



WATER QUALITY ASSESSMENT OF RIVER-RESERVOIR NEAR THERMAL POWER PLANT, UMARIA, MADHYA PRADESH, INDIA

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ABSTRACT: The present study was aimed to study the possible changes in the physico-chemical properties of water in Johila river near Sanjay Gandhi Thermal Power Plant, Birsinghpur-Pali at Umaria District in Madhya Pradesh. Parameters such as air temperature (AT), water temperature (WT), pH, electrical conductivity (EC), turbidity, dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), sulphate, nitrate, total hardness, total dissolved solids and boron were recorded and analyzed seasonally for a period of one year starting from October 2013 to September 2014. The sampling points in the river were chosen at three points (a) upstream of the plant (b) downstream of the plant and a reservoir close to the plant. The result revealed that some parameters of water were permissible for drinking purpose but some parameters beyond acceptable limits in downstream and reservoir. Need for continuously monitoring of reservoir and downstream water quality is required by the user agency for the use of local inhabitants and their bovines of the locality.

Keywords: *Physico-chemical parameters, seasonal variation, upstream, downstream, reservoir, thermal power plant*

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Water is a basic requirement for survival of all living organism on the earth. Only small amount

of fresh water occurs in rivers, streams, lakes, and several manmade water reservoirs are available for the terrestrial life (Prescott, 1969). The reservoir serves as a rich source of water supply for thermal power plant, also used for drinking other day to day activities by nearest village's and their bovines. Water pollution is a major problem in India and almost all developing countries. River, lake, pond and other water body of India has facing the major problem of water pollution (Mahajan, 1988). The healthy aquatic ecosystem is depended on the physico-chemical and biological characteristics (Venkatesharaju, 2010). Good quality of water resources depends on a large number of physico-chemical parameters and biological characteristics (Medudhula et al., 2012; Garg et al., 2010, Sharma et al., 2011, Pawale et al., 2012, Tilekar et al., 2013, Pandey et al., 2013).

The present study was conducted from October 2013 to September 2014 through monthly sampling at three different environmental conditions (upstream, reservoir and downstream study sites) of Sanjay Gandhi Thermal Power Plant, Birsinghpur, Umaria district (Figure 1). The Power Plant is one of the coal

based power plants of MP. Power Generation Company Limited with an installed capacity of 1340 MW, and located between latitude 23° 15' to 23° 30' N and longitude 81° 0' to 81° 30' E. The power plant is situated on the bank of Johilla River. Johilla reservoir is made on Johilla River with a catchments area and submergence area of 1634.39 sq. km and 1810 hectares respectively. Johilla Dam is a concrete cum earthen dam with the capacity of 171 million cu m. The water of this reservoir is mainly used by the thermal power stations to cool down the steam, used in a steam turbine.

MATERIALS AND METHODS

Water samples for physico-chemical analysis were collected from three different study sites viz., upstream (10 km up from reservoir), reservoir and downstream (10 km down from reservoir) second week of every month in the morning, from October 2013 to September 2014. The physico-chemical properties of water such as water temperature (WT), pH, electrical conductivity (EC), turbidity, dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), sulphate, nitrate, total hardness, total dissolved solids and boron were determined in winter, summer and monsoon seasons by adopting to standard methods (Trivedi et al., 1987).