IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)
e-ISSN: 2319-2402,p- ISSN: 2319-2399.Volume 17, Issue 12 Ser. 1 (December 2023), PP 38-41
www.iosrjournals.org

Physico-Chemical Analysis Of Drinking Water From Different Districts Of Tripura

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Abstract:
The present study aims to determine the physicochemical properties of drinking water samples collected from different water sources in all eight districts of Tripura. A total of 1,018 water samples were collected from different water sources viz., drinking, surface and groundwater. The gross appearance, odour, temperature and pH of the samples were analyzed. Most of the Water samples were transparent and odourless and the taste was agreeable. The values of temperature ranged from 7 to 30.1°C and pH ranged from 4.9 to 9.7. Out of 1,018 water samples, 44 and 27 samples were turbid and odour respectively. Out of 1,018 water samples tested, 216 (20%) water samples' pH was more or less than the prescribed level.

Key Word: *Tripura, Physico-chemical, water, Tube wells, Borewells, surface water.*

Date of Submission: 01-12-2023 Date of Acceptance: 10-12-2023

I. Introduction

Presently, clean and fresh water for drinking, irrigation, and industrial purposes is most important all over the world[1]. Groundwater and surface water play a vital role in arid and semi-arid regions[2,3]. More than two billion population depends on groundwater and surface water for drinking purpose and for their daily needs. Therefore, it is important to understand the quality of both groundwater and surface water[4,5].

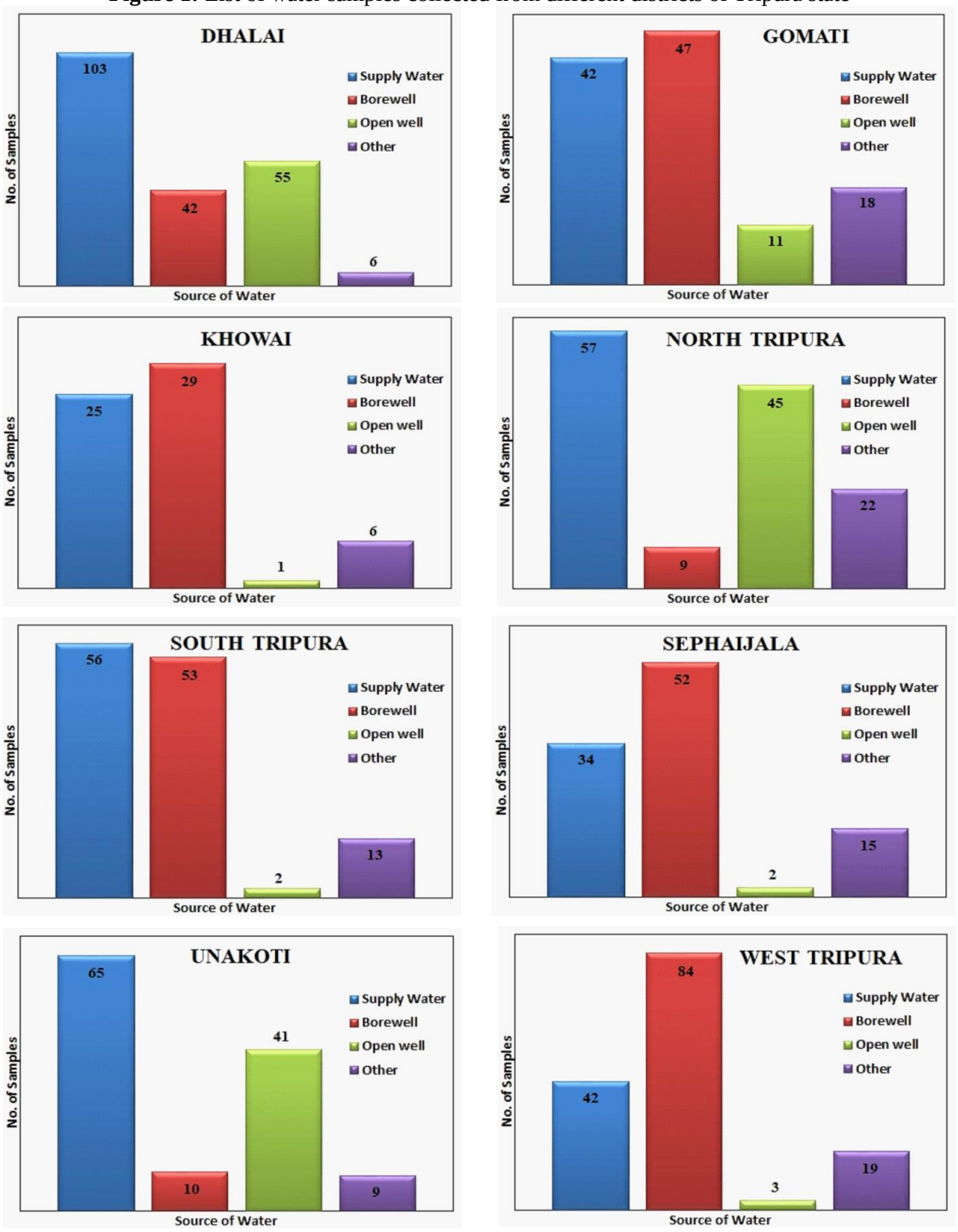
Water pollution is one of the most serious problems in the modern world. Human and animal faeces, household waste, industrial, domestic, and municipal wastes released into water bodies, etc. are some of the important causes of water pollution. Pollutants may be decaying and miscible with soil and waterbodies. An obvious and asymptomatic issue with the pollutants is their effect on water quality. Decomposition of the above pollutants may result in the production of compounds like carbon dioxide, simple organic compounds like methane, simple fatty acids, etc.[6]

Groundwater quality is majorly affected by urbanization and agricultural activities are a major problem in Tripura. Past few decades, rapid growth in population and urbanization has brought significant changes in the environment, resulting in more demand for water for agriculture and domestic activities. Due to the inadequate availability of surface water, to meet the requirement of human activities, groundwater remains the only option to supplement the ever-increasing demand for water[7]. Municipal supply water and groundwater usage is equally seen in Tripura. In the present study, we want to check the few physicochemical parameters of drinking water in all the districts of Tripura.

II. Materials and Methods

Study area: Water samples were collected from 1,081 sites in all eight districts of Tripura from June 2021 to December 2021. Samples were collected from random sites in different villages to cover the sampling to represent the entire district. Municipal supply water and bore well water is the chief source of drinking water for the people of the studied areas. In some sites, river water and open well water is also found to be the major source of water. The highest number of samples were collected from the Dhalai district (206 samples) while a small number of samples were collected from the Khowai district (61 samples). The total number of samples collected from districts is depicted in Figure 1.

Figure 1: List of water samples collected from different districts of Tripura state



Collection and testing of the samples: The water was collected from different sites in 50 ml sterile polyethene bottles and brought to the laboratory for physico-chemical analysis. Physical parameters like colour, odour, temperature and chemical parameters like pH were estimated.

The turbidity of the water samples was observed through transparent tubes and odour by smelling the samples. Temperature was carried out at the site of sample collection using a portable thermometer. This was done by dipping the thermometer into the sample container and recording the stable reading. The pH of the water sample was determined using the portable pH meter.

III. Results and Discussion

The turbidity depends on the quantity of solid particles present in the collected water samples. Out of 1,018 water samples, a total of 44 water samples were light yellow, light green or turbid by visibility. District-

wise turbidity samples are depicted in Figure 2. The majority of them are open wells and river/pond water samples due to most of the daily activities of the surrounding people will be done near these water bodies. Out of 1,018 samples, 27 water samples were pungent or foul in smell. District-wise water sample's odour was mentioned in Figure 3.

Figure 2: List of turbid water samples from different districts

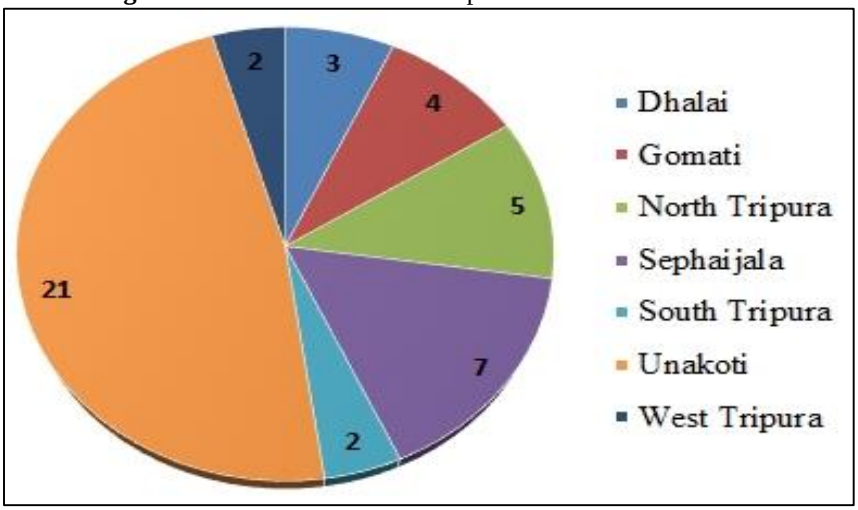
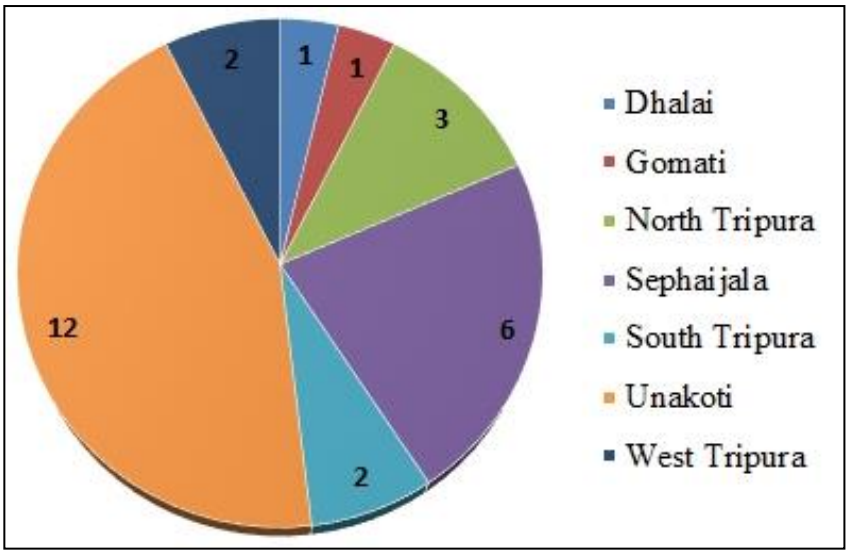


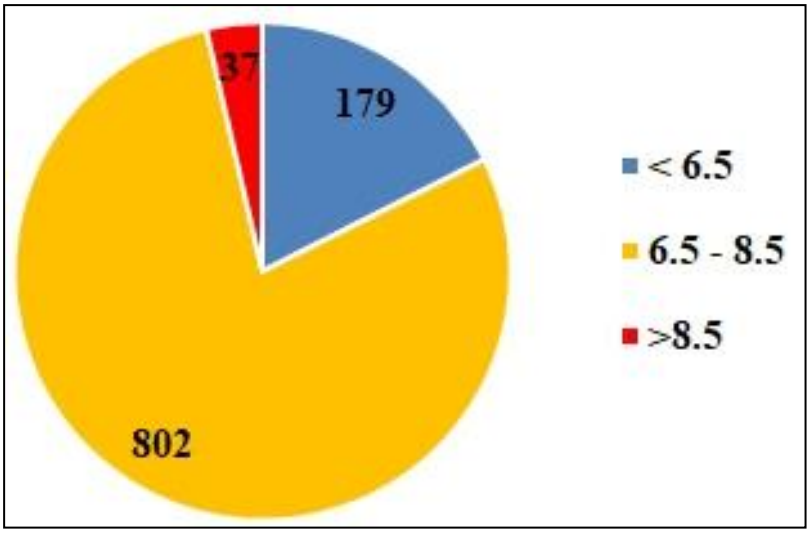
Figure 3: List of odour water samples from different districts



The temperature was found in the range of 7°C to 30.1°C in the tested water samples. The variation in the water temperature in samples is due to the time of the sample collection and the effect of the climatic conditions. The lowest temperature of 7°C is recorded in the Dalura and Khayerpur sites of the West Tripura district and the highest temperature of 30.1°C is recorded Barbhaiya site of Gomati district.

pH is an important parameter in evaluating the ionic balance of water. It is an indicator to detect the acidic or alkaline condition of the water. As per the WHO guidelines[8], the maximum permissible limit of pH is from 6.5 to 8.5. The present study ranges between 4.9 to 9.7. Out of 1,018 samples tested, a total of 216 (20%) water samples' pH content exceeded the limit of WHO guidelines. A total of 179 samples showed acidic conditions and 37 samples were reported alkaline in nature. The lowest pH was recorded at the Nasirnagar site of the South Tripura district and the highest pH was recorded at the Paschim Noabadi site of West Tripura.

Figure 4: pH Range of water samples



IV. Conclusion

In the present study, 80% of the sampling sites were of good water quality. Few samples from open wells, rivers and ponds showed turbidity and foul smell. Further, it was noted that 216 (20%) of water samples' pH content exceeded the limit of WHO guidelines.

Conflict of interest statement Nil.

Acknowledgements

The authors acknowledge the Indian Council of Medical Research (ICMR), New Delhi, India for providing the financial grant for the study under SEED grant (NE). The authors are thankful to the Regional Medical Research Centre (ICMR-RMRC, NE), Dibrugarh & ICMR – Center for Ageing & Mental Health, Kolkata for support and collaboration.

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