Available online at https://ijmras.com/

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND STUDIES
ISSN: 2640 7272
Volume:03; Issue:04 (2020)



# PHYSICO CHEMICAL ANALYSIS OF POLLUTED POUND WATER

JITENDRA KUMAR
*M.Phil., Roll No. 140103, Session: 2014-15*
*Department of Botany, B.R.A. Bihar University, Muzaffarpur, India*
*hizee8888@gmail.com*

## ABSTRACT

The unquenchable need for information and the insatiable human curiosity that drives it are the key basis upon which the expansion of scientific knowledge is constructed. An important percentage of the progress that has been accomplished in scientific research and technological practice has been directed toward the manufacture or development of human comforts, which has led to an overall improvement in the standard of living in the community. This chapter includes a literature review that is relevant to the objective of the study, which is to determine the current state of water quality. The purpose of the research is to determine the current state of water quality. In addition to that, information on the production of adsorbents and the ways in which they may be used to purge impurities from water is included in this chapter. It has been said that a considerable amount of effort has been done to improve the water quality, the production of a number of adsorbents, and the use of those adsorbents in order to get rid of the sulfur-containing pesticide. In addition, this report contains a condensed explanation of the different adsorbents that may be used to remove the toxins from the environment. In addition to that, we have included a discussion on the most recent thinking about the quality of the water that is available to those who live in rural regions.

**Keywords**: physical, chemical, polluted pound water, environment, community

## INTRODUCTION

The unquenchable need for knowledge and the insatiable human curiosity that drives it are the essential foundation upon which the growth of science is built. A significant portion of the advancements made in scientific research and technical practice have been geared towards the production or enhancement of human conveniences, leading to an overall improvement in the level of life in the community This resulted in an acceleration of the process of industrialization. The use of science and technology has led to a number of significant changes in our level of life, some of the more notable of which include the following:

- The production of more food of higher quality;
- the eradication of a variety of contagious diseases;
- the development of new and more efficient communication systems;
- the creation of reliable and more efficient transportation systems;
- the provision of clean water; f) the invention of machines to replace human and animal labor;
- the reduction of water-borne diseases through the improvement of water technology; and
- the attenuation of the negative effects caused by natural disasters

## RELIABLE AND MORE EFFICIENT TRANSPORTATION SYSTEMS

As a direct result of these advancements, a number of unsettling unintended consequences have shown themselves, including environmental degradation, deforestation, urbanization, the loss of arable land, the emergence of new creatures resistant to control, and many more. These consequences are being viewed as possible dangers to both the environment and to human beings.

The consequences of pollution caused by sewage and trade effluents that are released from industrial units and home habitations have recently been a major worry in our nation and other developed countries. This concern is shared by other countries as well. The rapid and potentially catastrophic impacts of pollution caused by a few industrial units in the recent


**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

past have brought to the forefront the need of implementing pollution control measures. It is common knowledge at this point that all future development activity has to be evaluated in the context of the ultimate effect it will have on the environment. The alarming rise in industrial production seen over the last several decades, as well as the poisonous byproducts of that production that have been dumped into the natural environment, have given rise to a great deal of cause for worry.

The environment is thrown off-kilter as a result of pollution. Every person has primary responsibility for protecting the ecological integrity and preserving the cleanliness of their surrounding environment. It is only when people from all walks of life become aware of and comprehend the significance of environmental preservation that the situation will begin to improve. In this vein, environmental education at each and every stage of one's academic career is of the utmost significance. The significance of water is immediately apparent from the earliest stages of life. It is the source of life. Water makes up around 70 percent of the human body. Water's distinct physical and chemical qualities have made it the ideal environment for the development of life on Earth.

This viewpoint is shown by the passage that follows, which is taken from Szent-Gyorgyi (1958).

It is not debatable that different parts of the cell perform different activities when water is present. Life began in water, continues to flourish in water, and water serves as both the medium and the solvent for life. It is the foundation upon which life is built.

The water supply, both in terms of its quality and its quantity, is of the utmost importance.

Man has a responsibility to safeguard, preserve, and appropriately make use of fresh water since it is a critical resource that is both valuable and restricted in its availability. But sadly, this has not been the case, as the contaminated lakes, rivers, and streams seen all over the globe are evidence of. The researchers at the National Environmental Engineering Research Institute in Nagpur, India, estimate that around 70 percent of India's freshwater resources are contaminated (Pani, 1986).

The public, the government, and the industrial sector have all, thankfully, come to a profound understanding of the critical need of effective pollution management. The majority of nations have reached the point where they acknowledge water pollution as an issue, and legislation to prevent it have been established in their country. The Water (Prevention and control of Pollution) Act was first passed in India in 1974, and since then, it has undergone a number of amendments that have served to make it an ever more rigorous piece of legislation.

The subject "Clean water and sanitation for everyone by 1990" was underlined during the United Nations Conference on Human Settlements (HABITAT) in 1976. At the United Nations Water Conference that took place in Mar del Plata, Argentina, in March 1977, this central subject was discussed once again. The conference proclaimed the years 1980-1990 to be the International Drinking Water Supply and Sanitation Decade.

It also urged the governments of the world to reaffirm the commitment they had made at the HABITAT conference and to implement programs that adhere to realistic quality standards in order to meet the goal of providing clean water to one hundred percent of the world's population by the year 1990. The United Nations General Assembly held a special session in November 1980 to formally inaugurate the Decade, which has been running since November 1980. (Subramanyam, 1983).

These pollutants can be roughly characterized as

- Organisms that may cause diseases (via human and animal wastes)
- Synthetic organic compounds (pesticides, home chemicals, and other industrial and commercial chemicals, etc.)
- Inorganic compounds, such as acids, alkalies, and heavy metals, the majority of which come from industrial effluents.
- Substances radioactives originating from nuclear power plants
- Oxygen requiring wastes (sewage and certain industrial effluents)
- Plant nutrients (through sewage and agricultural run offs)
- Sediments (as a result of erosion of the soil), and
- Thermal discharges (from power plants).


**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

Odum (1971) separated the many types of pollutants into three primary categories, namely non-degradable, biodegradable, and thermal, based on their impact on the environment. Substances such as DDT, long chain phenolic compounds, mercuric salts, heavy metals, and a variety of others fall under the category of non-degradable pollutants. Sewage from homes and a wide variety of other chemical contaminants fall into the biodegradable category. When the intake of degradable contaminants into the system is greater than their capability for dispersion, a problem is created.

## OBJECTIVE

1. To Study On physico chemical analysis of polluted pound water
2. To Study On development of new and more efficient communication systems;

## REVIEW LITERATURE

Maticie has also evaluated the effect that agriculture has on the quality of groundwater in Slovenia (1999). It has been revealed that the quantity of nitrate in 12 of Slovenia's most important groundwater aquifers is higher than the maximum level of 50 mg/l that is permitted for use in drinking water. In their research on the impact of chemical fertilizers on the quality of groundwater in the Nile Valley aquifer in Egypt, Shamruck et al. (2001) found that the major ion concentrations ranged from 20 to 340 mg/l for nitrate, 96 to 630 mg/l for sulfate, 7 to 34 mg/l for phosphate, and 7 to 28 mg/l for potassium. Other major ions included phosphorus (96 to 630 Ammann et al. (2003) published a study that discussed the contamination of groundwater by runoff. In Whatcon County, Washington, Almasri et al. (2004) investigated the regional long-term trends and presence of nitrate in the groundwater of agricultural watersheds.

Researchers Kataria et al. (1995) discovered that the turbidity of bore well water in the city of Bhopal ranged from 2.0 to 102.0 NTU. Sharma et al. (1995) conducted an investigation into how seasonal shifts in the quality of the groundwater in Gwalior, and they discovered that many metrics surpassed the limit that was set by the WHO. Pande et al. (1996) examined the presence of trace metals in drinking water drawn from a variety of sources in the port city of Paradeep. These sources included the Mohanadi river, Taladanda water, tap water, tube well, and open well water. They discovered that the levels of these trace metals varied seasonally.


**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

In 1997, Kumaraswamy and colleagues conducted an investigation on the chemical composition of the groundwater in a coastal basin in Visakhapatnam.

Muralikrishna et al. (2000) conducted an investigation into the groundwater quality of samples taken from Karkala. They discovered that the ground water samples that were analyzed were safe from the point of view of the chemical aspect, but that all of the well water samples were highly contaminated from a bacteriological standpoint. Srinivas et al. (2000) studied the groundwater quality of Hyderabad by taking 32 tube well water samples. They reported that the levels of Electrical Conductivity, Total Dissolved Solids, Total Alkalinity, Hardness, Calcium, Magnesium, Sodium, and Chloridess were all above the permissible limit according to WHO and Indian Standards. The research was carried out in 2000. Freeda et al. (2001) conducted a study on the quality of the drinking water in five villages located in the Jayakondam Panchayat Union of the Ariyalur District in Tamil Nadu and concluded that the water could be used safely.

Mohapatra and colleagues (2001) presented the results of a correlation investigation on the physicochemical properties of groundwater in the Paradeep locations. According to the findings of a study that was conducted by Ruj (2001) on the groundwater quality of the north western part of the Bankura district in the state of West Bengal, it was discovered that 78% of the water samples from tube wells exceed the permissible limit for iron content in potable water. Jayasree (2002) conducted research on the chemistry of the coastal water in Thiruvananthapuram and discovered that there has been a decline in the quality of the water in specific areas.

Sharma et al. (2002) published a study that examined the effects of industrial pollution on the quality of groundwater in the Kalmeswar region of the Nagpur district in the state of Maharashtra. According to Garg (2003), the physico-chemical characteristics of groundwater from 10 sample sites in Chitrakoot area for four seasons throughout the year 2000 were found to be appropriate for drinking. These parameters were measured over the course of the year. The quality of the groundwater in the Malaprabhaa sub-basin in Karnataka was investigated by Jain et al. (2003). According to the findings of Elangovan et al. (2004), who conducted research on the quality of the groundwater in the Salem Namakkal districts, the water is fit for human consumption. The quality of the groundwater in the vicinity of an industrial region in Jalgaon (Maharastra) was investigated by Chaudhari et al. (2004). They also conducted


**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

research on the Water Quality Index, which indicates that the water is not fit for direct consumption.

## METHODS

In recent years, environmental monitoring, particularly in the form of consistent assessments of water quality, has emerged as an essential component in the process of either exploiting aquatic resources or preserving them.In most cases, determining the quality of the water entails doing an examination of the water's physical, chemical, and biological characteristics. This reveals the current state of the water reservoir's biotic and abiotic elements. As a result, this facilitates the process of designing conservation plans.It is vital to examine and monitor the health of the environment via water quality evaluation since there is a continual flow of chemicals between the water reservoir and the environment that surrounds it.Gathering of information There are two distinct categories of data that need to be collected. Both of these types of data gathering procedures are known as secondary and primary, respectively.

Primary data

It refers to the information that is obtained in a straightforward manner during the course of the inquiry.

Secondary data

It makes reference to the pre-existing data sets in the system. Before engaging in investigations in the field, it is necessary to first collect secondary data. It has the potential to provide important information on the inquiry and serve as the foundation. The data may be qualitative, quantitative or geographical.

## RESULTS AND DISCUSSION

In terms of the presence of species and the number of individuals that make up a population, physicochemical characteristics are of the utmost importance. (Koorosh Jalilzadeh et al (2009). Limnology is the study of aquatic ecosystems, and physicochemical factors are regarded as foundational components in comprehending the trophic dynamics of a specific body of water. While each component plays its own part, the overall impact is determined by how all of these variables interact with one another (Hulyal & Kaliwal, 2008).

 **Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

**Color**

**Fig. 4. 1 Temperature Recorded At All Sites**

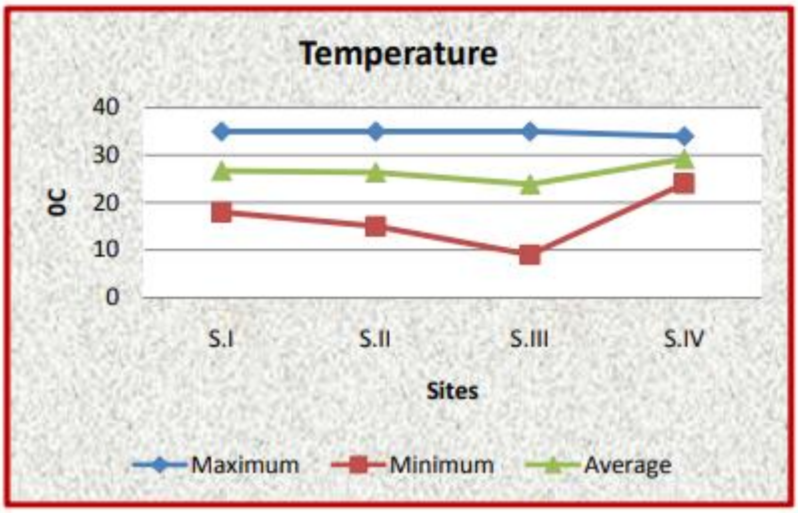



**Fig. 4. 2 (Maximum, Minimum & Average Temp. At All Sites)**

(r= +0.351). It also has a high degree of negative association with DO (r = -0.711), shows a negative correlation with total hardness (r = -0.534), and demonstrates a negative correlation with total alkalinity (r = -0.524). At site IV, the temperature has a moderately strong negative association with nitrate (r= 0.370) and a high degree of positive correlation with EC (r= +0.703).

## ELECTRICAL CONDUCTIVITY (EC)

Electrical Conductivity is a measurable property that may be used to estimate the concentration of salt in a solution. The conductivity of water is directly correlated to the amount of ions, including calcium, magnesium, sodium, chloride, bicarbonates, and carbonates, that are present in the liquid. Therefore, it refers to the entire quantity of salt that has been dissolved in the water.

In the process of dissolving in water, salts release ions that are electrically charged and may thus conduct electricity. Therefore, higher levels of ions in the water are responsible for the electrical conductivity that it has.

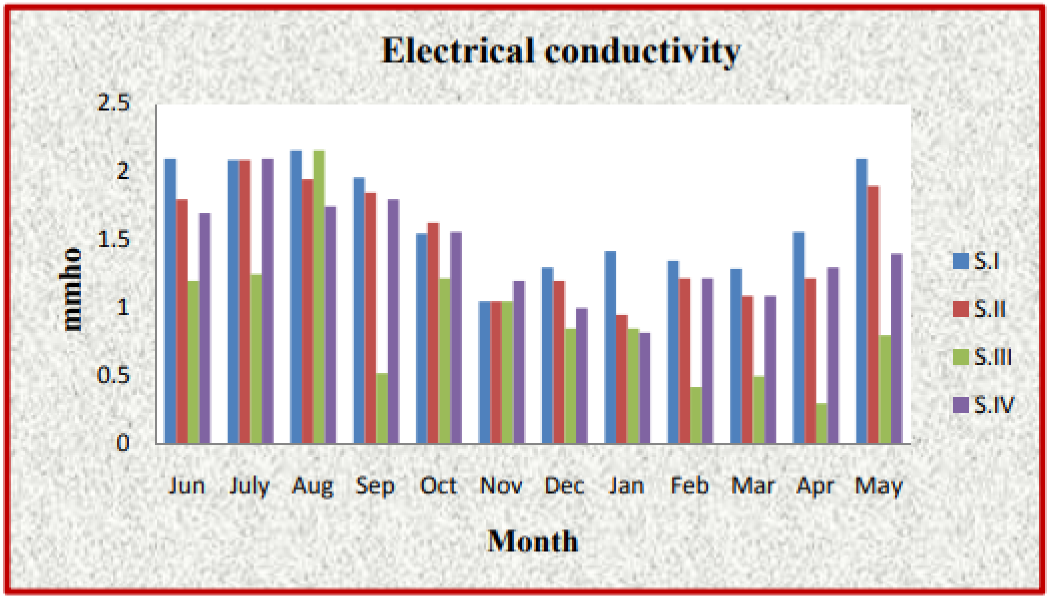

**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

Hard water is the term used to describe the state of water that has a high concentration of dissolved salts. As was said before, hard water also has a higher level of electrical conductivity.

The seasonal shift in conductivity may be attributed, in large part, to an increase in the concentration of salts brought about by the evaporation of reservoir water. Solanki(2001) recorded a finding that was quite similar to this one at the Sursagar lake located in Vadodara. In addition, Trivedy et al. provided support for this theory (1989). An further reason for the lake's increased conductivity might be the influx of waste water from the neighboring areas. However, this was not the case in the research being discussed here.

During the course of the investigation, the value of EC varied from 2.16 to 0.3 mmho/cm across all of the locations.

During the months that have monsoons, often high values are reported. During the months of summer, the amount of water in a body of water often decreases, which has a negative impact on the life that lives there. The majority of them could perish. Because of this, the salts and ions that were present in the body of water were not used, which will cause a rise in the concentration of those substances in the water, which is ultimately responsible for high EC values. After the summer, electrically charged ions are released back into the water as a result of the breakdown of aquatic plants and animals, according to research by Vora et al., (1999), Ahluwalia (1999), and Solanki and Pandit (1999).




 **Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

**Fig. 4. 3(Electrical Conductivity Recorded At All Sites)**

According to the findings of the current investigation, EC has a positive association with Temperature (r= +0.557), Turbidity (r= +0.407), and BOD (r= +0.589). There is a statistically significant inverse relationship between the two (r = -0.503). At site II, the EC demonstrates a positive connection with temperature (r= +0.688), total dissolved solids (r= +0.479), and biological oxygen demand (r= +0.597). In addition, EC has been shown to have a negative connection with both phosphate (r = -0.414) and total alkalinity (-0.410). At site III, the EC has a significant positive correlation with Turbidity (r= +0.716), a significant negative correlation with pH (-0.774), a significant negative correlation with Total Alkalinity (r= -0.571), a significant negative correlation with Calcium hardness (r= -0.541), and a moderate negative correlation with Total hardness (r= -0.447). At site IV, EC has a stronger positive association with temperature (r = +0.703), while also demonstrating a significant negative correlation with total hardness (r = -0.521) and nitrate (r = -0.521). (-0.440).

## TURBIDITY

Due to the increased amount of surface runoff that occurs during the monsoon, lakes and ponds that are left to their natural state may become cloudy during this time of year. This is because the runoff has taken so many objects from the catchment region to the water body. The murky conditions of the pond or lake may be traced back to the presence of silt, clay, organic debris, phytoplankton, zooplankton, and other types of microorganisms.

Das and Srivastava (2003), The levels of turbidity in a water body are helpful in estimating the levels of primary production in that water body, and they may also reveal the pattern of land use in the catchment region.

At each location, the turbidity might be anywhere from 0.1NTU to 25NTU. The highest value is 25NTU.

The highest value, 25 NTU, was recorded at site-I during the month of June 2011, while the lowest value, 0.1NTU, was recorded at site-III during the month of September 2011.

Turbidity readings of 25 NTU and 3.1 NTU were taken at site I; readings of 16 NTU and 1.6 NTU were taken at site II; readings of 8 NTU and 0.1 NTU were taken at site III; and the


**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

greatest and minimum readings of turbidity throughout the research period were recorded as 20 NTU and 1.2 NTU respectively.

The high turbidity of the water in the reservoir is due to the monsoon rains bringing in clay, silt, and a variety of other pollutants. Rainwater is also a contributing factor. Ansari and Prakash (2000), Solanki (2000), Dagaonkar and Saksena (1992), and Garg et al., all found findings that were comparable to those found by Ansari and Prakash (2000). (2006).

The monsoon season often brings about an increase in turbidity across the board. Jawale, C.A., et al. found findings that were comparable to these (2009). Results found by Govind Balde, Vasumathi Reddy, and others who participated in the study were likewise quite similar (2009). The amount of rainfall that occurs during monsoon season is another factor that determines the turbidity.

**TDS**

The total dissolved solids (TDS) measure the amount of dissolved salts found in natural water. These salts include carbonates, bicarbonates, sulfates, phosphates, chlorides, and nitrates of calcium, magnesium, sodium, potassium, iron, and other elements.

The high concentration of dissolved solids causes a rise in the water's density and has an effect on the osmoregulation process. Because of the high TDS, gases like oxygen are less soluble in the water, and as a consequence, this water is unfit for drinking, as well as for usage in home and industrial settings.

At site-IV, the TDS concentration reached its highest point at 1510 mg/l, whereas at site II, it fell to its lowest point at 280 mg/l. During the monsoon season, the average TDS was observed at 1160 mg/l at site I, 460 mg/L at site II, 365 mg/l at site III, and 1097 mg/l at site IV respectively. These values were also documented to be 1330mg/l during the winter season at site I, 342.5mg/l during the winter season at site II, 545mg/l during the winter season at site III, and 1467.5mg/l during the winter season at site IV. At site I, it was reported as 1445 mg/l throughout the summer; at site II, it was 437.5 mg/l; at site III, it was 480 mg/l; and at site IV, it was 1070 mg/l.

 **Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

A water body with a high concentration of TDS has an enhanced nutrient status, which leads to the eutrophication of the aquatic environment. Within the scope of the current investigation, site IV reveals the following: 0 5 10 15 20 25 30 S.I S.II S.III S.IV

There are various indications that changes are occurring that may eventually lead to eutrophication at NTU Sites Turbidity Maximum Minimum Average 10. Singh and Mathur both reported seeing results that were comparable (2005).

After the monsoon season, TDS rose to a higher level. Similar findings were reported by Jawale A.K. and colleagues (2009), as well as by N. Vijaykumar (2009). The observed variance might be explained by the dilution effect that is connected with the rainy season, whereas the high rate of water evaporation that occurs during the summer could be the cause of the fluctuation. Sitaramassamy (1995). (1995).

**PH**

The hydrogen ion concentration is used to calculate the pH value, which is written as the negative logarithm of the value. Both hydrogen positive (H+) and hydrogen negative (OH-) ions may be found in water. When there are more H+ ions in water than OH- ions, the water is said to be acidic, but when there are less H+ ions than OHions, the water is said to be basic or alkaline.

The pH scale typically runs from 0 to 14. Any value of the solution that falls between 0 and 7 is thought to be acidic, 7 is seen to be neutral, and any value that falls between 7 and 14 is thought to be basic or alkaline. The equilibrium that exists between the dissolved $CO_2$, carbonates, and bicarbonate ions in pure fluids is what determines the pH of the water. According to De 2003, the pH levels of natural waters are typically anywhere between 6.0 and 8.5. When a body of water is regularly monitored, changes in its pH as well as its conductivity may be used to infer the existence of certain effluents. Sunilkumar (1998). (1998).

The majority of living forms, as well as the majority of other uses, are unable to survive in waters with pH levels that are either higher than 9.6 or lower than 4.5. According to research done by Verma et al. in 1978 and Sharma et al. in 1981, the majority of the fresh water bodies in India have a slightly alkaline pH.


**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

0 200 400 600 800 1000 1200 1400 1600 1800 S.I S.II S.III S.IV Mg/L Sites

Total dissolved solids

Maximum Minimum Average

The presence of dissolved solutes in it, which may exhibit a buffering activity, may be the cause of its alkaline character. Therefore, the H+ ions are balanced off by the OH- ions. Vora et al (1998).

The water body's pH is one of the most critical factors that determines the growth and development of the water body's flora and fauna. Because of this, the value of pH is of utmost significance due to the fact that the vast majority of biochemical reactions and biological processes are reliant on pH. The findings of Vasumathi Reddy et al (2009).

The current research found that the lowest pH value, 6.9, was recorded at site III while the highest pH value, 8.9, was detected at site IV. Throughout the course of the investigation, pH readings of 8.03, 7.94, 7.88, and 7.77 were measured and recorded as the average pH for each location. At location I, the average pH for the monsoon was reported as 7.9, whereas at location II it was 7.75, at location III it was 7.8, and at location IV it was 7.55. These were 7.9, 7.75, 7.8 and 7.35 during the winter months at sites I, II, III, and IV, respectively. In the same manner, an average pH of 8.3 was measured throughout the summer season at site I, whereas 8.2 was recorded at site II, 8.23 was recorded at site III, and 8.4 was recorded at site IV.

According to the findings presented above, the pH level was very high in the summertime. This is due to the tremendous photosynthetic activities that are taking place. This is also backed by Sanathanana in the same manner (1976).

Kushwah (1989), Vijaykumar (1991), and Vasumathi Reddy et al., all found that the pH levels in various bodies of water reached their highest point in the summer (2005).

The pH values that are often measured at various locations vary from 7.77 to 8.6, which is considered to be somewhat alkaline. Both Yeole and Patil observed very alkaline pH readings in their studies (2005). values of pH greater than 7 as a result of the strong buffering capacity of the system. Shelat and others (2005). The monsoon season had some of the lowest pH readings ever recorded. According to Grace (2006), the low value of pH during the monsoon


**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

was due to the transit of slightly acidic humic materials in colloidal suspension. This was the reason of the low pH value.

## TOTAL HARDNESS

The degree to which water is able to interact chemically with soap is referred to as the hardness of the water.

Ravindranath and Kumar both (1998). The cations calcium and magnesium form bicarbonates and carbonates, which are responsible for the water's temporary hardness. While sulfates and chlorides of calcium and magnesium are responsible for the water's persistent hardness, other factors may also contribute. Because calcium and magnesium have a concentration that is much greater than that of other cations, these two elements are the ones that are often used to determine the hardness of a substance. It plays a significant part in the dispersal of living creatures, and many species have been characterized as markers of the hardness or softness of the waters in which they live.

In the current investigation, the average hardness of all of the lakes was measured to be 170.42 mg/l, 142.5 mg/l, 188.33 mg/l, and 245.83 mg/l at site I, site II, site III, and site IV correspondingly. This remained the case for the whole of the study period. At site I, the maximum hardness measured 185 mg/l while the minimum measured 150 mg/l. At site II, the maximum measured 200 mg/l while the minimum measured 80 mg/l. At site III, the maximum measured 260 mg/l while the minimum measured 120 mg/l. At site IV, the maximum measured 350 mg/l was recorded as maximum while the minimum measured 80 mg/l.

0 2 4 6 8 10 S.I S.II S.III S.IV

pH Sites pH Maximum Minimum Average

The average amount of hardness during the monsoon season was measured to be 170 mg/l, 140 mg/l, 155 mg/l, and 197.5 mg/l accordingly at sites I, II, III, and IV.

The same was documented as having a concentration of 175 mg/l, 137.5 mg/l, 207.5 mg/l, and 315 mg/l throughout the winter season at site I, site II, site III, and site IV, in that order.

 **Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

170 mg/l was found at site I, 150 mg/l was found at site II, 202.5 mg/l was found at site III, and 225 mg/l was found at site IV over the summer season.

In most cases, the highest value of hardness is measured during the summer months. It's possible that the water has evaporated, and salts of calcium and magnesium have been added in its place. Bagde and Verma (1985) found findings that were comparable to these. This was further corroborated by the research conducted by Udhaykumar and colleagues (2006).

During the course of this research, researchers noticed signs of eutrophication at sites III and IV. These signs may be categorized as either positive or negative. It's possible that this is what causes the hardness level to drop over the summer. Pendse et al., (2006) saw the same kinds of alterations as well.

According to Patel and Sinha (1998), the primary factors responsible for overall hardness are eutrophication, magnesium, and calcium. The presence of a high quantity of calcium and magnesium in addition to sulphate and nitrate in the sewage waste that is added during the monsoon may be the cause of the high value of hardness that is measured during this time of year. Angadi and colleagues (2005) reported the same kinds of findings at the Papnash pond in Karnataka.

The outcomes of the current investigation are not exactly the same. This might be for a couple of reasons: first, the rain may have been delayed, and second, there may not be any sewage water flooding the reservoirs.

## CONCLUSION

The current investigation was carried out starting in June 2011 and continuing through May of 2012. During this time period, the city of Ahmedabad's four talavs, also known as ponds, were chosen to serve as the research location.They are all situated in various parts of the world and experience varying degrees of influence as a result of the many ways in which humans interact with their environments. The Kankaria Talav (Site I) is the largest of these four, followed by the Vastrapur Talav (Site II), which is of a medium size, and then the Malav Talav (Site III) and Ropada Talav (Site IV) are of a modest size.When compared to the preceding several years, the average rainfall that was reported throughout the research period was much lower.Nearly all of the research sites' physicochemical properties were determined to be within the acceptable range, which was one of the primary purposes of the


**Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

study.The conventional 37 procedures, which are described in chapter II, were used in order to perform analyses on both the physico-chemical and the biological parameters. Color, Odor, Temperature, pH, Turbidity, Electrical Conductivity, Total Dissolved Solids, Total Alkalinity, Total Hardness, Nitrate, Phosphate, Biological Oxygen Demand, and Chloride were the factors that were taken into consideration.

## REFERENCES

1. Ali, M.A., Salam, A. Azeem (2000) "Studies on the effects of seasonalvariations on physical and chemical characteristics of mixed water from Rivers Ravi and Chenab at union site in Pakistan". J. Res. B.Z. University, Multan, 2: 1-17.

2. Anandan, G., Sampath Kumar, P., Soundrapandian and Kannan, L (2004). Observation of Environmental characteristics of Ariyankuppam Estuary and Veerampattinam coast of Puducherry, India. J.Aqua.Biol.19(2): 67-72

3. Anant J. Dhembare, MS, India. (2001). European Journal of Experimental Biology, 1(2):68-76

4. Andhale, S.B. and P.B. Padiwal, (2009). J.Aqua.Biol.24(2), 5-11

5. APHA, (1998) "Standard methods for the examination of Water and Waste water."20$^{TH}$ edition. American Public Health Association, New York

6. Bagde, U.S. and Verma A.K. (1985) Limnological studies on JNU lake, NewDelhi, India Bull:Bot.Soc.Sagar, 32:16-23

7. Bath, K.S, and H. Kaur (1997) Crustacean population in relation to certainphysic-chemical factors at Harike reservoir (Punjab).
    i. J.Enr.Ecol.Vol.15(4):954-957

8. Battish, (1992). Fresh water zooplankton of India, Oxford and IBH Publishing Co., New Delhi.

9. Bhandarkar, W.R., Bhandarkar, S.V., Murkute, V.B., (2008) Observation on species diversity of Brachionus (Rotifera) from Kalikar pond, Bramhapuri, district Chandrapur, Maharashtra. J.Aqua.Biol. Vol 23(2) : 4-7

 **Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*

10. Chari, M.S. (1980) Environmental variation in the physico-chemical characteristics of freshwater body. M.Phil Thesis. Aligarh Muslim University,Aligarh.

11. Charjan, A.P., R.A. Malu and K.M. Kulkarni, (2008), J.Aqua.Biol.Vol23(2,:8-10

12. D, C. Sancheti and V.K. Kapoor, (1998) Statistic (Theory, methods and applications), Sultan Chand & Sons.

13. Dagaonkar and Saksena, D.N. (1992) Physico-chemical and biological characterization of a tample tank, Kaila Sagar, Gwalior, M.P., J.

    i. Hydrobiol;8(1):11-19

14. De, A.K. (2002) Environmental chemistry (4th Ed.) New Age. Internationa Publishers, New Delhi, India, p.232

15. Deshmukh, J.U. and Ambore, N.E. (2006) Seasonal variation in physical aspects of pollution in Godavari river at Nanded, MS, India. J.

    i. Aqua.Biol.Vol.21(2),93-96

 **Jitendra Kumar *,** *University Department of Botany: B.R.A. Bihar University, Muzaffarpur. India.*