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PHYSICOCHEMICAL CHARACTERISTICS OF SURFACE WATER QUALITY OF PACHAMALAI HILLS, TAMILNADU.

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ABSTRACT

Water is an essential component of the environment and it sustains life on the earth. Moving water dilutes and decomposes pollutants in an efficient manner than standing water, but many rivers and streams remain significantly polluted all around the world. The study was conducted to determine the surface water quality of Pachamalai Hills, TamilNadu. To perform the study surface water samples were collected from different locations and analyzed for various physicochemical parameters such as pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Alkalinity, Total Hardness, Calcium (Ca), Magnesium (Mg), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) and Nitrate. The analytical results of surface water quality parameters were compared with the World Health Organization (WHO) standards to assess their suitability for drinking purposes.

Introduction

Water is the most precious gift nature has given to mankind. Unlike other resources, water does not have a substitute in its main uses and it cannot be replaced. It is indispensable, limited and vulnerable resource. Virtually, no activity in the environment would be possible in the absence of water. Not only do we need water for our food, power generation, industrial processes, but we need it as a requirement in our life and our bodies need to ingest water every day to continue its functioning. Lack of good quality of water is found to be one of the important causes of human distress, disease and early death, directly or indirectly. Due to the close relationship between water and lifestyle, attention is paid to textures, religions and social orders. Water, as a resource is not evenly distributed spatially or temporally around the world and its declination and deterioration affects every sphere of life. Many parts of the world are affected by water scarcity and/or water quality problems to a minimal or greater extent.

Water pollution is one of the most serious causes for water scarcity. The main sources of pollution to water are domestic sewage, industrial, agricultural and other consumable wastes. These pollutants convert the water unusable and in turn lead to water scarcity. In addition to this, pollution of water bodies contaminates the groundwater reserve thereby affecting the groundwater from the usage for agricultural or any other activities. Awareness about the quality of water to be maintained and the problems due to water pollution are to be addressed and analysed immediately (Selvam, 2003).

Rapid industrialization and urbanization have wiped out the stream for the purposeless release of granular water and impacting amphibious lifestyles. In India, unlike northern waterways, southern streams are less treated, probably due to their more modest size and release, and most of the Indian streams on the peninsula are very localized. Limited (Nikhil and Azcz, 2009). Studies have shown that there is a spectacular ignition between heavy metals and pollutants in surface waters (Ishaki et al, 2012). A study by Govindarajalu (2003) revealed a scientific problem in canal bowls, where untreated modern waste and the release of metropolitan sewage (Usharani et al, 2010) severely polluted floor water. Normal water is sufficient for the existence of two creatures and plants on Earth (Nikanorov and Braznikova, 2009). After that, entry to secure incineration water is essential for welfare and is an important simple freedom important for the 2010 United Nations 64/292 decision (United International Places, 2014). Worldwide, 184 million people rely on floor water for endurance (WHO, 2019). In Uganda, 7% of the population depends on floor water (lakes, waterways, waterways for water dispensers, lakes) for water consumption (Uganda Bureau of Statistics, 2012).

. Surface water makes up a very small part (hardly 4%) of worlds total available fresh water and 96% is flowing as ground water. Ground water is stored preliminarily in aquifers which are geological formation of permeable saturated zones of rock, sand and gravels. The aquifers are recharged as atmospheric precipitation seeps into the ground or surface waters drain into them (Mehta and Trivedy, 1993). Being open water bodies, surface waters are more easily accessible and hence susceptible to pollution from run-off waters contaminated with pesticides/fertilizers used in agricultural fields, soil particles, industrial and domestic wastes from cities and rural bases. The atmospheric pollutants also find their way into surface waters through precipitations. Contaminants in surface waters can also depend on geology and hydrology ofthe area; cause pollution in an aquifer (Shields, 1985, Travis and Etnier, 1984). Soil water resources include lakes, streams, streams, trenches, and lakes. These groundwater resources often cannot be contaminated by the physical activity of humans, creatures, and the weather (Hunter, 2003 and Vitousek et al., 2008). Worldwide, waterborne infections, such as diarrhea, are responsible for two million more deaths each year. most of these passages occur in young people under 5 years of age (WHO, 2020).

The present investigation is an attempt to address the issue, in assessing the status of surface water quality through an estimation of physico-chemical parameters using standard methods (APHA 2005). The western part of the catchment area faces southwestern storms, mainly from June to September, and the Jap side receives most of the downstream at some point during the eastern rainy season from October to December. Therefore, the factors of this study were modified to determine the characteristics of the physical problems of the floor water source, and the area located on Pakumarai Hill was selected from the

cold seasons of Yar, summer and storm length. ..

Study area

Pachmal slides have been set up in three areas of Salem, Parambalur and Trichy in Tamil Nadu. The modern research area is located in 11 ° 7'47 " N-11 ° 29'26"N areas and the length around the topographic is seventy ° 24'22 " E - 78 ° 51'10 'E' quarter 14,122 ha Two cities in Gangavalli Is, a rectangle shaped like Salem and different cities in Uppilipuram and Thurayur Chowk in Trichy. An underheat and humidity wins at a base temperature of 23 થી C to 31 સે C and 12 18 C to 18 સાથે C with optimal temperature. In the last ten years, a limit of 1250 mm has been recorded so far. In general, the heast reaches the maximum amount of rainfall at any stage of the east-east storm in the long section from October to December. Southwest storms occur occasionally during the long period from June to September.

Sample Collection

15 examples have been selected for the description of groundwater physiological synthetic residences in the Pachamalai Hills. All surface filters such as winter, summer and rainfall were collected.

Methodology

Surface water tests were conducted from 15 regions (backward hills) during the four seasons, especially during winter, summer, southwest monsoon and northeast monsoon. Examples were investigated to determine the pH estimates of the examples using a pH meter and the electrical conductivity (EC) was estimated using an advanced meter. Absolute dissolved solids, alkalinity, total hardness, calcium, magnesium, chloride, dissolved oxygen (DO), organic oxygen demand (BOD) and chemical oxygen demand (COD) were evaluated. Nitrate action was estimated with the help of a spectrophotometer (Systronics - Double Beam Spectrophotometer Model - 2202). Nitrate was evaluated by the brucine sulfenilic crossactive strategy and the optical thickness in the lab is estimated at 410 nm, using a standard strategy suggested by the American Public Health Association (APHA 2005). All analyzes were completed in honor three times.

Results and discussion

Physico-synthetic barriers such as pH, electrical conductivity (EC), total dissolved solids (TDS), alkalinity, total hardness, calcium (CA), magnesium (Mg), chloride, dissolved oxygen (DO) and organic oxygen (BOD)). , Chemical Oxygen Call (COD) for the rating of accumulated water in Pachamalai Hills, and nitrate of water were broken.

These parameters were taken at the 15 different sampling sites namely (S1-Kodungal, S2-Malankadu, S3-Periya Nagar, S4-Chinna Mangalam, S5-Neyvasal, S6-Ponnavarai, S7-Chinna Pakkalam, S8-Vengamudi, S9-Perumparappu, S10-Periya Chittur, S11-Sengattupatti, S12-Kambur, S13-Kilkarai, S14-Kundakkadi, S15-Nachchalipatti) of the season wise (monsoon, winter and summer). The major constituents of the surface water inside the investigation region with minimum and maximum values are presented in the

following figure 1 to 12.

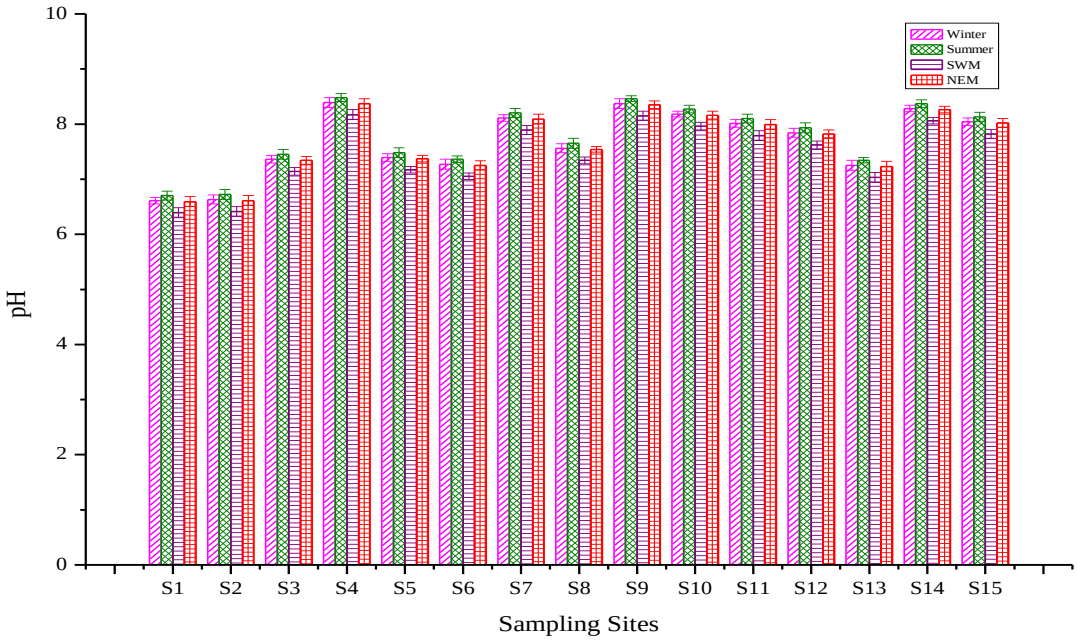

Fig: 1 pH content of surface water samples at Pachamalai hills selected areas

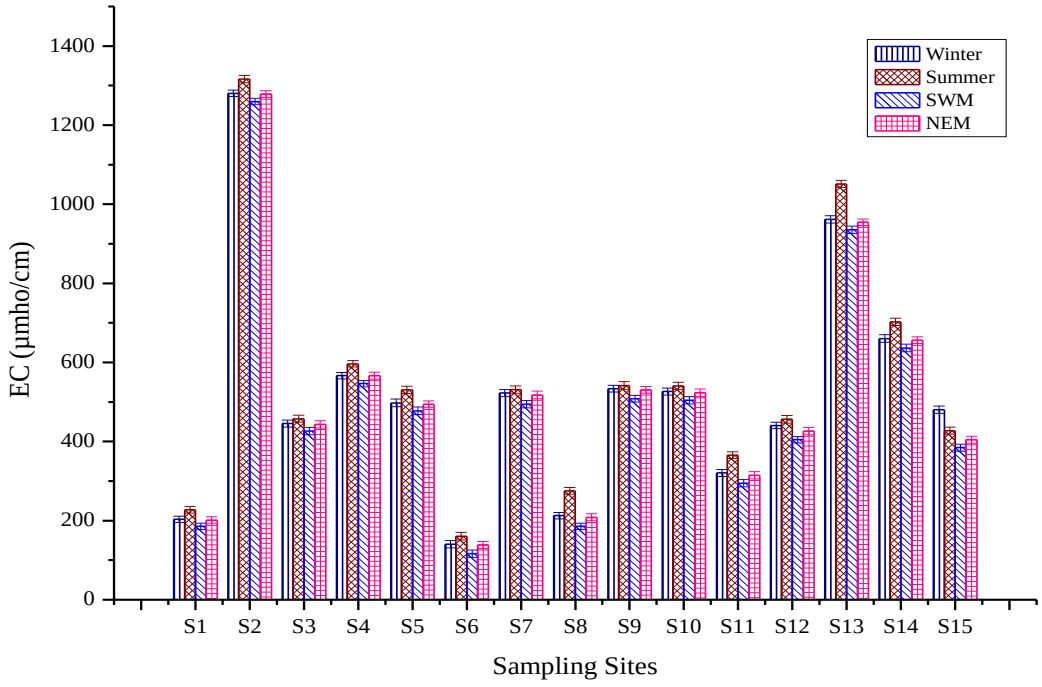

Fig: 2 Electrical Conductivity content of surface water samples at Pachamalai hills selected areas

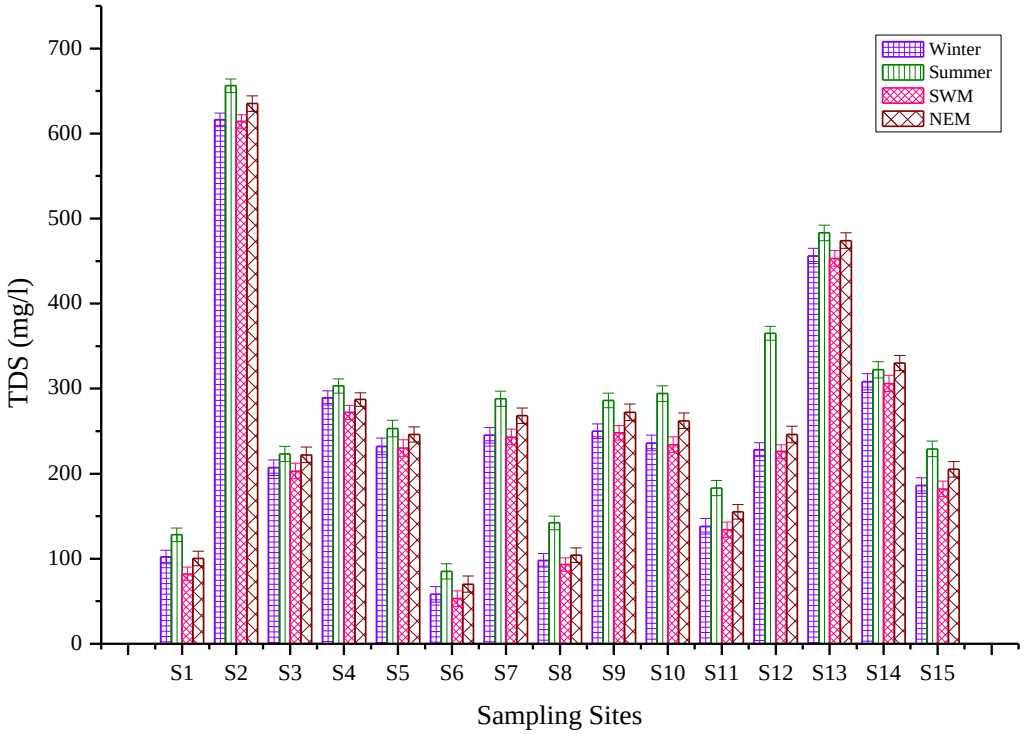

Fig: 3 TDS content of surface water samples at Pachamalai hills selected areas

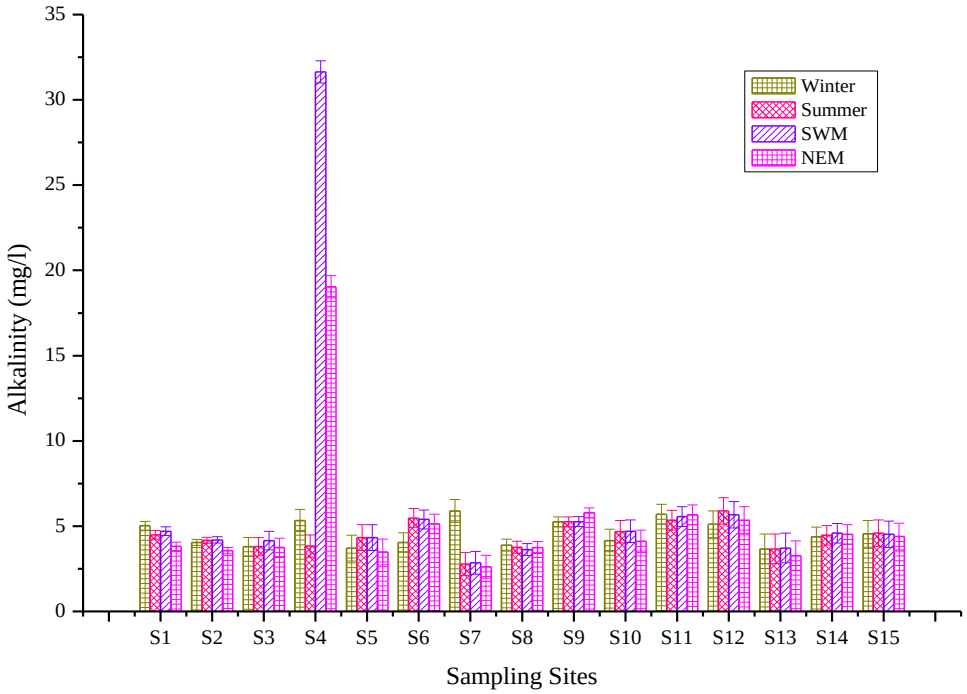

Fig: 4 Alkalinity content of surface water samples at Pachamalai hills selected areas

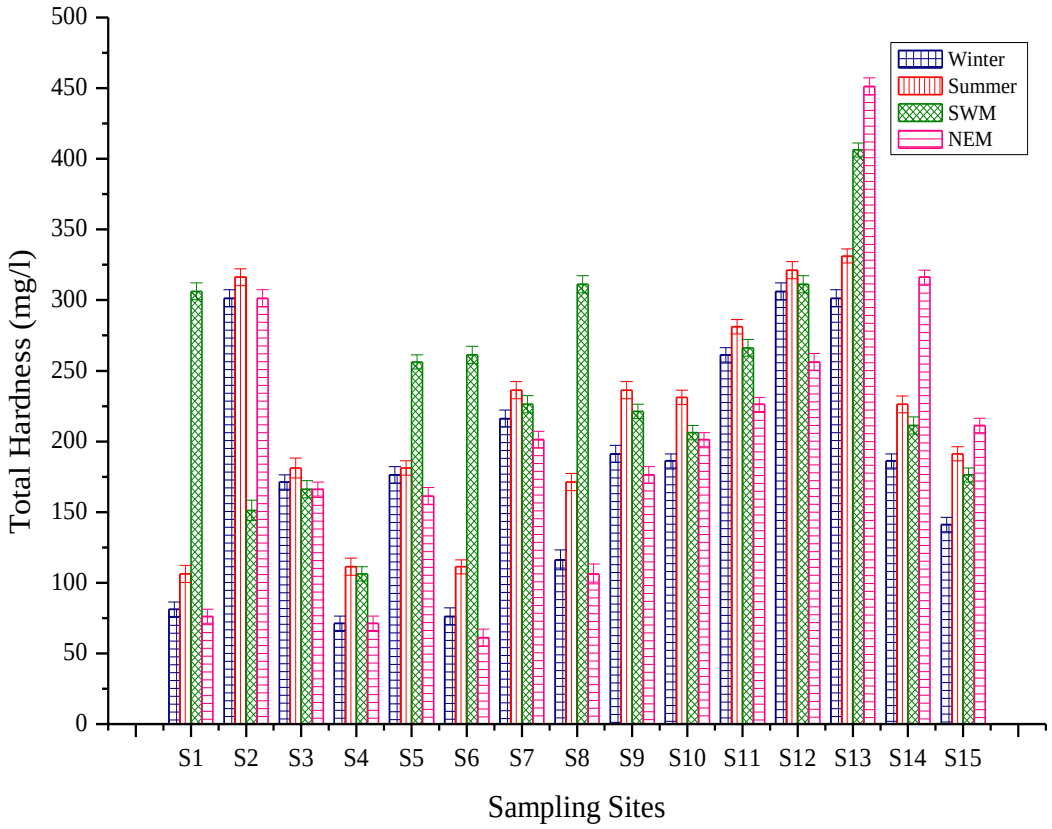

Fig: 5 Total Hardness content of surface water samples at Pachamalai hills selected areas

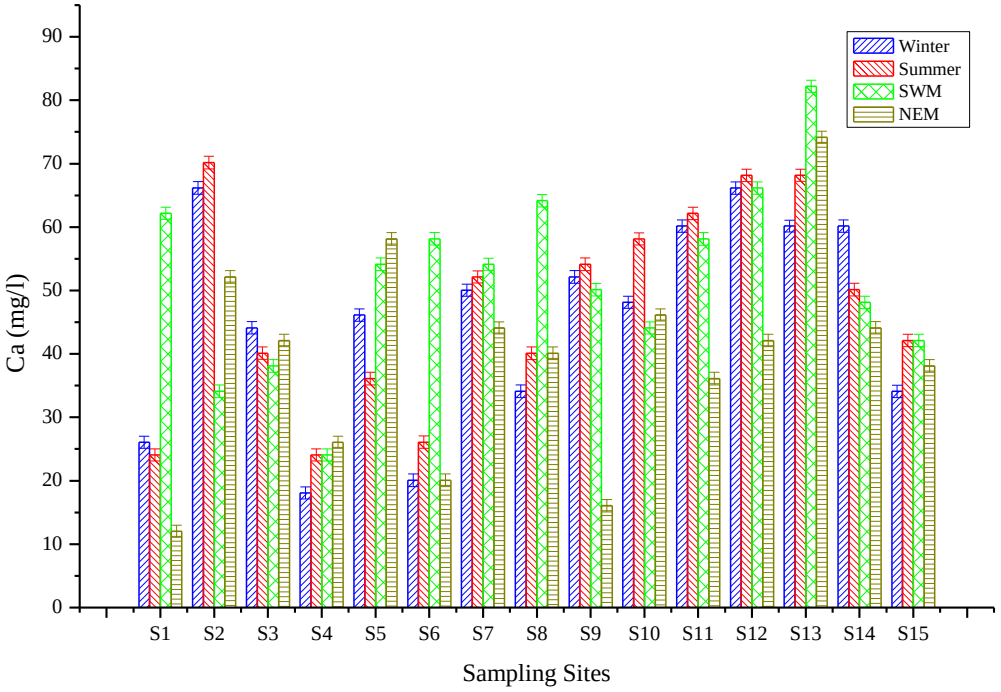

Fig: 6 Calcium (Ca) content of surface water samples at Pachamalai hills selected areas

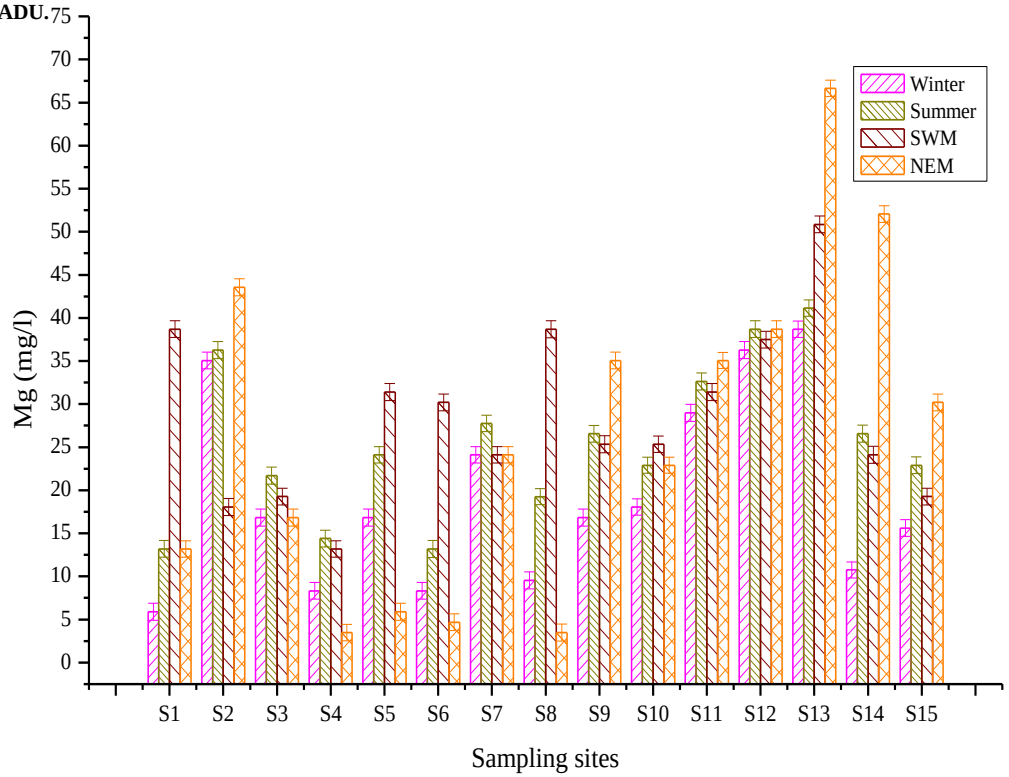

Fig: 7 Magnesium (Mg) content of surface water samples at Pachamalai hills selected areas

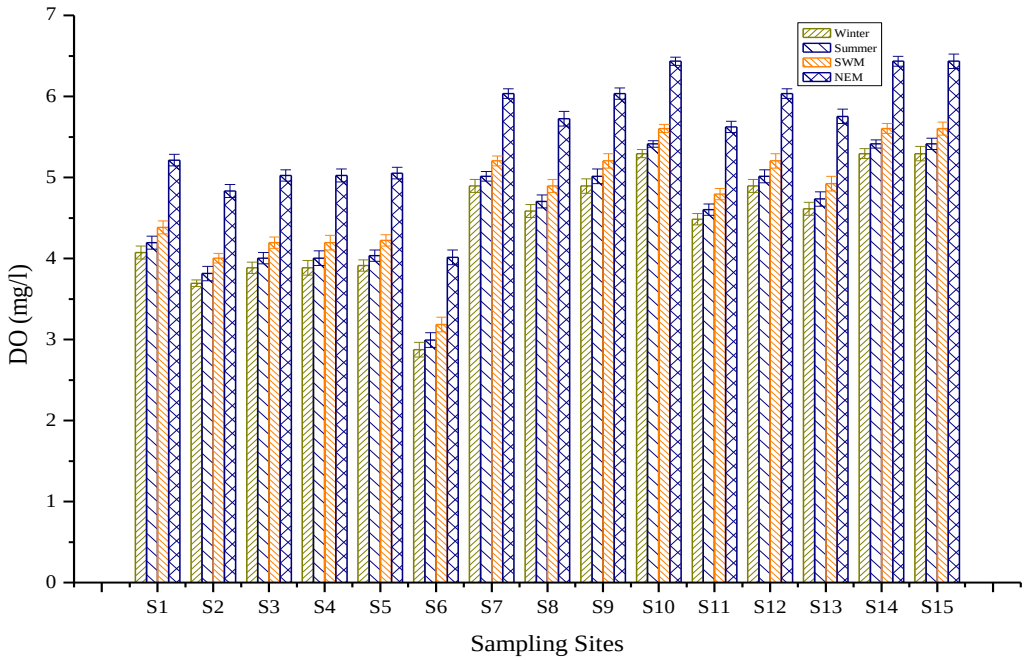

Fig: 8 Dissolved Oxygen (DO) content of surface water samples at Pachamalai hills selected areas

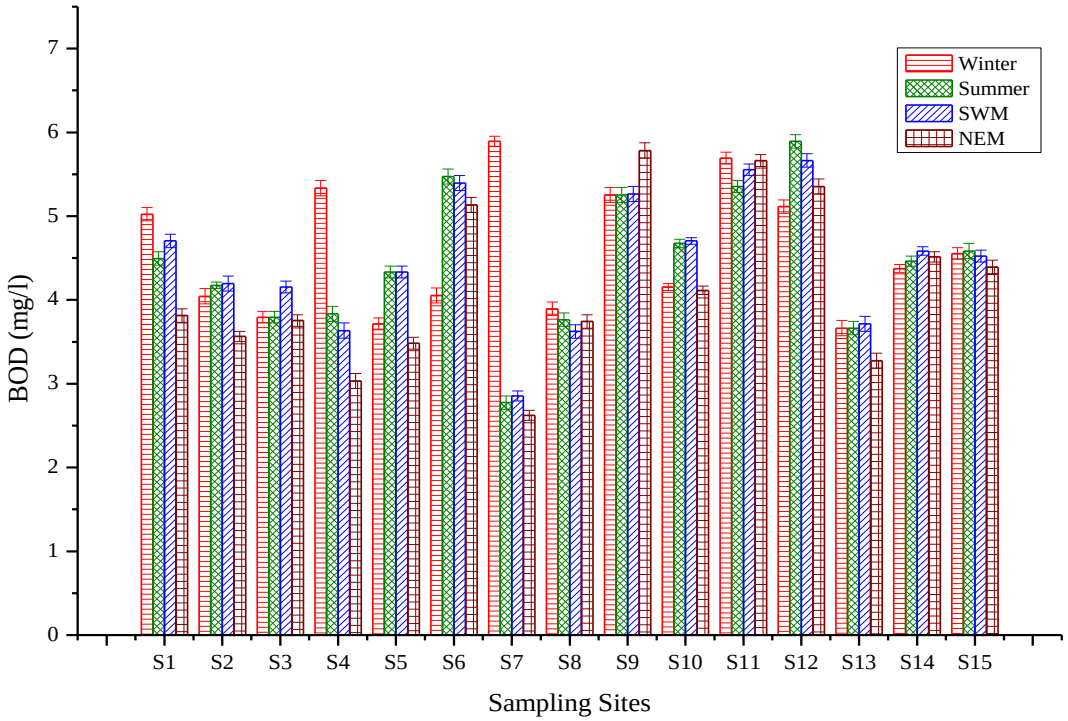

Fig: 9 Biological Oxygen demand (BOD) content of surface water samples at Pachamalai hills selected areas

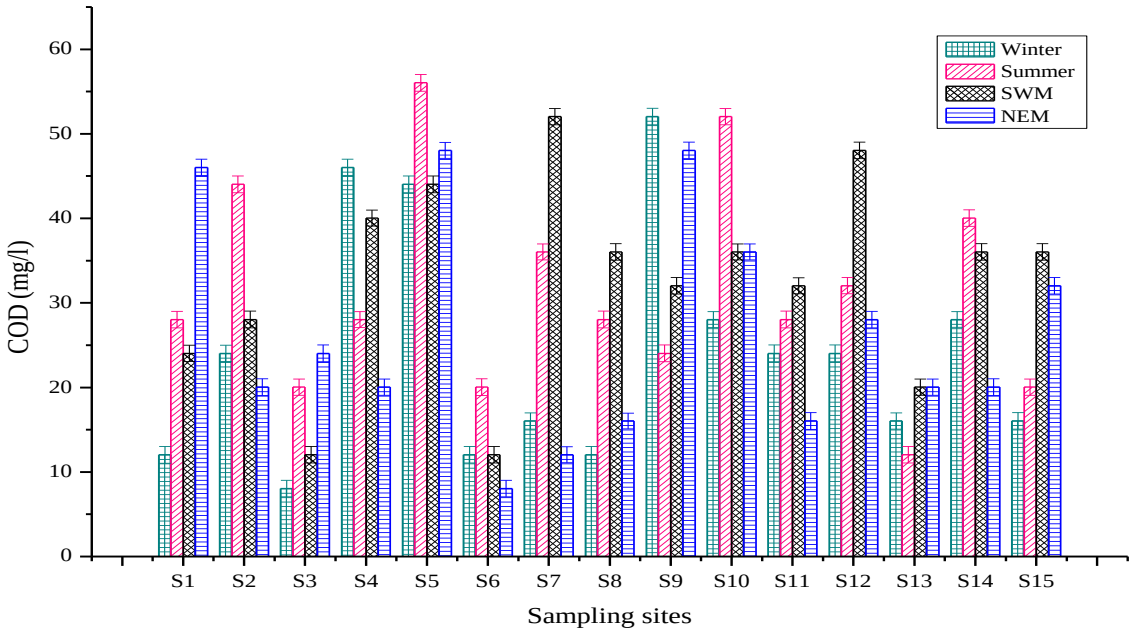

Fig: 10 Chemical Oxygen Demand (COD) content of surface water at Pachamalai Hills selected areas

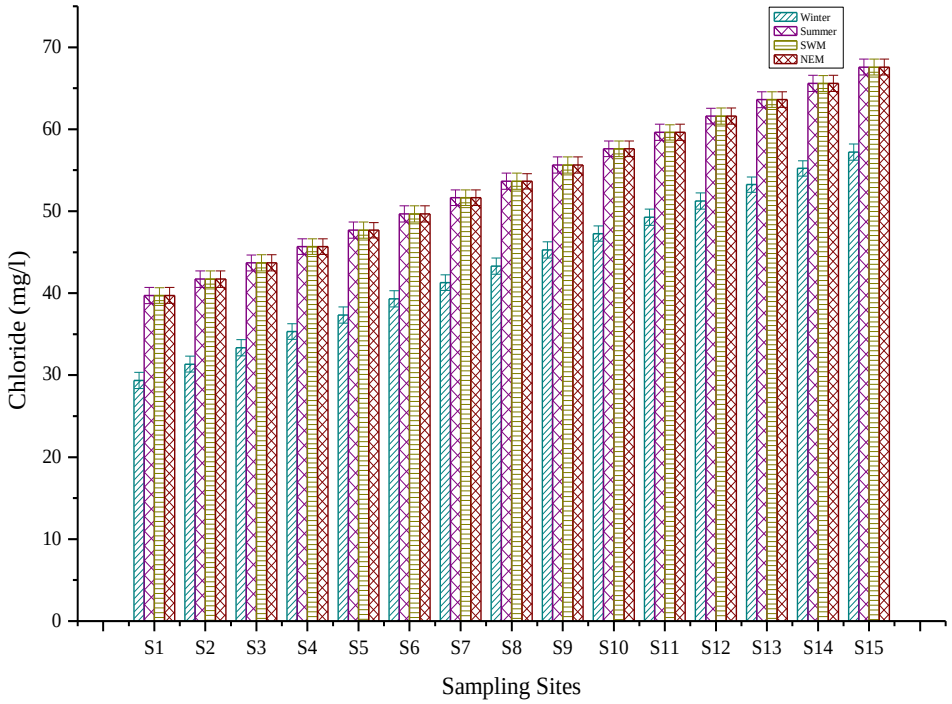

Fig: 11 Chloride content of surface water samples at Pachamalai hills selected areas

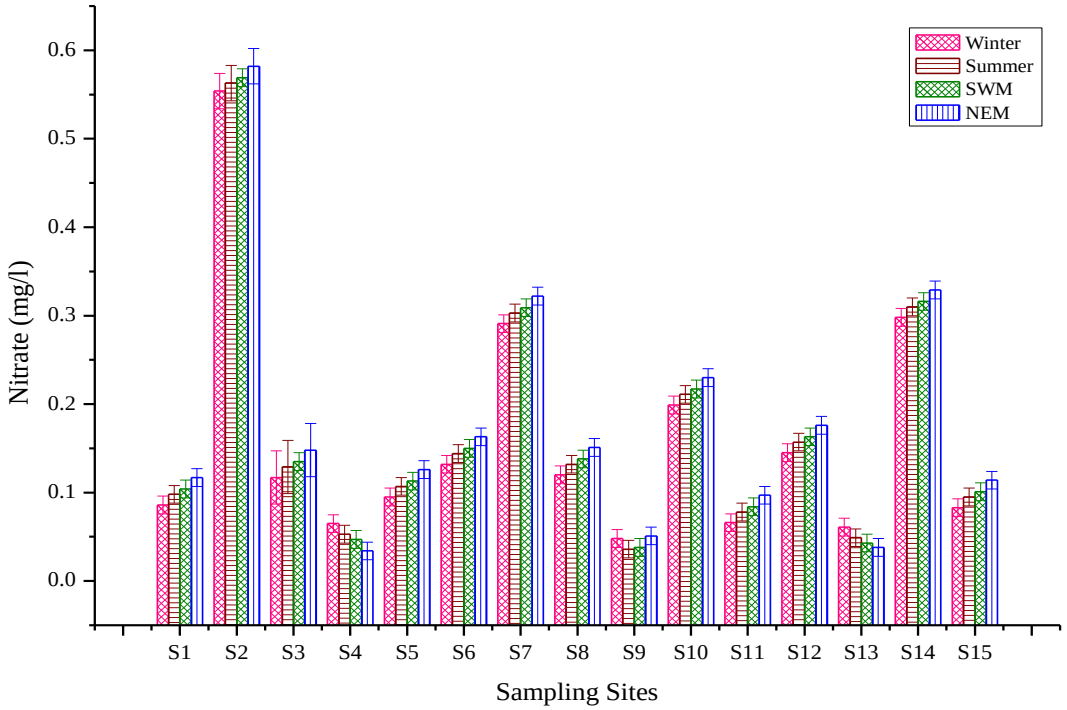

Fig: 12 Nitrate content of surface water samples at Pachamalai hills selected areas

The sampling sites showed the variation of pH in different seasons. The impetus behind finding a pH honor is to determine whether the water consumed is acidic or soluble in nature. pH value of water samples was found minimum at S1 during rainy season and maximum at S5 winter. Its mean value was found to

be minimum (6.6) at S1 and maximum (8.48) at S5 in the rainy and summer seasons respectively. It is observed that almost all the surface water samples within the prescribed limit (6.5-8.5). Electrical conductivity of water samples was observed minimum at S6 and maximum at S2 in the winter, summer and monsoon season, respectively. Its mean value was found minimum (116µS/cm) at S6 and maximum (1316.5 µS/cm) at S2 in the winter, summer and monsoon respectively. The electrical conductivity of water (EC) is based on the concentration of the particles and their complementary reputation (Saiful Islam et al., 2015). The EU presence study is usually tested on the feasibility of water at some distance, which is established with the help of the WHO.

The Total Dissolved Solids (TDS) values in surface water samples were detected to have minimum at S6 and maximum at S2 in the winter, whereas, its mean values were found minimum (58.14mg/1) at S6 and maximum (656mg/1) at S2 in the rainy season. TDS shows the general role of water as excellent or salty. Generally, water containing 500 mg / LTDS is not always considered sufficient for human consumption, although more mineral water is used, which does not always contain better quality water. All the water samples were found to have mean TDS level above 500 mg/1, signifying high inorganic pollution load (Suman *et al*, 2003).

Alkalinity values in water samples were found minimum at S5 in the rainy season and maximum at S4 in the winter. Its mean values were minimum (3.15 mg/1) at S5 in summer and maximum at (31.63 mg/l) in the winter. The fall of alkalinity in the rainy season is ascribed to dilution due to rainfall (Jain *et al.,* 1996, Khabede *et al.*, 2003). Salinity in water is a measure of its ability to kill corrosion and is characterized by the presence of hydroxyl debris with hydrogen particles in its composition. That mile is, after all, buffering water. For example, the simple alkaline diplomas found in the majority show the presence of helpless and stable bases in water, such as carbonates, bicarbonates and hydroxides (Jeyakumar *et al.,* 2003).

The total hardness values in the water samples were found minimum at S6 and maximum at S13 in the rainy and winter and summer seasons, respectively. Its mean value was minimum (61 mg/1) at S6 and maximum (331.3 mg/1) at S13 in the monsoon season. Hardness is directly recognized by the whiteness of the water and the properties of the water decontamination framework and affects everything that devours, lives or uses water, whether herbal or inorganic, better or worse (Ganesh Kumar et al., 2017) . In my opinion, calcium and magnesium substances in water quality tests are detected at least in S4 in icy conditions and in S2 in the middle of the year. The mean values for Ca and Mg were minimum with (18.06 mg/1) at S4 during rainy and (66.16mg/1) at S2 during summer, respectively. Their maximum values were found to be 82.19mg/1 at S13 and 74.17mg/1 at S13 during the rainy season. The mean values of Ca and Mg were found minimum (13.8mg/l) in the rainy at S4 and (66.64 mg/1) in summer at S13 respectively. All the water samples were observed with calcium (Ca) and magnesium (Mg) contents within the desirable limits.

Chloride concentration in water samples were observed minimum at S1 and maximum at S15 in the summer. The mean values were found minimum (29.36 mg/1) at S1 and maximum (67.58 mg/1) at S15 in the rainy season. All the samples were observed with chloride level above the desirable limit of 250 mg/1. Chloride auxiliary ingestion of water is trendy, because it does not represent a good opportunity if gifted less than 250 mg / 1. It is believed that before this level, it gives the water a fragrant taste. Those unfamiliar with high chloride in water are exposed to the effects of diuretics (Prakash and Rao, 1989).

The dissolved oxygen concentration in water samples were found minimum at S6 in the summer and maximum at S15 in the winter. The mean values were minimum (2.9 mg/1) at S6 in the summer and maximum (5mg/1) at S15 in the winter. DO indicates the degree of pollution of water and low DO value indicates high pollution load. Summer DO is likely to be depleted due to high temperatures (Chorasia and Adoni, 1985) and poor solubility of oxygen in the water, which ultimately affects the appreciation of BOD (Singh et al., 1991). DO is important and necessary for super water. Aromatic decomposed oxygen, which is in water consumption, provides flavor and has strong fluctuating aspect in water (Abhishek Kumar Awasthi *et al.*, 2012).

The BOD level in water samples were found minimum at S13 and maximum at S9 in the rainy season. Its mean values were minimum (3.6 mg/l) at S13 in the winter and maximum (5.2 mg/l) at S9 in the winter, summer and monsoon season respectively. The observed low BOD values in the rainy season may be due to dilution (Upadhyay and Rana, 1991). High BOD values in some sources also in the rainy season may be due to seepage of contaminated waste water containing decayed organic matter and effluents (Rajurkar *et al.*, 2003). In this study chemical oxygen demand (COD) levels in water samples were found minimum at S3 in the winter and maximum at S5in the rainy season. Its mean values were obtained minimum (8.03 mg/l) at S3 in the winter and maximum (52.03 mg/l) at S9 in the rainy season. COD in water estimates the carbonaceous fraction of organic matter; Since this is the degree of oxygen necessary to destroy the natural combination of water. Low COD values observed in different samples are attributed to the presence of minimum readily oxidizable organic matter. As many as possible in estimating the number of separate examples of the Charter of Democracy of 20 mg/l (ICMR). Nitrate content in the water samples were found minimum at S9 in summer and maximum at S2 in the rainy season. Its mean values were also found minimum (0.04 mg/1) at S9 in the summer and maximum (0.56 mg/I) at S2 in the rainy and monsoon season. The satisfactory destination of nitrate in groundwater is 45 mg / L, indicating that each instance is within reasonable limits. In general, an increase in nitrate in groundwater can be a sign of bacterial contamination (Srinivasamoorthy *et al.*, 2014).

Conclusion

The surface water samples are collected from Pachamalai Hills in different stations. Body composition limits, for example, pH, electrical conductivity, total soluble solids (TDS), alkalinity, hardness, calcium (CA), magnesium (MG), chloride, dissolved oxygen (DO) Organic oxygen calls for BOD, call breaks using common techniques for chemical oxygen (COD) and nitrate. The results from this test area suggest that a large portion of the surface water assessment is appropriate for consumption and water system functions in each storm interval.

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