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# Major Ion Chemistry and Groundwater Quality Assessment in Purulia District

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The chemical characteristics of groundwater of Purulia district of West Bengal were studied to evaluate the major ion chemistry and suitability of water for domestic and irrigation uses. Groundwater samples of 60 locations were collected and analysed for pH, EC, TDS, $F^-$, $Cl^-$, $HCO_3^-$, $NO_3^-$, $SO_4^{2-}$, $Ca^{2+}$, $Mg^{2+}$, $Na^+$ and $K^+$. The cation concentrations indicate that among the cations only $K^+$ concentrations in 15% of sampling location exceed the WHO limit for drinking water. In case of anions 1.67%, 11.67% and 21.67% of the sample locations exceed the limit for $Cl^-$, $F^-$ and $NO_3^-$ respectively. Based on US salinity diagram, 50% samples fall in the field of C2S1 while 40% and 10% samples fall in the field of C3S1 and C1S1, respectively. The analytical data plotted PI against total concentration shows that 68.33% of the water samples fall in Class–I and 15% in Class–II in the Doneen's chart implying that the water is of good quality for irrigation purposes with 75% or more of maximum permeability. However, 16.67% groundwater samples belong to Class–III, that is unsuitable category. In the analysed groundwater samples 9 samples have MH > 50, that is harmful and unsuitable for irrigation use.

**KEYWORD**

Major ion chemistry, Water quality, SAR, RSC, Purulia.

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# Assessment of Ground and Surface Water Quality in Nagar Panchayat Chitrakoot

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An assessment of the ground water quality was carried out in Nagar Panchayat Chitrakoot, Satna district. The study was aimed at examining the various samples of ground water/surface water and the quality of the drinking water as it relates to public health. Ten drinking water samples were taken from handpumps and river water and were analyzed for pH, electrical conductivity, chloride, total alkalinity, total dissolved solids, dissolve oxygen, total hardness and E. coli. The results were compared with WHO and IS: 10500 standards. The usefulness of these parameters in predicting ground water and river water quality characteristics were discussed. Thus an attempt has been made to find out the quality of ground water and river water in Nagar Panchayat Chitrakoot for knowing the suitabillity for drinking purposes or not.

**KEYWORD**

Ground water, River water, Water pollution, Alkalinity, Total dissolved solids, Chloride.

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# Impact of Seasonal Variation on the Recreational Water Quality of Calabar River Estuary, Nigeria

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Sampling was fortnightly for 12 months in 5 stations. Stations 1-3 were near-shore while stations 4 and 5 were in the estuary. Dry season sampling was from October to March while wet season sampling was from April to September. The work focused on the bacterial aspect of water quality. The highest total coliform count (1900/100 mL) was recorded during the wet season in July at station 3. The lowest count (163/100 mL) was recorded at station 2 during the dry season in November. Almost the same scenario was observed for fecal coliform. The highest count of fecal coliform was recorded during the wet season in July also at station 3 during flood tide. The lowest count was recorded during the dry season in February also at station 2. The lowest 95th percentile value of intestinal *Enterococci* (14/100 mL) recorded at station 2 was during the dry season in November. On the other hand, the highest 95th percentile value of intestinal *Enterococci* of 190/100 mL was recorded at station 3 during the month of July which is the peak of the wet season.All the microbial water quality parameters had negative t-test values indicating that the wet season samples had higher counts of total coliform, fecal coliform and intestinal *Enterococci* than the dry season samples and concluding that there was significant difference in microbial water quality between the dry and wet seasons.

**KEYWORD**

Total coliform, fecal coliform, intestinal *Enterococci*, wet season, dry season, microbial water quality.

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# Water Quality Analysis on Yercaud Lake by Using Multivariate Statistical Analysis

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Water samples are collected at top, middle, bottom of Yercaud Lake, Salem district. Water quality index (WQI) is physico-chemical parameter of lake water, like turbidity, total dissolved solids, electrical conductivity, pH, total alkalinity, total hardness, calcium, magnesium, sodium, potassium, iron, ammonia, nitrate, chloride, fluoride, sulphate and phosphate are tested for 9 samples as per IS method. Based on the value of the water quality index has been estimated for 2010 to 2014. The lake water is found not good quality in some months (WQI-100 to 200). And identified the source of pollution in the lake by multivariate statistical analysis as used via factor analysis, correlation component analysis (CCA). Based on the results 3 pollution were identified. In thus agricultural pollution, organic pollution, domestic wastewater pollution influences the lake water quality high. These methods are believed to assist water managers to complex nature of water quality issues and determine priorities to improve water quality.

**KEYWORD**

Water quality index, Multivariate statistical analysis, Factor analysis.

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# Analysis of Bacterial Contamination in the Kolavai Lake at Chengalpet

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The prevalence and seasonal variation of bacterial indicators of faecal pollution, such as total coliform bacteria, faecal coliform bacteria and faecal streptococci were investigated in samples of Kolavai Lake water, Chengalpet, Tamil Nadu. Further, the samples were screened to study the reliability of faecal indicator bacteria as an index of human pathogenic bacteria. Total coliform bacteria, faecal coliform bacteria were isolated from the lake. Faecal streptococci were also detected in most samples. The total coliform and faecal forms were observed in maximum as 3000 and 1200, respectively in the lake. Which is more than the permissible limit. The result showed that the water is polluted and presents a potential risk to public for recreational and fishing activities**.**

**KEYWORD**

Faecal pollution, Bacterial indicators, Faecal coliform bacteria, faecal streptococci.

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# A Review on Traditional Water Purification Methods Used in Rural Area

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A safe and convenient water supply plays a vital role in public health and well being of the society. There are numerous conventional water treatment technologies available in rural areas of developing countries. The rural communities have adopted some simple rudimentary water treatment technique that can serve individual household. Basically all such techniques aim to remove suspended impurities from water. There are also some traditional household techniques to remove specific water pollutant. Traditional water purification methods include boiling, filtration, sedimentation and solar radiation. Water borne diseases are more common in rural community where potable water supply coverage is very low. The boiling method was the most efficient giving 100 % decontamination after three minutes of boiling. Boiling and solar methods were found to be suitable for purifying domestic water in the rural areas. However, solar method being simple, practicable and cheap is, therefore, recommended for use in the rural communities. This paper contains traditional and household techniques that are widely used in rural areas.

**KEYWORD**

Traditional, Purification, Impurities.

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# A Study of Bacteriological Quality in Ground Water in the Catchment Area of the Tunia River, Bongaigaon, Assam

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The water of drinking water sources should not have any bacteriological parameters for human health. Bacteriological parameters are contaminated with the water of drinking water sources as well as the ground water due to submersion of flood water of the Tunia river at the drinking water sources and uncontrolled discharge of domestic wastewater. These bacteriological parameters are generally considered as reliable indicators for the presence of pathogens in water. The most important indicator organisms are total coliform, faecal coliform and faecal streptococci. Water samples of drinking water sources, such as tubewell and openwells are collected and analysed for bacteriological parameters, like total coliform, faecal coliform and faecal streptococci. The ratio of faecal coliform to faecal streptococci are evaluated and ascertain the sources of bacteriological parameters. Necessary measures are proposed against the contamination of pathogen and bacteriological organisms for sound health of people in the catchment area.

**KEYWORD**

Bacteriological, Total coliform, Faecal coliform, Faecal streptococci, Pathogen, Most probable numbers.

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# A Study on the Classification of Water Quality, Pazhayar River Basin, Kanyakumari District, Through Aggregation of Water Quality Index

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The river Pazhayar originating from the slopes of Mahendragiri hills at an altitude of 800 m above M.S.L., flows towards south-western direction through Mahendragiri Estate, Palkulam, Bhuttapandi, Thazhikudi, Nagercoil town, Suchindram, etc., and joins the Arabian Sea near Manakudi. The basin contains number of water storage tanks/bunds. The catchment area of the river is 397 $km^2$. The total length of the river is 40 km. There is one CWC Hydrological Observation Station at Ashramam on this river. The early kings also constructed about 11 check-dams along the course of the river. A Venad ruler, Boothala Sree Veera Udaya Marthandavarma, who ruled this area in 1517, constructed the Veerapuli dam and its canals. But, unfortunately, the dam was destroyed by a flood 40 years ago. Another major problem faced by the Pazhayar is pollution. Though the river water is free from pollution from Surulacode to Putheri, the stretch from Putheri to Suchindrum is highly polluted. Sewage from Putheri and Nagercoil also flows into the river. The sewage (household sewage, solid waste and liquid waste from hospitals) from Putheri area drain into the river at Putheri and sewage from Nagercoil is let into the river between Vadaserry - Ozhuginaserry - Edalakudi. A study was undertaken during the month of June 2015 to November 2015 (south west and north east monsoon period) and evaluates the water quality of Pazhyar river. The study involves the physical and chemical and analysis, like turbidity, electrical conductivity (EC), total dissolved solids (TDS), pH, total alkalinity (TALK), total hardness (TH), Ca, Mg, Na, K, Fe, Mn, Cl, F, $NH_3$ ,$NO_2$, $NO_3$, BOD and DO of river. The results of the present study have been compared with the permissible standards prescribed by the standards, such as BIS, CES, CPHEEO, ICMR and WHO. The average value of the water quality index for Pazhayar river was 49.01 (during monsoon period) indicating that this river is under moderate pollution of water quality rating. Based on this report, appropriate steps to be taken to control the pollution in this river.

**KEYWORD**

Pollution, Water quality analysis, Water quality index, Pazhayar river.

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# Assessment of Groundwater Quality in the Kadapa Municipal City, Y.S.R. District

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Groundwater is a natural replenishable resource which becomes an important source for any developmental activities due to shortage of surface water and frequent failures of monsoon. Increasing demand for groundwater causes decline in water levels as well as deterioration in water quality. Kadapa is one of the oldest municipalities in Rayalaseema region and the district headquarter of YSR Kadapa district of Andhra Pradesh with an area of 91.05 $km^2$. The study area resembles the shape of an irregular parallelogram, separated in half by the Eastern Ghat ranges. Kadapa is located 8 km (5.0 m) south of the Penna river by a inner flow of Buggavanka. The city is surrounded on 3 sides by the Nallamala and Palakonda hills lying on the tectonic landscape being sandwiched between the Eastern and Western Ghats. The study area because of its tropical wet and dry climate conditions characterized by year round high temperatures and less monsoon is subjected to drought prone areas in the state. To assess the groundwater conditions in the study area 25 samples were collected from either handpumps or openwells at different streets. The pH of groundwater in the study area is ranging from 7.4 to 8.7. The electrical conductivity of the groundwater is ranging from 1650 to 7920 Siemens/cm at $25^0$C. The total dissolved solids of the groundwater in the study area is ranging from 700 to 3730 mg/L. The total hardness of the groundwater in the study area is ranging from 100 to 560 mg/L. Water hardness is primarily due to the result of interaction between water and the geological formations. The calcium concentration of the groundwater in the study area is ranging from 12 to 124 mg/L. The chloride concentration of the groundwater in the study area is ranging from 71 to 859 mg/L. The bicarbonate concentration of the groundwater in the study area is ranging from 12 to 60 mg/L. The fluoride concentration of the groundwater in the study area is ranging from 0.562 to 2.22 mg/L during pre-monsoon period.

**KEYWORD**

Replenishable resource, Groundwater quality, Rayalaseema and Kadapa.