

Impact of tannery effluent on the self purification capacity and biodiversity level of rivers

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Introduction

Most of the world's water resources are gradually becoming polluted due to the addition of foreign materials from their surroundings (Lokeshwari and Nanjunda 2006). Industrial units located in and around the outskirts of cities, intensive agricultural practices along the riversides and indiscriminate disposal of wastewaters are the major sources of river pollution. In developing nations, more than 95 percent of urban sewage is discharged untreated into rivers and bays, creating a major human health hazard and a problem for the environment. This situation is a clear indication of the challenges of developing nations to reach the targets set by the Millennium Development Goals by the year 2015 especially in the goal ensuring environmental sustainability (Allan and Poff 1995).

Aim

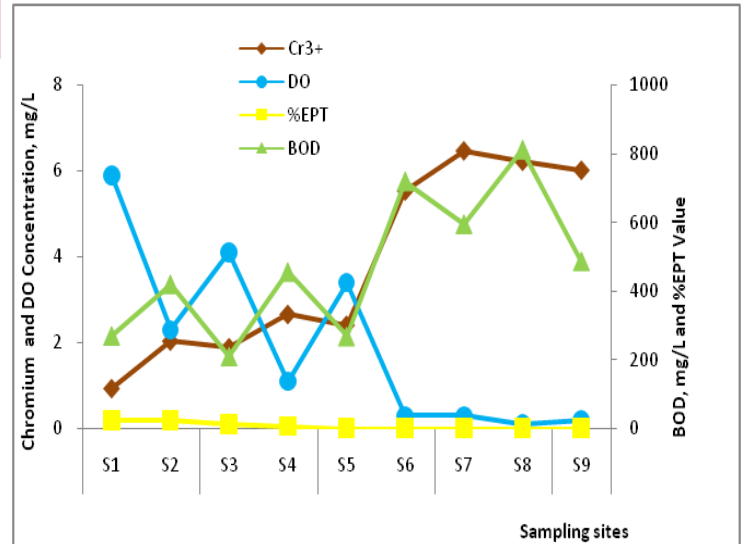
This research investigates the impact of tannery effluent on the self purification capacity of natural streams and on the safeguarding of biodiversity.

Method

Water samples were collected from upstream (US) and downstream (DS) of the discharge point of four tanneries along the course of the Tinishu Akaki river (Ethiopia) for physicochemical parameters and macroinvertebrate analysis. DO (Dissolved Oxygen) BOD₅, COD, NH₄-N, Cr, Suspended solids (SS) and sulfides were analyzed in the laboratory following the standard methods for water and wastewater analysis (Eaton et al. 2005) while the macroinvertebrate samples were collected by the kick-sampling technique following the procedure (Davies 2001).

Result and Discussion

As the concentration of chromium and sulfide increases from US to DS of the river, the removal of SS (Suspended Solids), and reduction of BOD₅ (Biological Oxygen Demand) and COD (Chemical Oxygen Demand) by the self purification process decreases from 71%, 59% and 50%, respectively, to 10%, 30% and 28%, respectively, while also the nitrification capacity becomes severely hampered.



The macroinvertebrate %EPT (ratio of total number of individuals classified as Ephemeroptera, Plecoptera, and Trichoptera to the total number of individuals), which is a measure for the presence of pollution sensitive macroinvertebrates decreased from 24% to zero, starting downstream from the third tannery, indicating severe pollution. The diversity index and correlation values between the concentration of physicochemical parameters, BOD₅ reduction, the macroinvertebrate count and the chromium concentration further support these

Conclusion

The conclusion from this study is that, although the physicochemical parameters might indicate that, given enough distance between the tanneries, self recovery of the river can be recovered for a while, the biodiversity and general health of the river is severely compromised such that aquatic life cannot be sustained.

References

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