REVIEW ON PHYSICO-CHEMICAL PARAMETERS OF SRIRAMSAGAR RESERVOIR DISTRICT NIZAMABAD

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ABSTRACT

Water is one of the most important compounds that majorly influence life. The quality of water usually described according to its physicochemical and biological parameters. Due to increased population to enhance crop productivity excessive use of chemical fertilizers and pesticides in agriculture are causing tremendous pollution which reduces water quality and depletion of aquatic flora and fauna. This is the one of the serious problems now a day. When human being consume such kind of polluted water suffers from water borne diseases. Thus the analysis of the water quality is necessary to regulate the natural eco system. The study is carried out to asses' environment impact on physic-chemical parameters like pH, TDS, alkalinity, turbidity, nitrates, chlorides phosphates, BOD,COD, DO, minerals, salts. This research paper focus on review of different research papers related to physico-chemical analysis of water from different sources used for drinking purpose.

INTRODUCTION

Water is one of the abundantly available substances in nature, which man has exploited more than other resources for the sustenance of life; good quality of water is required for living organisms. Dams are most important water resources. Unfortunately, the dams are being polluted by indiscriminate disposal of sewage, industrial wastes and human activities. Large towns in India are situated near dams, their run off and those from agricultural lands find their way to the river and add in dam water which unfit for human use. Nowadays due to increased human population and manmade conditions, the water quality is deteriorating everywhere. Water quality provides current information about the concentration of various solutions at a given place and time. Water quality parameters provide the basis for judging the suitability of water for its designated use and to improve existing conditions. The study of different water parameters is very important for understanding of the metabolic events in aquatic ecosystem. The parameters influence each other as well as they govern the abundance and distribution of the flora and fauna. Therefore, it has become obligatory to analyze the important water parameters when ecological studies on aquatic unfavourable changes occurring in the ecosystem.

REVIEW OF LITERATURE

1.(M. Suresh Kumar et al 2016) focused on groundwater quality in the Kanchipuram municipality during July 2015. Seventeen samples of ground water were collected from different stations around the municipal solid waste dump yard. Global Positioning System (GPS) and Geographical Information System (GIS) were used to prepare spatial map of the study area with sample locations. Both physical and chemical parameters such as Total Dissolved Solids (TDS), Electrical Conductivity (EC), pH, Total Alkalinity (TA), Total Hardness (TH), Calcium (Ca), Magnesium (Mg), Iron (Fe), Manganese (Mn), Free Ammonia (NH3), Nitrate (NO3), Chloride (Cl), Fluoride (F), Sulphate (SO4) and Phosphate (PO4) were tested and compared with standards prescribed by WHO and BIS. The results show the physical and chemical properties of groundwater samples are affected by pollution.

2. A study conducted (Sandip Singh Bhatti, Vaneet Kumar 2016)to analyse the physicochemical characteristics of the groundwater of Jalalabaad village in Tarn Taran district of Punjab situated on the bank of the river Beas. Groundwater samples were collected from hand pumps and tube wells with depth of 50-75 feet and 200-225 feet respectively. The results obtained were in the permissible limits of BIS. Concentration of nitrates was very low in both the samples. As the groundwater quality changes due to changing climate and anthropogenic activities constant analysis of the water quality is mandatory in this area. More profound physico-chemical and biological studies are required for avoiding and minimizing contamination in groundwater.

3. Dr.C.Nagamani (2015) investigated Physico- chemical status of four water samples taken from Urban and rural locations of Bangalore for water samples. The pH of all water samples were found almost neutral. The TDS, conductance, hardness increased towards the urban water as compared to rural water All Parameters were within the permissible limits prescribed by World health organization (WHO). This study indicated that urban water is less hard and containing more dissolved ions safe for drinking purpose.

4. (Dhanaji Kanase et al 2016) carried out comparative study on the physico-chemical analysis of well water and bore well water in Kadegaon Tahsil, Maharashtra, India. The parameters such as water temperature, total dissolved solid, hardness, pH, alkalinity, dissolved oxygen, chemical oxygen demand, biological oxygen demand, conductivity and chloride, were analyzed for water samples collected from different places of Kadegaon Tahsil. Water samples from studied area were not suitable for drinking and require pretreatment like both the well and bore well water samples can be quite safe after the boiling. Sewerage waste treatment, X-rays water filter can be used for clarifying water from microorganism, awareness about the harmful effect of water on human health.

5. (Dr. Nidhi Jain 2018) throws light on assessment of Physico- chemical parameters in Alard College Campus, situated in Hinjewadi, Pune from various sampling station. The results were compared with the water quality standards of WHO and ISI 10500-91. EC, pH and turbidity values for all investigated samples were found to be above the permissible limit. The result shows that the rest of the parameters like TDS, Alkalinity, Total Iron, DO Zinc, Copper, Chloride Potassium, BOD and COD values are well within the permissible limits. A systematic correlation study showed that the TDS, EC and pH are important physicochemical parameters of water quality and are correlated with most of the other parameters. .The systematic calculation of correlation coefficient (r) between various physicochemical parameters suggests priority for the necessary treatment to a particular location. It indicates that the outlet water from Alard campus is highly polluted and unsafe for domestic use.

6. (Ashwani Kumar Sonkar and Aarif Jamal 2019) investigated groundwater quality around Singrauli coalfield area due to mining and industrial activities. Eight groundwater samples were collected from the hand pump & Dug-wells located around Singrauli coalfields area during pre-monsoons and post monsoons seasons in the year 2018and analyzed for physicochemical parameters Assessment of the groundwater quality followed by statistical analysis. A systematic calculation of the correlation coefficient has also been carried out between different analyzed parameters. The correlation of 13 physicochemical parameters of groundwater of the study area indicated that all the parameters were more or less correlated with one another. The ground water of the study area is alkaline in nature.EC found above maximum permissible limit prescribed by BIS in the pre-monsoon (933 µS/cm) and post-monsoon (831µS/cm).The analysis shows that the groundwater of the study area needs pretreatment for potable use.

7. (Ichwana et al. 2016) stated that pH is an indicator of the amount of hydrogen ion concentration value. It is used to indicate acidity or basicity of the water. Normal water a has pH value between 6.5 and 7.5. Sewage into water can change the hydrogen ion concentration (pH) in the water, and it became more alkaline depending on the types of waste and chemical substances contained in them.

8. (Shinde et al. 2019).). Change of pH can change the heart rate, curve spin and shape of the head.

9. (Ichwana et al. 2016) Turbidity is description of the optical properties of water which is calculated by amount of light emitted and absorbed by particles in the water.

10. (Koli et al. 2018), As most of the major pathogenic diseases, hazards and dermatological problems, are recognized due to consumption of polluted water

11(Benyahya et al. 2008; Harvey et al. 2011.Air temperature (AT) has a significant impact on various environmental factors that influence water temperature (WT) and the overall content of dissolved oxygen (DO) of the rivers).

12. (Stumm and Morgan 2012). Imperatively, the correlation between AT and WT is a crucial factor that significantly impacts the water quality, determines the viability and behaviour of aquatic organisms

13. (Lookingbill and Urban 2003; Shen and Leptoukh 2011; Kattel et al. 2022).The observed fluctuations may be ascribed to the prevailing climatic and topographic conditions

14. (Van Vliet et al. 2011; Jalal and Sanalkumar 2012; Beechie et al. 2013; Tank and Chippa 2013).Water temperature (WT), a critical ecological factor, is mainly responsible for the growth and distribution of aquatic flora and fauna.

15(Jobling 2002; Quinn et al. 2007; Boyd 2019)WT substantially impacts the solubility of oxygen in water, as well as the metabolic rates and reproductive processes of aquatic species.

16(Marcogliese 2008), the incidence and pathogenicity of aquatic infections are significantly affected by WT.. Evidently, it is seen that WT is impacted by AT, with lower AT during winter season, gradually increasing throughout the spring season and reaching its peak during the summer season (Arismendi et al. 2014; Khanday et al. 2021; Mir et al. 2023).

17. (Hamid et al. 2020).The pH of water is often used to ascertain its level of acidity or alkalinity. Aquatic species must maintain an adequate pH for survival and the pH of aquatic environments is primarily influenced by photosynthesis and respiration (Mirza et al. 2014; Dar et al. 2020; Manzoor and Iqbal 2020).Similar observations were also obtained while analysing the pH of different water bodies in the past. Mirza et al. 2013, 2014; Manzoor and Iqbal 2020).Several investigations conducted in the past by different workers yielded similar results.

18 Afrin etal.(2015) reported that the temperature of the Turag River ranged from 23.20^0 C to 31.90^0C from January to March.

19. (Kataria et,al:1995) In Ramganga river,Bareilly,Singh and Gaur observed water temperature to be in the range of 28.5^0C to 30^0C.Water temperature is of enormous significance as it regulate various abiotic characters and also activities of an aquatic ecosystem.

20.(Bhateria and Jain 2016).It has been noted that rivers traversing regions with clay soil containing ionizing substances tend to exhibit elevated EC

21(Bhateria and Jain 2016)..Studies have reported similar findings from the other tributaries/basins of the Jhelum River in the Himalayan region (Khanday et al. 2021; Arafat et al. 2022).

22(Dar et al. 2019). .TDS serves as a reliable indicator for evaluating the overall composition of water, enabling us to gauge its level of cleanliness and integrity

23. ele(Mirza et al. 2014; Mir and Gani 2019; Manzoor and Iqbal 2020The previous studies have also documented similar findings, suggesting that during the summer season, there is an).vated discharge of household waste materials, municipal waste and agricultural runoff into rivers and this influx of anthropogenic activities is believed to contribute to an increase in the concentration of dissolved ions

24. ele(Mirza et al. 2014; Mir and Gani 2019; Manzoor and Iqbal 2020Dissolved oxygen (DO) in aquatic ecosystems plays a crucial role in controlling the metabolic activities of various aquatic organisms Many factors, including temperature, primary production and the breakdown of organic waste, influence water's concentration of DO (Mir et al. 2023). Assessing water quality, organic contamination, ecological state, productivity and water resource health heavily rely on DO content, making it an essential limnological parameter (Lone et al. 2021).

25. (Khan et al. 2003; Qadir et al. 2008; Eliku and Leta 2018; Manzoor and Iqbal 2020; Bhat et al. 2021).The results of this study are consistent with other investigations that have been carried out in the past.

26(Arafat et al. 2022)..The concentration of FCO_2 is mostly regulated by metabolic activities, i.e. photosynthesis and respiration, apart from atmospheric diffusion Moreover, FCO_2 concentrations are also affected by the inflow of groundwater, frequently enriched with CO_2 owing to soil respiration in the watershed (Allan and Castillo 2007). It is crucial to note that a larger quantity of FCO_2 increases the acidity of water (Maas and Wicks 2017).

27. (Mir et al. 2023). Total alkalinity (TA) refers to the capability of water within an aquatic environment to withstand changes in pH levels. Since it stabilizes pH, it is believed to possess an acid-neutralizing capacity (ANC) TA is contributed by various ions such as OH^-, CO_3^{2-} and HCO_3^- as well as by carbonates of Ca and Mg (Kang et al. 2001). An important point to consider is that there is an inverse relationship between pH and TA concerning water outflow (Rebsdorf et al. 1991; Arafat et al. 2022).

28. (USEPA 2000; Seth et al. 2016).Total hardness (TH) of water prevents soap from forming a lather. TH depends on the amounts of soluble salts of bivalent ions, such as bicarbonates of calcium, magnesium, chlorides and sulphates while other ions such as manganese, strontium and iron also contribute.

29. (Mirza et al. 2014; Mir et al. 2016; Seth et al. 2016; Manzoor and Iqbal 2020).It is important to note that higher TH during autumn season can be attributed to agricultural runoff, sewage waste and pronounced deposition of salts by stone quarrying by stone crushers. These findings are in conformity with those of other workers.

30. (Mirza et al. 2014; Mir et al. 2016; Seth et al. 2016; Manzoor and Iqbal 2020).It is important to mention that the concentration of these nutrients above normal levels in water bodies can lead to the eutrophication of water bodies (Arafat et al. 2022).

31. (Dodds 2002Aquatic ecologists have extensively studied nitrogen as a prominent nutrient among other nutrients).

32. (Bernhardt et al. 2002; Swaney et al. 2012). Most of the nitrogen comes from sewage inputs, surface fertilizer runoff from agricultural fields and through natural atmospheric diffusion.

33. (Goller et al. 2006; Mir et al. 2023)Nitrogen and phosphorous concentrations are influenced by anthropogenic activities such as industrial waste and municipal effluents that are pumped into surface water bodies (point source) in addition to surface runoff from the agricultural fields (non-point source) which contain nutrient-rich fertilizers.

34(Seth et al. 2016).Sulphate (SO_4^{2-}) is commonly found in almost all-natural water sources where gypsum and other minerals are naturally found in a significant concentration. Mainly, sodium, potassium and magnesium sulphates are found in our water as these are highly soluble sulphates.

35. (Singh et al. 2023)SO_4^{2-} is primarily used in manufacturing industries such as cosmetics, pharmaceutical, cleaning products, etc., besides being used in lead–acid batteries and fertilizers.

36.Elevated Cl^- concentrations are consistently seen as a sign of pollution and may have a detrimental impact on freshwater ecosystems.

37. (Shyamala et al. 2008; Mir et al. 2023)The interconnectedness of various physico-chemical parameters plays a crucial role in advancing information, which may be more effectively examined via linear regression analysis.

38. (Abubakar et al. 2020; Mir et al. 2023)The augmentation of WT also promotes the breakdown of organic matter from animal and plant residues, leading to a more substantial release of nitrogen and thus reducing DO levels.

39. Grochowska and Tandyrak-2009 determined the calcium content of lake water in the range of 14.9 to 67.8 mgCal^{-1}.

40. Anita S M et al. (2018) Physico-synthetic investigation is the prime thought to evaluate the nature of water for its usage like drinking, water system, household and accommodating in understanding the unpredictable cooperation between the climatic and organic procedure in the water. The current examination is done on the water nature of Nagaral dam of Chincholli Taluk, Kalaburagi locale, Every month water tests were gathered from the distinctive inspecting destinations of the dam from December 2015 to November 2017 and exposed to physical-compound investigation and substantial metal examination. All the estimations of the physical-compound boundaries are inside as far as possible.

41. Pandey and Devkota, (2016) studied different water parameters of Tinau River, Butwal, Nepal and reported that all the physicochemical parameters are within the standard for drinking water except turbidity and pH (Butwal station) and raw water source for potable abstraction.

42. Breaban et al,. (2014) while working on Seasonal variation of water quality parameter in the Chirita reservoir, IASI found that "A parameters showed significant temporal 5 differences and partial spatial variability". The seasonal changes in water quality were influenced mostly by turbidity, organic pollution, oxide-related process, erosion as well as anthropogenic activities.

43. According to Acharya et al., (2016), the area of Phewa lake has shrunken, whereas Rupa being increase in surface water area. Begnas had few changes. While deriving the water indices, the smaller lakes such as Gunde, Khaste, Neureni and Madi, except Dipang were not detected in the process due to smaller size of surface water than the spatial resolution of Landsat images. Hence, the change in these lakes could not calculated from mid resolution satellites. Dipang lake showed increase in surface water area after 25 years of gap (due to construction of retention walls).

44. Pant et al., (2018) while studying on water quality of Begnas and Rupa lakes revealed that the water of both lakes were relatively pure with very less TDS as compared to other lakes considered for the comparison with this study. However, the concentrations of CO_2 and phosphates were found to be higher than WHO guidelines for drinking water and also indicated the problem of rapid eutrophication in both of the lakes.

45. Phewa Lake, which is a major tourist destination of Nepal, is at present facing high human pressure at both its urban and rural watershed areas in the absence of proper researches. Pages (IOE Graduate Conference, 2020). Similarly, Begnas and Rupa Lake situated side to each other not being an exception to the possible threats of pollution.

46.Wang et al., (2019), on studying a redundancy analysis between the submerged plants and environmental factors found that the water transparency, turbidity, and water depth were the key environmental factors affecting the plants. These results suggest that the longlasting severe flooding of Liangzi Lake in 2010 led to the degradation of both the submerged plant community and water quality.

47. Sahu et al. (2018) studied Nitrate a compound of nitric acid, is the most highly oxidized form of nitrogen found in aquatic environment. It is an essential nutrient for many photosynthetic autotroph and in some instances, functions as a growth-limiting nutrient. It is used by algae and other aquatic plants to form plant protein which, in turn, can be used by animals to form animal protein and its high quantity in water bodies cause water eutrophication and blooms.

48. Jannat et al. (2019) studied physico-chemical properties of surface water of Mokeshbeel, Gazipur, Bangladesh. Some physico-chemical parameters like pH, temperature, and TDS met the standard acceptable limit in Bangladesh, while TSS, BOD and COD were very high in concentration compared to the national and international standards. The results of this study indicated a very bad quality of water in Mokeshbeel. Thus it could be posed a health and environmental risk to the communities that rely on the Beel, in particular to the flora and fauna and finally the human being.

49. Nair (2020) studied the availability of good quality water is an indispensable feature for preventing diseases and improving quality of life, therefore it is necessary to know details study about different physico-chemical 20 parameters such as hardness, pH, sulphate, chloride, DO, BOD, COD, alkalinity, nitrates and phosphates used for analysis and testing of water quality.

50. Mishra and Kumar (2021) studied in River Narmada, the input waste water is enriched with the large number of organic and inorganic contaminants that cause severe biotic risk, influences biogeochemical cycle and deteriorating ecological health of river. Presence of coliform bacteria in polluted river water resulting in unsuitability for human consumption.

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