^{H}$ | 6.71 |
| 3. | Total suspended solids[mg/l] | 344 |
| 4. | COD  [mg/l] | 1855 |
| 5. | BOD[3days at27$^0$C,mg/l] | 313 |
| 6. | Oil and grease [mg/l] | 14.0 |
| 7. | Total chromium asCr mg/l | 5.981 |
| 8. | Sulphides as S mg/l | 20.4 |
| 9. | Chloride as  Cl [mg/l] | 850 |
| 10. | Sulphate as So$_4$ mg/l | 1114 |
| 11. | Total dissolved solids[TDS]mg/l | 4250 |

**Table 3: Final waste water effluent outlet on land industrial growth center khara, bikaner-2012-13**

| S.No. | Parameters | Result |
|---|---|---|
| 1. | Colour vis | Dark g ray |
| 2. | P$^{H}$ | 7.33 |
| 3. | Total suspended solids[mg/l] | 572 |
| 4. | COD  [mg/l] | 3430 |
| 5. | BOD[3days at27$^0$C,mg/l] | 488 |
| 6. | Oil and grease [mg/l] | 9.0 |
| 7. | Total chromium asCr mg/l | 2.658 |
| 8. | Sulphides as S mg/l | 20.9 |
| 9. | Chloride as  Cl [mg/l] | 320 |
| 10. | Sulphate as So$_4$ mg/l | 203 |
| 11. | Total dissolved solids[TDS]mg/l | 2430 |

**Table 4: Final waste water effluent outlet on land  karni  industrial  area, bikaner-2012-13**

| S. No. | Parameters | Result |
|---|---|---|
| 1. | Colour vis | Dark gray |
| 2. | P$^{H}$ | 07.54 |
| 3. | Total suspended solids | 280 |
| 4. | COD  [mg/l] | 360 |
| 5. | BOD[3days at27$^0$C,mg/l] | 297 |
| 6. | Oil and grease [mg/l] | 18.0 |
| 7. | Total chromium asCr mg/l | 2.156 |
| 8. | Sulphides as S mg/l | 4.4 |
| 9. | Chloride as  Cl [mg/l] | 290 |
| 10. | Sulphate as So4 mg/l | 190 |
| 11. | Total dissolved solids[TDS]mg/l | 3330 |

can be attributed to the bulk use of dyes containing in woolen industries. TDS was found minimum for khara growth center (2430 mg/l) , and maximum for Beechwal industrial area (4250 mg/l). This may be due to effluent contribution of large number of food processing unit in this area. All the parameters were found to be significant (P=>0.5) for all the parameters except of oil contents and pH .

**Table 5: Refrence standard parameter for discharge of effluent on free land surface the environment (protection) rules, 1986, Govt. of india**

| S.No. | Parameters | Result |
|-------|-----------|--------|
| 1. | Colour vis | Colour less |
| 2. | pH | 5.5-9.0 |
| 3. | Total suspended solids(mg/l) | 100 |
| 4. | COD  [mg/l] | 250 |
| 5. | BOD[3days at27$^0$C,mg/l] | 285 |
| 6. | Oil and grease [mg/l] | 10.0 |
| 7. | Total chromium asCr [mg/l] | 2.0 |
| 8. | Sulphides as S [mg/l] | 2.0 |
| 9. | Chloride as  Cl [mg/l] | 1.0 |
| 10. | Sulphate as So$_4$ [mg/l] | 2.0 |
| 11. | Total dissolved solids[TDS]mg/l | 100 |

**CONCLUSION**

Results shows that the waste water effluent discharged on surface land contains high degree of pollutant load above than permissible limits .Most of the industrial units are discharging their effluents without following any standard and prescribed treatment. Study concludes that heavy pollutant load discharge on surface land leading to deterioration in soil and water resources quality as well as generation of early and delayed health hazards for sub population.

**Recommendations**
1**.** There should be a high leveled campaign with public participation to make people aware about these industrial health hazards they are getting frequently.
2. Monitoring policy must be revised and should be result oriented.
3. There should be an improved active role of public representation like NGO's and Freelance researchers for such monitoring empowered with making of penalty charges, policy and other actions.
4. A deep regular thorough high level of research promotion is required with this regard.

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