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Studies on Biochemical Content of Water Samples

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Abstract: People on globe are under tremendous threat due to undesired changes in the physical, chemical and biological characteristics of air, water and soil. Due to increased human population, industrialization, use of fertilizers and manmade activity water is highly polluted with different harmful contaminants. Water is an essential innate resource on earth. All life including human being depends on water. Water resources are of great significance to human life and wealth and are the main insistence for the demand of drinking water, for irrigation of lands and industries. In this review, bio chemicals (carbohydrate, protein, reducing sugar, amino acid, nitrite, chloride and sulphate content in the falls of Courtallam water samples. In the present study deals with the qualitative and quantitative analysis of mineral metal and bio molecules were made. Of these, high content of carbohydrates, amino acids, bio molecules were found. Mineral and metals such as Potassium, Iron, sulphur, Phosphorous, Calcium, Magnesium, Arsenic Chromium, Lead and Mercury also identified.

Keywords: Falls water, mineral, metal and biochemical.

I Introduction

Life on the earth is never possible without water. Water is one of the most essential constituents of the environments. Less than 1% water is present in ponds, lakes, rivers, dams etc. which is used by man for industrial, domestic and agricultural purposes. Water quality is an aquatic ecosystem is determined by many physical, chemical and biological factors (Sargaonkar *et al*., 2003). Water has become an essential commodity for the development of industrials and agriculture (Kudesia, 1990). Water is essential not only for survival of human beings, but also for animals, plants and all other living things (Razo *et al*., 2004). Water is also crucial for the quality of life. Water quality can be defined as the chemical, physical and biological characteristics of water, usually in respect to its suitability for a designated use. As we all know water has many uses, such as drinking, fisheries, agriculture and industries. Each of this designated use has defined physical, chemical and biological standard necessary to support that use (Dwipjyoti Mishra). Water is one of the most important and abundant compounds of the ecosystem. All living organism o the earth need water for their survival and growth. As of now only earth is the planet having about 70% of water (Basavaraja simpi *et al*., 2011). Water is essential to all forms of life. It is indispensable for agriculture, manufacturing, transportation and many other human activities. Despite its importance, water is he most poorly managed source in the world (Fakayode S.O; 2005). Water is a natural resource with limited and uneven distribution in time and space. All forms of life and all human activities are dependent on water. Water resources are of great importance to human life and economy and are the main source of meeting the demand for drinking water, for irrigation of lands and industries (Xhelal Kepuska, Ph.D *et al*., 2014).

II. Materials and Methods

2.1 Study area

The present study was carried out in the courtallam falls which is in Tenkasi district in the south Indian state of Tamilnadu bordering to the Kollam district Kerala. The falls is located on the Western Ghats on the river Chittar.Is is

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located 5Km from the city Tenkasi.Three of the main waterfalls-the New and Old Courtallam falls, and the five falls are reachable by road. Courtallam Main falls is a 30-40m Ayurvedic waterfalls.

2.2 Sample collection and preparation

The water samples were collected from five water falls (Old falls,Main falls,Five falls,Tiger falls and Chittraruvi) and samples were collected from different locations to evaluate the physico chemical contamination during rainy,winter and summer season. Samples were collected in polythene bottles (2.0lt) and then heated for 30-40 mins using 1.5ml concentrated HCL ,2.5ml concentrated HN03,50ml of distilled water and 46ml of water samples are added and diluted.

2.3 Sample analysis

A biomolecule is defined as any substance that is produced by cells and living organisms. There are various types of biomolecules, which are carbohydrates, proteins, reducing sugars, amino acids, nitrite, sulphate and chloride. The chemical, mechanical and biological properties of biomolecules constitute crucial features in the development of distinctive biomaterials. Mineral water contains a large quantity of dissolved minerals or gases. Mineral analysis of minerals such as potassium, iron, sulphur, phosphorous, calcium and magnesium are present in the five different water samples (Brinda *et al*., 1981). Metal analysis of metals such as arsenic, chromium, lead and mercury are of high concern because they are toxic to humans and can be extremely harmful if exposed to the environment (Gilreath 1954). Qualitative analysis of protein is identified by five different tests like Biuret test, Ninhydrin test, Xanthoproteic test, Sakaguchi test, Million's test (Dr.P.Palanivelu 2000). And also tests such as Moilisch's test, Benedict's test, Barfoed's test, Iodine test, Fehling's test, Seliwanoff's test and Anthrone test are done to identify the presence of carbohydrate.

Quantitative estimation of reducing sugar (Somogi 1952), estimation of total carbohydrate (Hedge et al., 1962) by Anthrone method, estimation of protein (Lowry et al.,1951) by Lowry method, estimation of total free aminoacids (Moore et al.,1948) and tests of nitrite, sulphate and chloride (CMGRI- Diamond Jublee year 19472007) were identified. Estimation of chloride was done by titrate method.

Calculation:

Amount of biomolecules present in 100 mg:
of the sample = $\frac{\text{mg of glucose}}{\text{Volume of test sample}} \times 100$

Amount of chloride mg/l = $\frac{\text{ml of titrant used} \times N \times 35.46 \times 1000}{\text{ml of samples}}$

III. Results and Analysis

3.1 Qualitative sample analysis

The minerals help to maintain the alkaline level in the body to balance the reaction of acidic food we consume. The analysis of mineral, metals, proteins, and carbohydrates in water sample was carried out using standard procedure and the results expressed in table.1. Minerals such as potassium, iron, sulphur, phosphorous, calcium, magnesium metals such as chromium, arsenic, lead, mercury and then protein and carbohydrates present.

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Table 1. Qualitative Mineral And Meta analysis Of Water Samples

No.	Minerals and metals	S1	S2	S3	S4	S5
1.	Potassium	++	++	++	++	++
2.	Iron	++	+	++	+	++
3.	Phosphorous	+	+	+	++	+
4.	Sulphur	+	++	++	++	+
5.	Calcium	+	+	+	+	+
6.	Magnesium	+	+	+	+	+
7.	Arsenic	++	++	++	++	++
8.	Chromium	++	++	++	++	+
9.	Lead	++	++	++	++	++
10.	Mercury	++	++	++	++	++

S1 – Chittraruvi, S2 – Tiger falls, S3 – Five falls, S4 – Old falls, S5 – New falls

Table 2. Qualitative Analysis of Protein And Carbohydrate

Name of the sample	Experiments						
	Protein tests					Carbohydrate tests	
	Biuret test	Ninhydrin test	Xanthoproteic test	Sakaguchi test	Million's test	Molisch's test	Fehling's test
S1	+	-	-	+	+	++	+
S2	+	-	+	+	+	++	+
S3	+	-	-	+	+	++	++
S4	+	+	-	+	+	++	-
S5	+	+	-	+	+	++	++

S1 – Chittraruvi, S2 – Tiger falls, S3 – Five falls, S4 – Old falls, S5 – New falls

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3.2. Quantitative sample analysis

Reducing sugars have the property to reduce many of the reagents. All the five water samples contain (30-40 µg/ml) of reducing sugar from 510nm. Carbohydrates are a very important of storage and structural materials in the plants. The sample contain 60-80 µg/ml of carbohydrates from630nm. The amount of protein present in unknown water samples as (40-63 µg/ml) at 660nm. Total free amino acids present in 4ml of unknown water sample contains the range of (50-80 µg/ml) at 570nm. In all falls water samples showed the ranges of Nitrate (40-80 µg/ml) sulphate (60-120 µg/ml) chloride (425-567 mg/l) observed using 510nm and 420nm respectively.

Table 3. Quantitative Analysis Of Biochemicals

Name of the biochemicals	**Concentration content of the biochemicals (µg/ml)**
Reducing sugar (510 nm)	30-40
Carbohydrate (630 nm)	60-80
Protein (660 nm)	40-63
Amino acid (570 nm)	50-80
Nitrite (510 nm)	40-80
Sulphate (420 nm)	60-120
Chloride (mg/l)	425-567

Table 1. Qualitative minerals, metals, carbohydrates and protein analysis of different water samples. **Table 2**. Carbohydrate, protein, reducing sugar, total amino acids, chloride, nitrite and s uphate are present in the different values using the different nanometer. People on globe are under tremendous threat due to undecide changes in the physical chemical and biological characteristics of air, water and soil. Due to increased human population, industrialization, use of fertilizers and manmade activity water is highly polluted with different harmful contaminants. Natural water contaminates due to weathering of rocks and leaching of soils, mining processing etc. The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. It is necessary to know details about different physico-chemical parameters such as color, temperature, acidity, hardness, Ph, sulphate, chloride, nitrite, DO, BOD, COD, alkalinity used for testing of water quality. Heavy metals such as Pb, Cr, Fe, Hg etc, are of special concern because they produce water or chronic poisoning in aquatic animals. Some water analysis reports with physico-chemical parameters have been given for the exploring parameters study. (**Patil *et.al*.,2012).** A water quality standard is a rule or law comprised of the uses to be made of a water body or segment and the water quality criteria necessary to protect that uses. Due to the pressure of human activity the ground water sources and surface sources are degraded gradually, therefore pure, safe, healthy and odorless drinking water is a matter in deep concern. There are many pollutants in ground water due to sewage viz. organic and inorganic pollutants, heavy metals, pesticides, fluoride, etc. the purpose is to ascertain the quality of water from the sources. The present study determines the quality of drinking water supplied to the hostels, canteens and campus of Assam down town University, which includes physical and chemical characteristics determination tests. Samples are collected from five

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different sources. After conducting all the test, the quality standard are determined by using different IS codes. The result shows that the water taken from sample A and sample D are suitable for drinking. And the remaining samples will be suitable for drinking only after proper treatment (**Dwipjyoti Mishra**). The complete analysis of 15 drinking water samples was carried out to develop a data base on the quality of water being consumed in different areas of Abbottabad district. The qualitative and quantitative analysis of water samples of different localities was conducted to determine the exact number of different pollutants present in water. The drinking water samples were taken from the main water sources where maximum peoples were using them for drinking purpose. The results indicated certain sources of waterborne diseases in drinking water, which are common in the people of a particular area. The results of the present research work showed that drinking water collected from different areas of Abbottabad district was not found to be suitable for human health due to microbiological issues (**Anwar Khalid *et.al*.,2011).** The mean elemental (C, H, N) and biochemical composition (lipids, carbohydrates, and Proteins) of some abundant crustac ean zooplankton species of Italian insubric lakes has been estimated by the analysis of samples collected at different seasons from various environments (Lake Maggiore, Lake Varese, Lake Comabbio, Lake Monate). From each sample an adequate number of specimens of each abundant species was sorted and analyzed by a CHN **elemental** analyzer. The percentage of lipids carbohydrates and proteins and the calorific contentwere calculated from the elemental composition according to Gnaiger & Bitterlich(1984). Inter and intraspecific variability of biochemical composition was quite high, while elemental composition and calorific content were less variable. An estimate of the mean elemental and biochemical composition of each species was obtained by pooling the data. These mean values have been used to estimate the pools of elements and compounds in the crystacean zooplankton of Lake Comabbio to provide an example of the importance of a multiple approach in zooplankton studies. (Nicoletta **RICCARDI *et.al.*, 1999**).

IV. Conclusion

To conclude the present study, we have found that most of biomolecules were present in the protein, carbohydrate, reducing sugar and amino acid of freshwater samples. The results of tests conducted for arsenic, chromium, lead and mercury shoes that these metals in the water must be kept under check. To protect the water quality and to ensure the health of aquatic life in these waterfalls. It is required to make regular observations and to monitor the parameters affecting the water quality and aquatic life.

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