



# Testing of Quality of Waste Water Disposed from the Hospital and Health Centre

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## Abstract-

Bio-medical waste means any solid or liquid waste including its container and any intermediate product, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps. There is no doubt that liquid medical waste management is a major problem for healthcare facilities and their employees. However, technology and treatment solutions are available. This paper deals with the experimental testing of waste bio-medical liquid waste from the inlet and coming out from the outlet of the hospital. The Effluent treatment plant are mandatory in the hospital and community health Centre as per government guidelines. As this liquid waste can cause health risk, infection to lungs and other harmful skin diseases. The test performed is for evaluating the pH value, suspended solids, BOD, COD, oil & grease. The work concludes that there is need for general routine testing of the waste water in order to maintain the acceptable criteria of the parameter and chlorination technique is suggested for the further work.

**Keywords:** *Bio-medical Liquid, BOD, COD, pH, Suspended Solid*

## 1. INTRODUCTION

Healthcare has grown to be one of India's most important industry sectors, both in terms of revenue and employment. Hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance, and medical equipment are all part of healthcare. The Indian healthcare market is increasing rapidly as a result of improved coverage, system part, and increased spending by both public and private players. Akbar Mokhtari Azar et. al (2010), removal efficiency in biological treatment by the biological oxidation method is greater than 90% for the main parameters of hospital wastewater. The biological oxidation method for hospital wastewater is advantageous and can be used for all hospital wastewater treatment that includes similar pollution. The removal of all important parameters in hospital wastewater, such as BOD, COD, detergent, and microbial parameters, was accomplished with high efficiency using this method. According to Babitha M. (2018), the absence of bacteria is identified as the COD in the effluent is higher than in the influent. MLVSS values of 0 also indicate the same thing. Even in this state, the

plant does not stink because it is in an aerobic state. Because no microorganisms survive in the plant, the oxygen supply in the aeration tank is simply wasted. As a result, the blowers or diffusers consume more power, resulting in an 80 percent loss of electric power. Some recommendations are made to address all of these issues.

## 2. Site Selection of the Study

In Chhattisgarh, there are various sectors in which ETP has been installed. Some of them are District hospital, civil hospital, Community Health centre and Mother & Child hospital. Based on the data collected from the ground survey, the total no. of ETP plant installed or in progress of completion are as follows-

*Table 1: Availability of ETP at different Hospitals and Health Centres (Source: CGMSC)*

ETP Located at	Total ETP	Completely Installed	Work On Progress
District hospital	25	18	7
Civil Hospital & Community Health centre	175	66	109
Mother & Child hospital	21	10	11

The source of data collection for the table above is from the Chhattisgarh Medical Services Corporation Ltd. The study is to deal with the Hospitals with Effluent Treatment Plants in which evaluation of water quality is been done for the re-use of disposal waste water. The site selected for the water quality test are nearby area as given in Table below.

*Table 1: Site Considered for the Work*

Hospitals	Latitude	Longitude
CHC Hospital, Birgoan, Raipur	21.3674° N	81.6239° E
CHC Hospital, Tilda, Raipur	21.6007° N	81.7942° E
CHC Hospital, Gudiyari, Raipur	21.2840° N	81.6294 ° E
CHC Hospital, Simga, Baloda Bazar	21.6298° N	81.71473° E



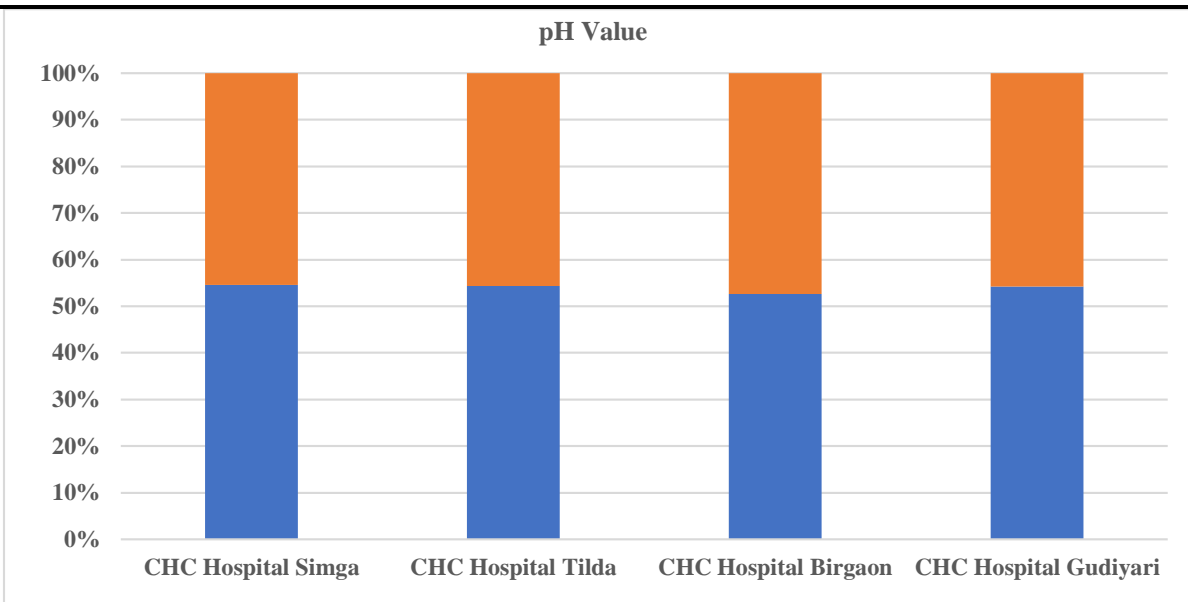
*Fig. 2: CHC Hospital, of Birgoan, , Tilda, Gudiyari, Simga Site Location*

### 2.1 Research Work Explanation

The work deals with the testing and investigation with the sample collected from the different hospitals and the community health centre as case study. Samples of biomedical waste water were taken from the inlet and outlet from the hospital to the effluent treatment plant (ETP). Every sample is carefully packed in a colourless transparent bottle which has capacity up to 2 litres. Waste water Sample were taken to ETP. The testing is done to investigate the water quality of the sample taken. The parameters such as pH, COD, Oil & grease, all solids, BOD and fecal coliform were evaluated.

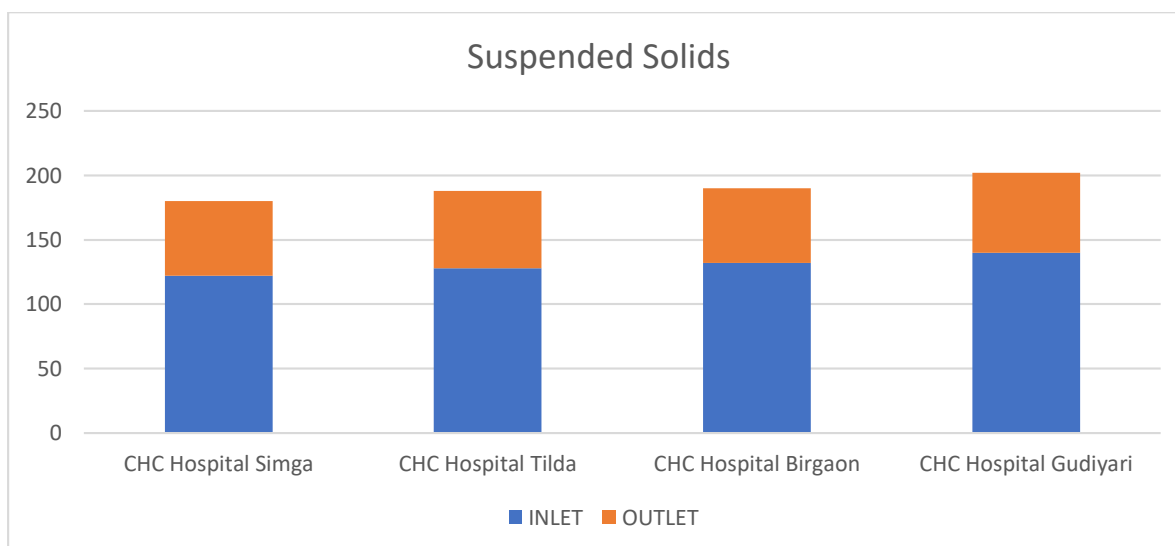
### 3. Result

The maximum ph at inlet is almost simialr for all the considered cases states that there is no issue to health at this ph level but if this water encounter skin, then it becomes dry, itchy, and irritated.

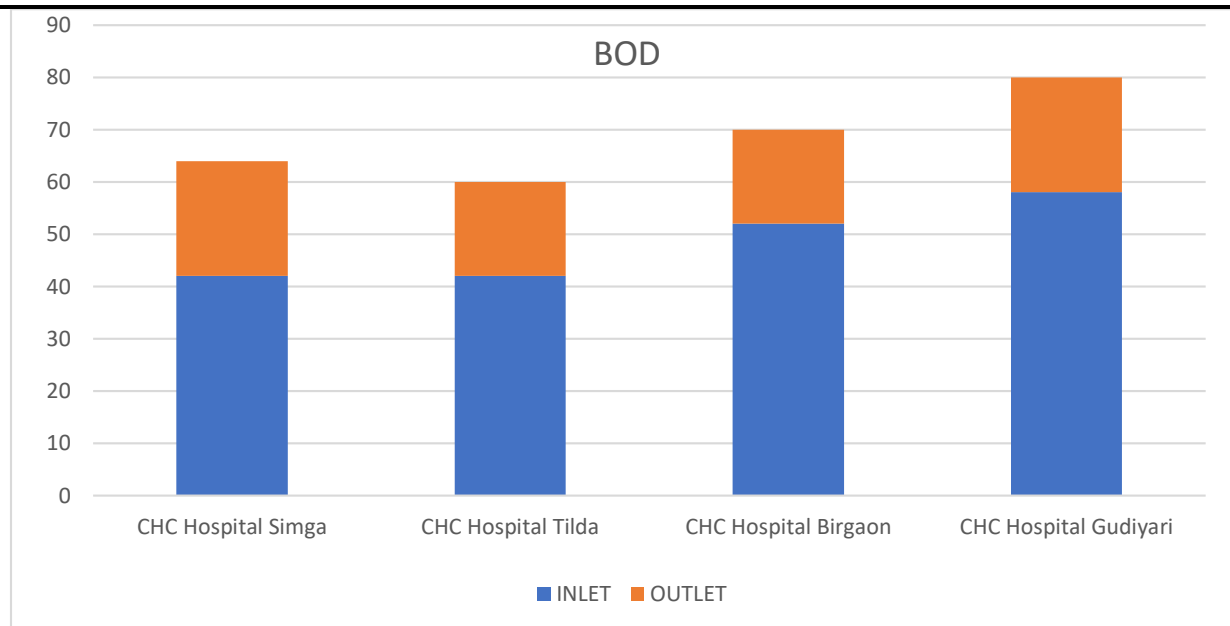


**Fig. 3 pH value for the CHC Hospital**

The inlet value of suspended solids at CHC hospital, Simga is 52.45% more than outlet value. The inlet value of suspended solids at CHC Hospital Tilda is 53.1% more than outlet value. The inlet value of suspended solids at CHC Hospital, Birgaon 56 % more than outlet value. The inlet value of suspended solids at CHC Hospital, Gudiyari 55.7% more than outlet value.

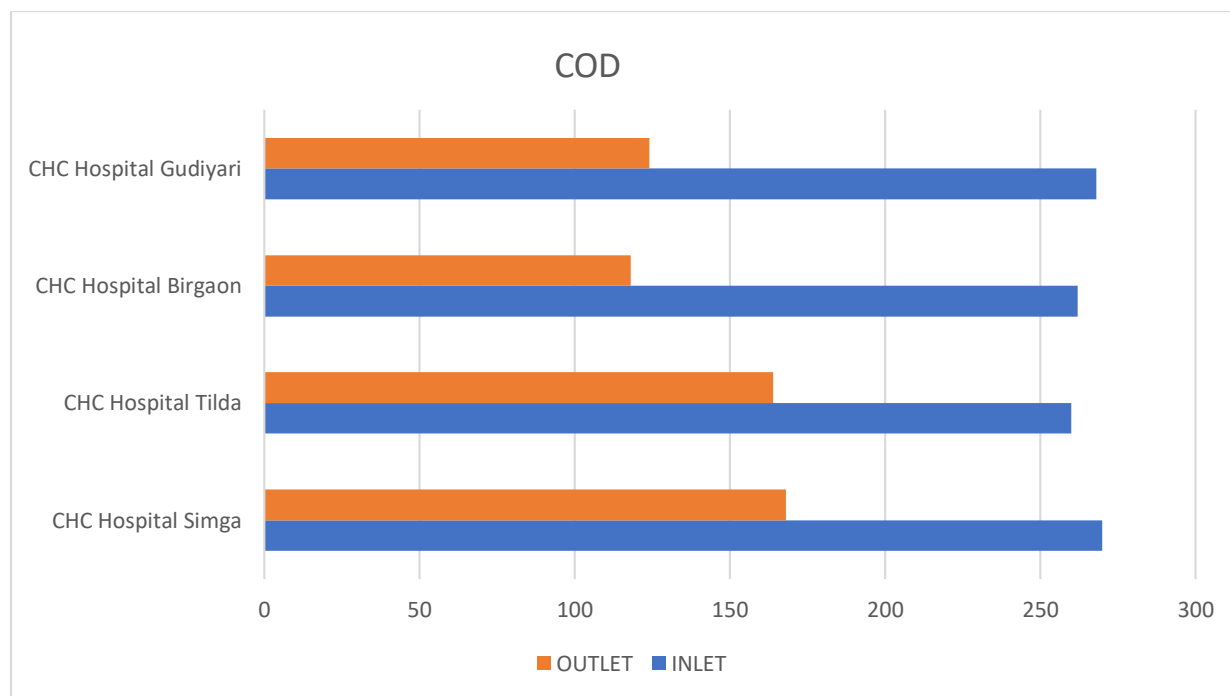


**Fig. 4 Suspended Solids for the CHC Hospital**

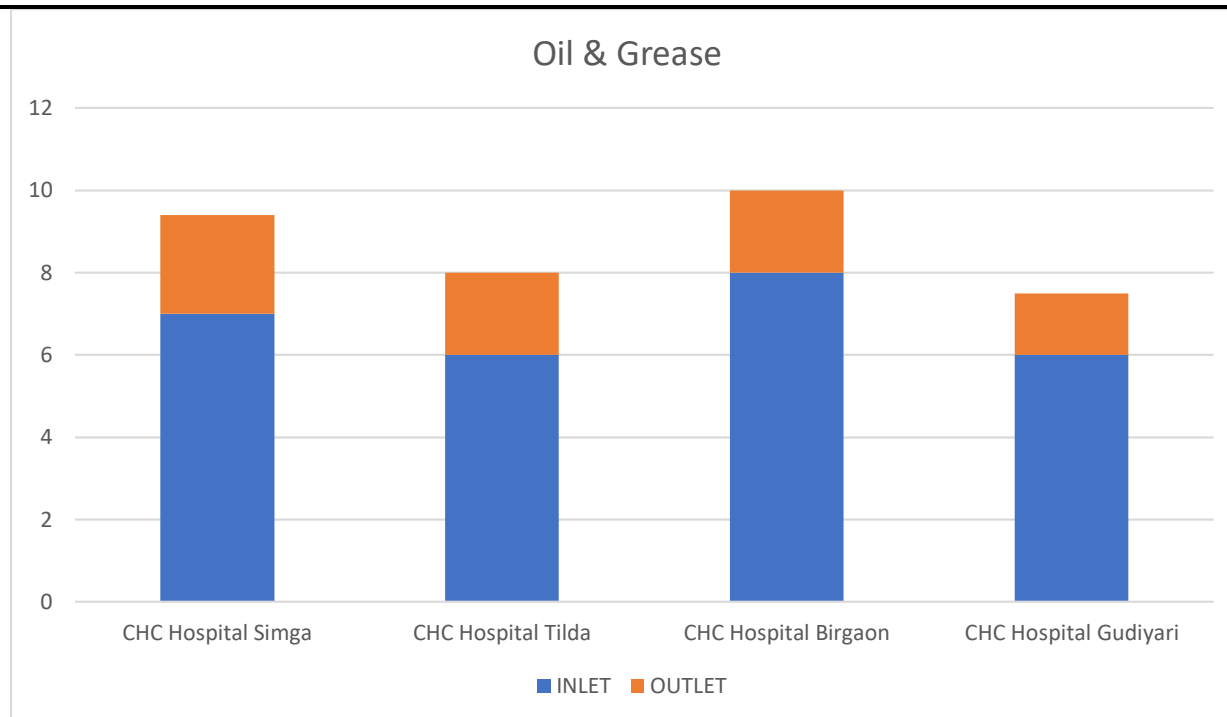


**Fig. 5 BOD for the CHC Hospital**

The inlet value of COD at CHC hospital, Simga is 37.77% more than outlet value. The inlet value of COD at CHC Hospital Tilda is 36.92 % more than outlet value. The inlet value of COD at CHC Hospital, Birgaon 54.96 % more than outlet value. The inlet value of COD at CHC Hospital, Gudhiyari 53.73 % more than outlet value



**Fig. 6 COD for the CHC Hospital**



**Fig. 7 Oil & Grease for the CHC Hospital**

The inlet value of Oil & Grease at CHC hospital, Simga is 65.71 % more than outlet value. The inlet value of Oil & Grease at CHC Hospital Tilda is 66.67 % more than outlet value. The inlet value of Oil & Grease at CHC Hospital, Birgaon 75 % more than outlet value. The inlet value of Oil & Grease at CHC Hospital, Gudhiyari 75 % more than outlet value.

## CONCLUSION

Hospitals and biomedical facilities, which were intended to improve health, have unfortunately become a potential health risk due to improper management of infectious waste. The safe handling of BMW remains a major concern for Indian health authorities, as waste generated from medical activities can be hazardous, toxic, and even lethal due to the high potential for disease transmission. It has been determined that additional treatment is required, and the plant's chlorination system should be regenerated.

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