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Water –Quality-Analysis of River Mohand-Rao Flowing In the Doon Valley in Lower Hills of Himalayas

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ABSTRACT

The people who rely on the river water needs water quality monitoring for their day to day usages.Herewe take ,a stretch of 15Km from Dat- Mandir to Ganeshpur of the Mohand-Rao river (Doon-Valley) was studied during the year 2019-2020.The impact of seasonal variation on water quality of Doon – Valley is the main concern of study here in this paper. The different water samples were collected during 2019 (Summer and Monsoon) and 2020(Winter). Mohand- Rao river flow through Mohand Anticline in the lower parts of the Shivalik hills in the Doon Valley. In Doon valley ,though the urbanization are fast but low industrial effluent around the study areas as there is less harmful industries are present . The main requirement to analyze the water quality of the stream Mohand-Rao is to check the pollution status, as water quality gives the information about the catchment characteristics such as topography,geology,soil and vegetation. Changes in flow regime an d habitat type, loss of riparian vegetation ,causing major effects on riparian and in – stream habitat and processes are the some of the direct effect ,also increase in sediment transport from the catchments leading to change in water quality .

Keywords: Water-Quality-Monitoring,Mohand-Anticline,Topography

I. INTRODUCTION

The whole human race or living being depends upon the environment for the survivor. Nature and mankind's forms an inseparable part of the life support system. This system has five element air, water , land flora and fauna which are interconnected, inter-related and inter-dependent and have co-evolved and are co-adopted.

Deteriorations in one inevitably affect the other four elements. If the deterioration is for a short term and the life support system had enough resilience, it repairs itself and reverts to the original states.

However if the deteriorations continues, the whole systems including all lives are thrown out of gear. This disturbance of system is called the pollutions; it may be in air, water and land causing air, water and land pollution. The importance of understanding the relationship between man and environment has never been so great as it is realized at present.

In whole world industrial and technological advancement creating the depletion of environmental resources and increasing pollution. Therefore ,the sustainable development is globally recognized as the need of today for not only restoring environmental resources but also sustain life on our planet.

Pollution may be defined as any undesirable changes in physical, chemical or biological characteristics of air, water and soil. The dispersion and movement of pollutant in the biosphere is a complex process and it accumulates within organisms and causing toxic effects.

On our planet 80% of earth surface is water one of the precious natural resource which we humans use in various forms. On our planet earth water is essential for life. Owing to increasing industrialization on one hand and exploding population on the other, the demand of water supply have been increasing tremendously. Moreover considerable part of this limit of water is polluted by sewage,

Assessment of aquatic body involving three main component as, hydrology,physic-chemical and biology. These components are monitored for the accurate assessment of the water quality of an aquatic body.The analysis of water quality of aquatic body on physical,chemical and biological aspects is needed not only for human health but also for the living creaters in the aquatic body.

Due to different human activities such as urbanization and industrialization there is increase in water pollution in ground and surface both.Thence there is the requirement of safe potable drinking water. Various treatment methods are use for the purification of water and to raise the quality of drinking water. Water should be free from various contaminants viz Organic and Inorganic Pollutants,heavy metals,Pesticides and other synthetic chemicals and also all its parameter such as Electrical conductivity, Turbidity, Calcium,Magnesium,Total hardness,pH, Carbonates and bicarbonates,Chloride, alkalinity,Sodium ,Potassium ,Nitrates and Dissolved Oxygen should be within a permissiable limit.

II. DESCRIPTION OF THE STUDY AREA

A. Geology of the study area :

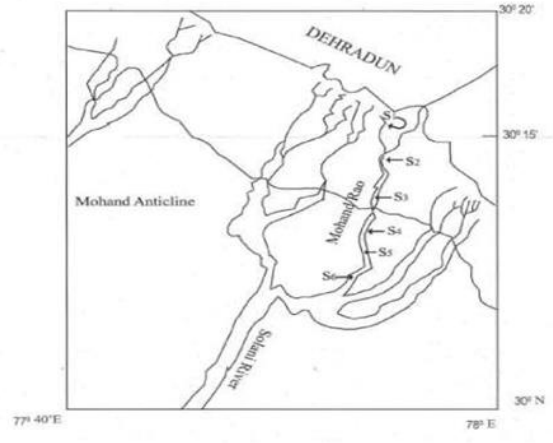
Doon Valley are formed by the tectonic activity that goes on within earth crust in the Himalayan region.The Doon Valley is situated between latitude 30° and 30°32' and longitude 77°43' and 78°24'. It is nearly 75 Km long from North-West to South-West. Region of Dun Valley involves two distinct styles and amplitudes of folding . In the Northern part, the overturned Santaurgarh-anticline with both limbs dipping steep to moderate was developed as fault propagated fold over the Santuargarh-Thrust (ST).

B. Drainage System :

River Yamuna and river Ramganga demarcated the western and Eastern boundaries of the Garhwal Region. Holy Ganga and its tributaries are mainly covered the region of Garhwal and the region western Uttar-Pradesh attached to it also there flow not only develops the gorges of certain length also made Himalaya get demarceted.From Shivalik many river flows through the district Saharanpur ,among these are the river Mohand-Rao .District Saharanpur is situated on the northern part of Uttar-Pradesh the state of India.

Mohand Rao river originated near a temple known as Dat-Mandir.It is about 18 Km in length and flow from Dat-Mandir passing through various villages from Mohand to Amanatgarh village where the river Mohand Rao joined river Solani

Which then via Khedi,Hasanpur,Madanpur,Khubbanpur,Bhagwanpur, Landhora it join Ganga near Luxor. The length of the river is 20Km with a width varying between 5m and 100m . The mean depth of the river is only 0.3m.



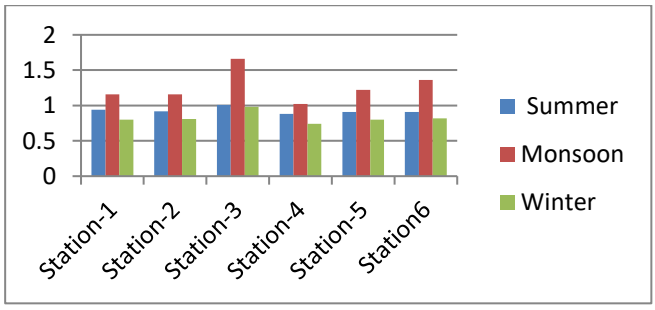
III. METHODOLOGY

Surface water quality analysis :

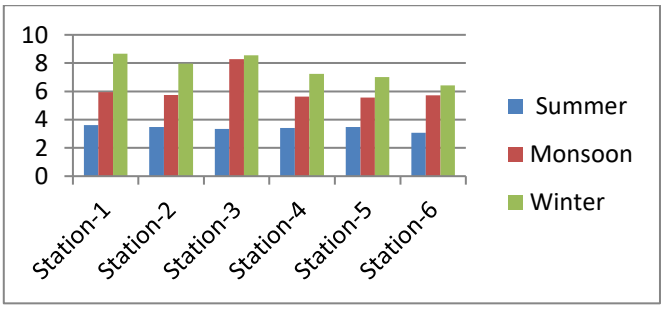
Six surface water samples were collected from selected locations. In the present study Dissolved Oxygen, Chemical Oxygen Demand, and Biochemical Oxygen Demand were determined by using standard methods

Station		Summer			Monsoon			Winter		
		B.O.D	C.O.D	D.O	B.O.D	C.O.D	D.O	B.O.D	C.O.D	D.O
1-	Mean	0.94	3.11	3.62	1.16	4.37	5.95	0.8	2.93	8.67
	SD	0.02	0.07	0.17	0.07	1.01	0.19	0.0	0.06	0.17
2-	Mean	0.92	3.11	3.49	1.16	4.7	5.75	0.81	2.87	7.97
	SD	0.03	0.11	0.18	0.11	0.15	0.19	0.03	0.07	0.37
3-	Mean	1.01	3.76	3.34	1.16	5.22	8.28	0.98	2.88	8.56
	SD	0.05	0.14	0.13	0.13	0.21	0.27	0.03	0.16	0.15
4-	Mean	0.88	2.88	3.4	1.02	4.23	5.64	0.74	1.99	7.23
	SD	0.02	0.07	0.16	0.02	0.11	0.14	0.03	0.05	0.16
5-	Mean	0.91	3.02	3.47	1.22	4.55	5.56	0.8	2.1	7.01
	SD	0.03	0.13	0.1	0.11	0.19	0.11	0.07	0.15	0.26
6-	Mean	0.91	3.02	3.06	1.36	4.65	5.71	0.82	2.02	6.42
	SD	0.03	0.13	0.11	0.12	0.18	0.16	0.07	0.1	0.4
Total-	Mean	0.93	3.15	3.4	1.26	4.62	6.15	0.83	2.47	7.64
	SD	0.05	0.3	0.23	0.23	0.18	0.98	0.09	0.44	0.87

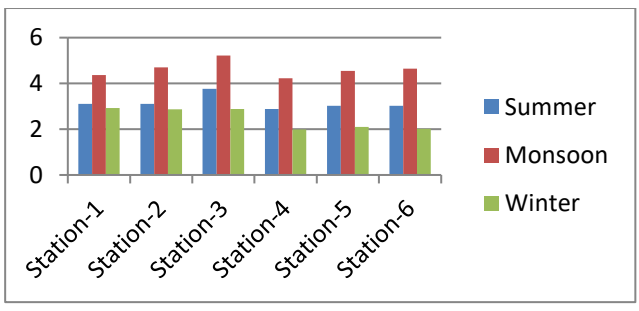
1-B.O.D. (BIOCHEMICAL-OXYGEN-DEMAND)



3- D.O. (DISSOLVED OXYGEN)



2-C.O.D.(CHEMICAL-OXYGEN-DEMAND)



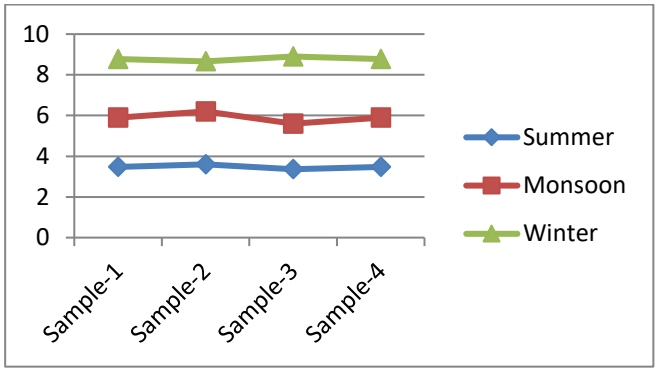
IV. RESULT AND DISCUSSION

Assessment of water quality today in global terms implies the need for a reference point against which the result of monitoring can be measured and weighted. An attempt is made to define and describe natural water quality to the extent possible and scientifically justified. Aquatic ecosystem as a part of

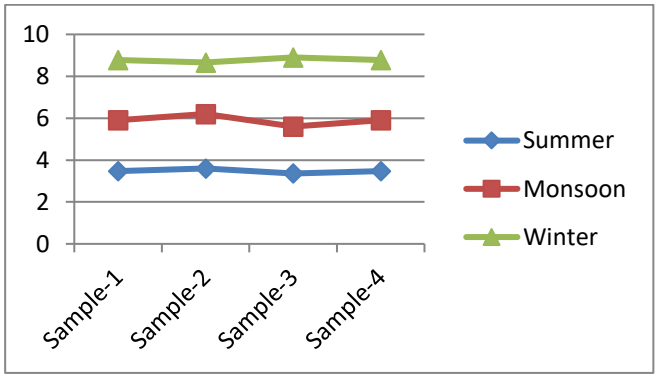
the natural environment are balanced both within themselves and other environmental compartments and this equilibrium is subject to natural variations and evolutions as well as variation caused by human interventions.

A- Analysis of dissolved-oxygen of the river MOHAND –RAO flowing in the lower hills of Himalayas in Doon Valley

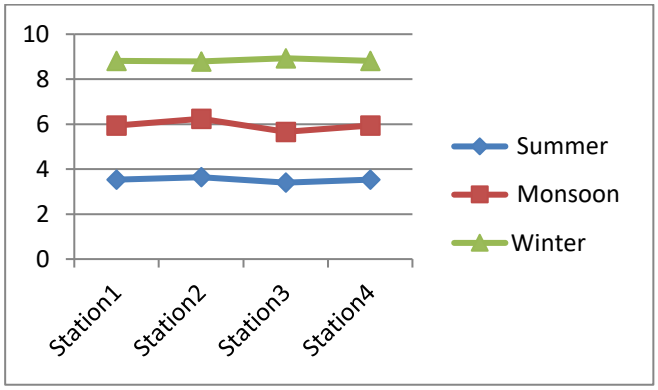
Station-1: having dissolved oxygen in the year 2016-2017



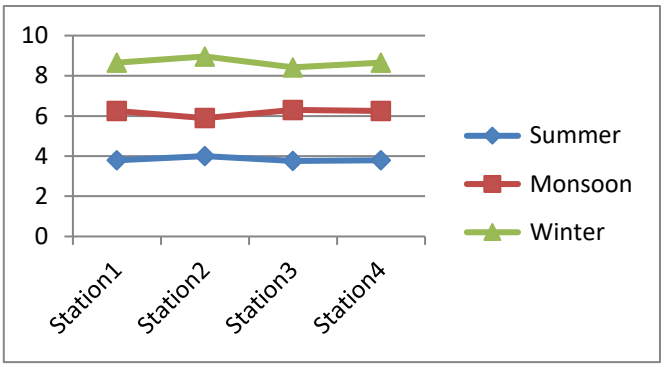
Station-1 :having dissolved oxygen in the year 2017-2018



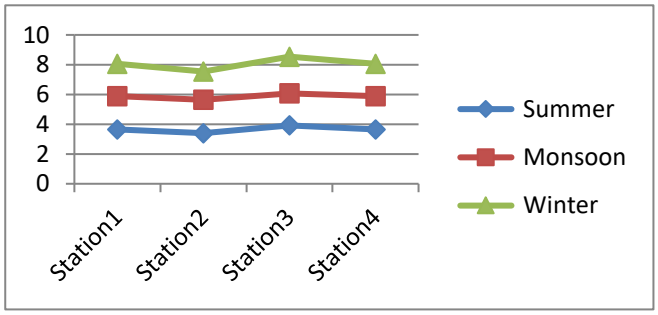
Station-1:having dissolved oxygen in the year 2018-2019

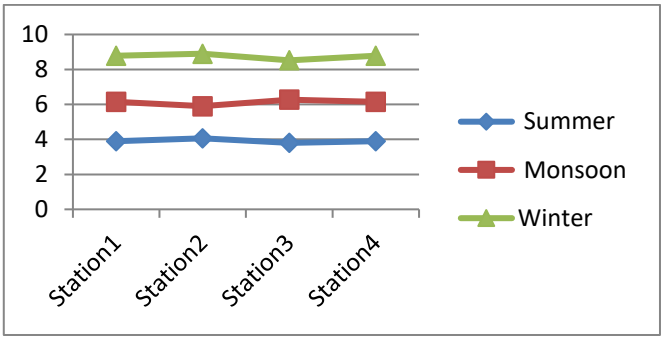


Station1: dissolved oxygen of the Station1 in 2019-2020

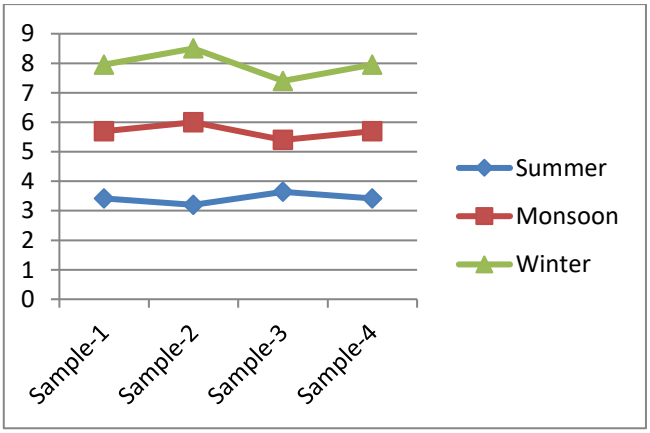


Station1: dissolved oxygen of the Station1 in 2020-2021

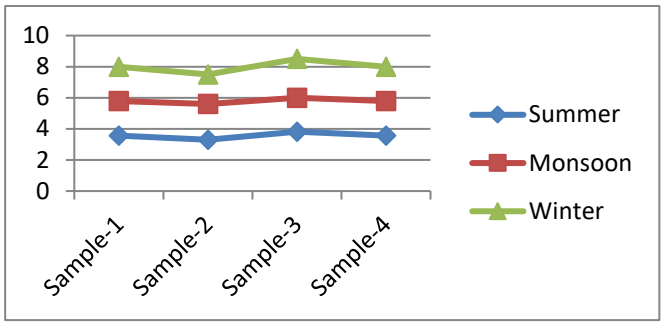




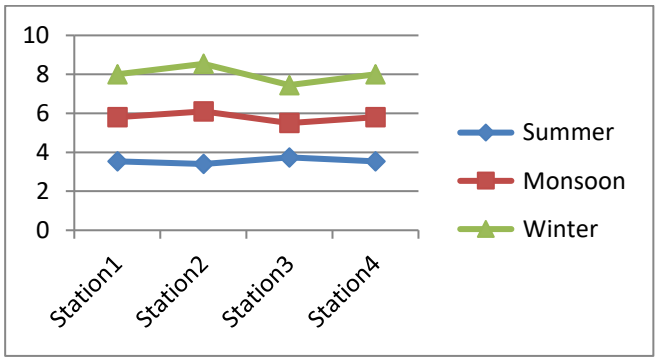
Station-2 having dissolved oxygen in the year 2016-2017



Station-2 having dissolved oxygen in the year 2017-2018

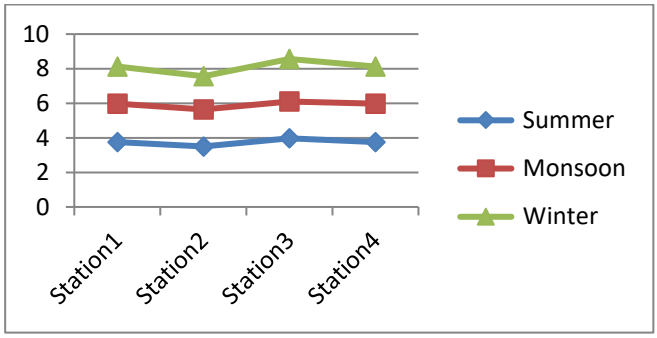


Station-2 having dissolved oxygen in the year 2018-2019

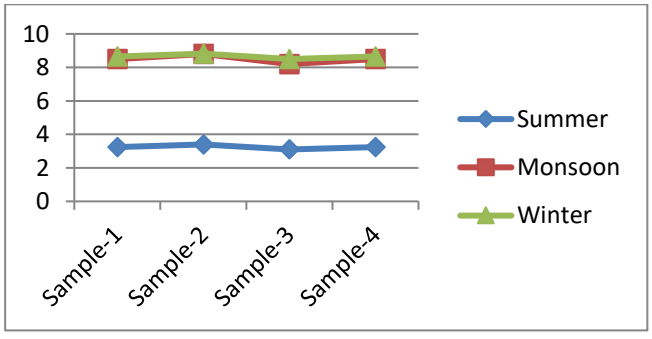


Station-2 having dissolved oxygen in the year 2019-2020

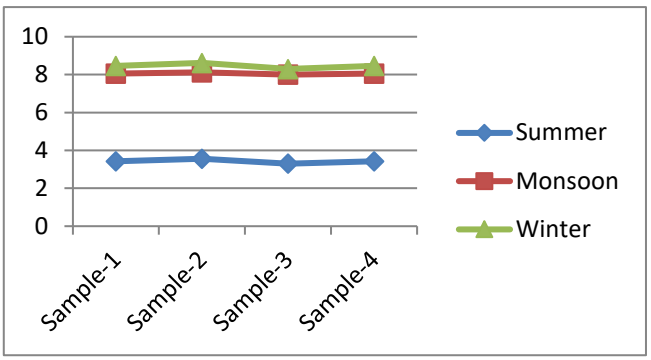
Station-2 having dissolved oxygen in the year 2020-2021



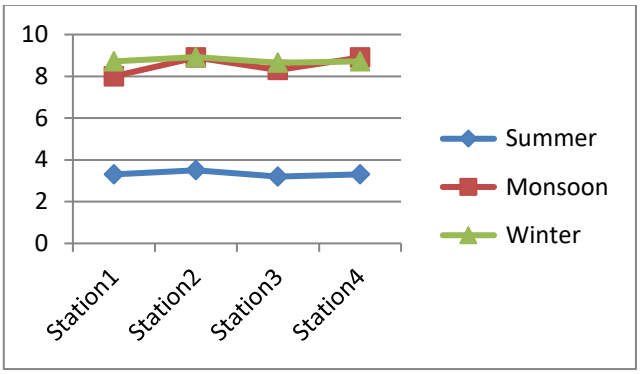
Station-3 having dissolved oxygen in the year 2016-2017



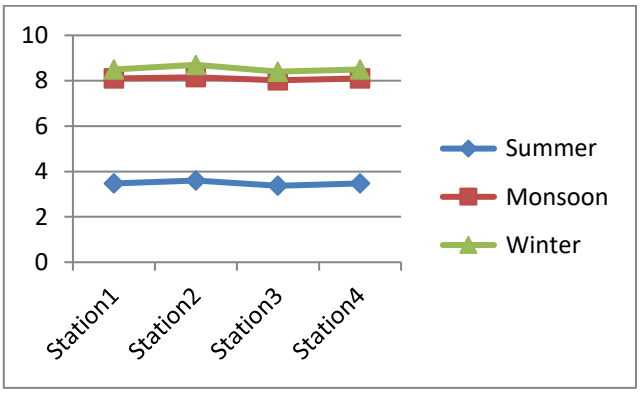
Station-3 having dissolve-oxygen of the year 2017-2018



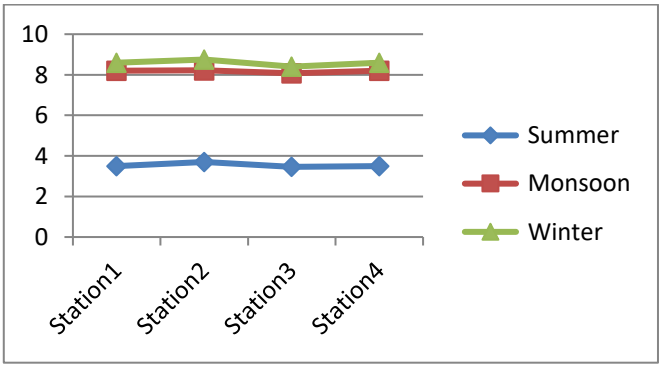
Station3 having dissolve oxygen of the year 2018-2019



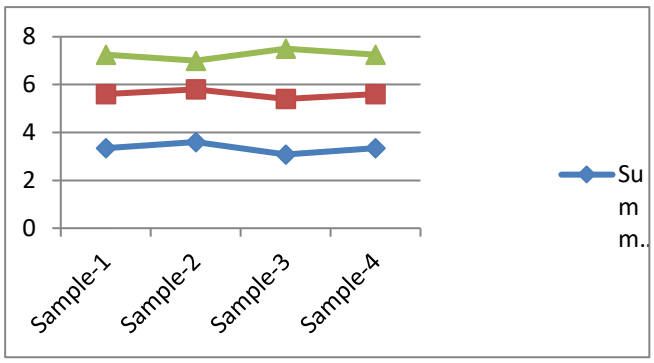
Station3 having dissolve oxygen of the year 2019-2020



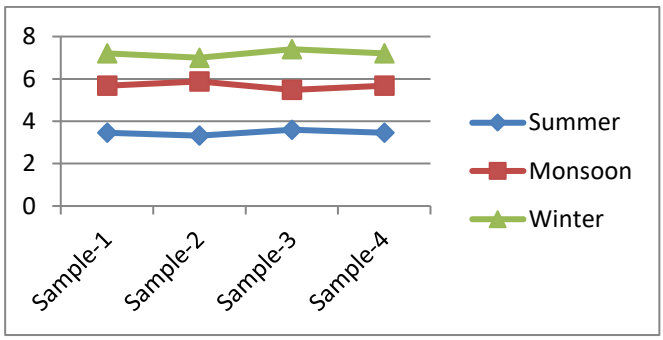
Station3 having dissolve oxygen of the year 2020-2021



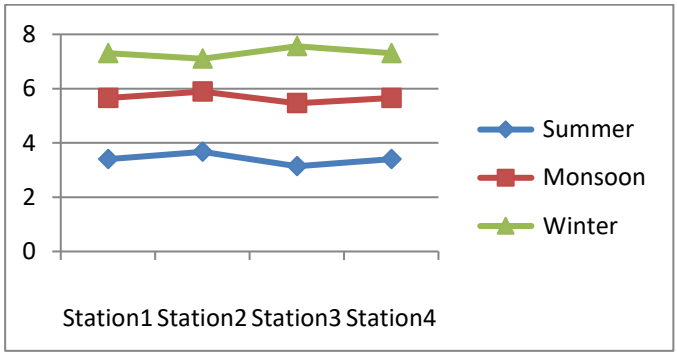
Station-4having dissolve oxygen of the year 2016-2017



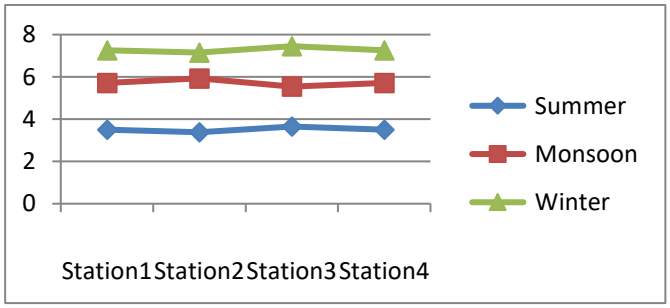
Station-4 having dissolve-oxygen of the year 2017-2018



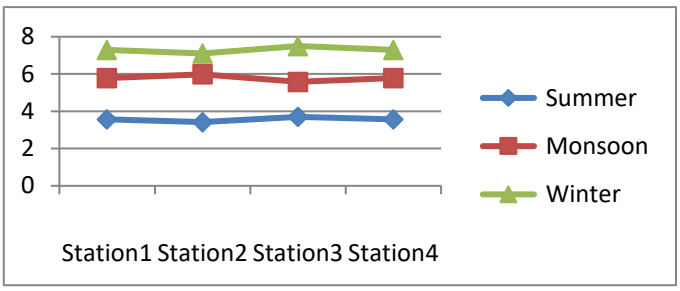
Station-4 having dissolve oxygen of the year 2018-2019



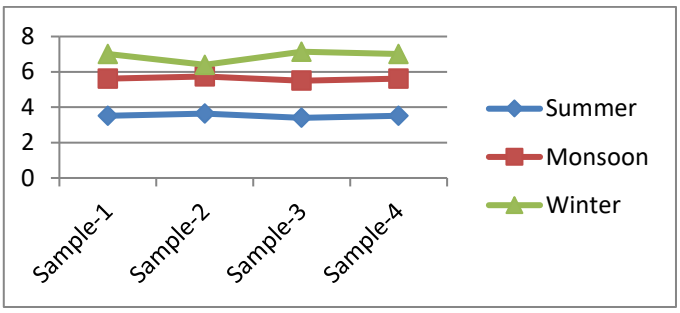
Station-4 having dissolve oxygen of the year 2019-2020



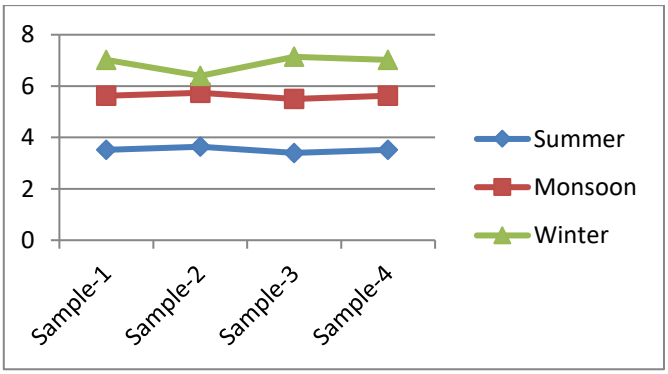
Station -4 having dissolve-oxygen of the year 2020-2021



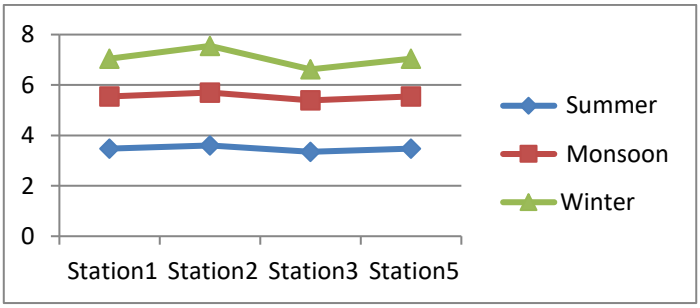
Station-5 having dissolve-oxygen of the year 2016-2017



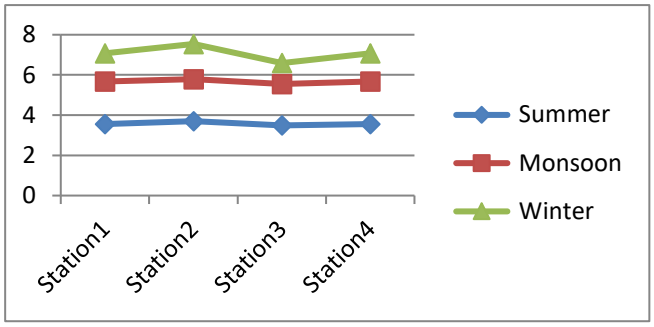
Station-5 having dissolve-oxygen of the year 2017-2018



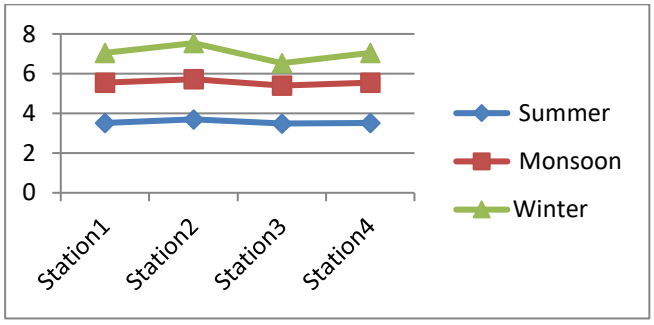
Station-5 having dissolve-oxygen of the year 2018-2019



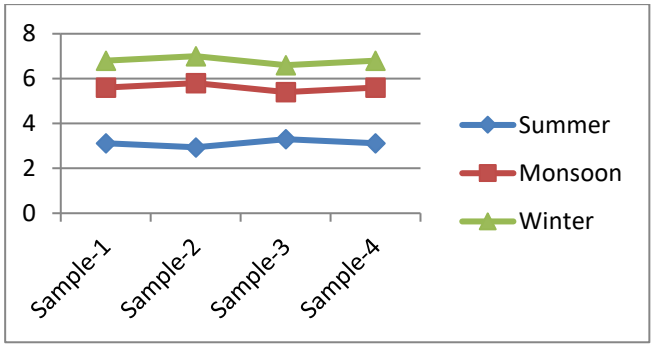
Station-5 having dissolve-oxygen of the year 2019-2020



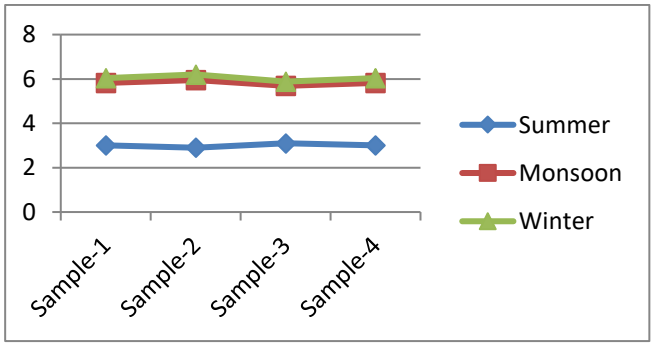
Station-5 having dissolve-oxygen of the year 2020-2021



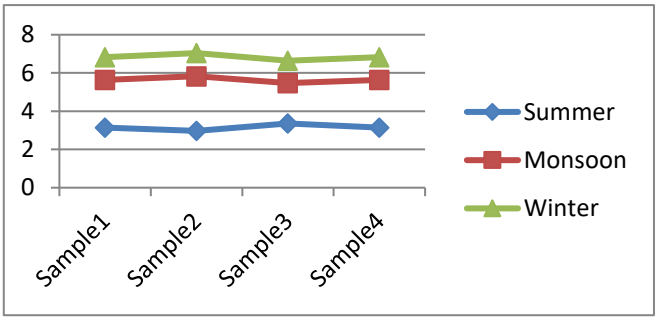
Station-6 having dissolve oxygen of the year 2016-2017



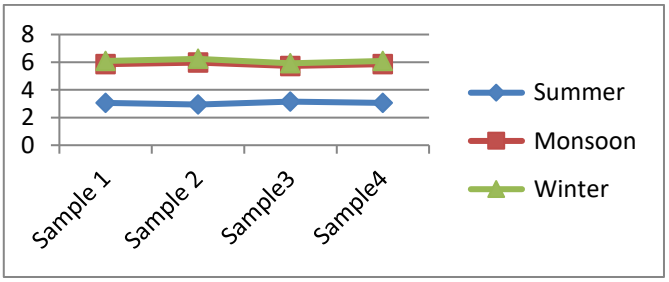
Station-6 having the dissolve-oxygen of year 2017-2018



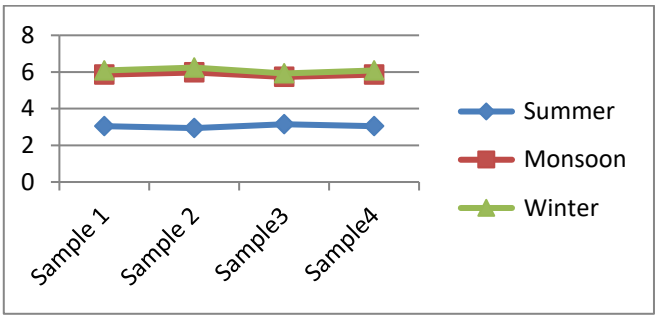
Station-6 having the dissolve-oxygen of year 2018-2019



Station-6 having the dissolve-oxygen of year 2019-2020

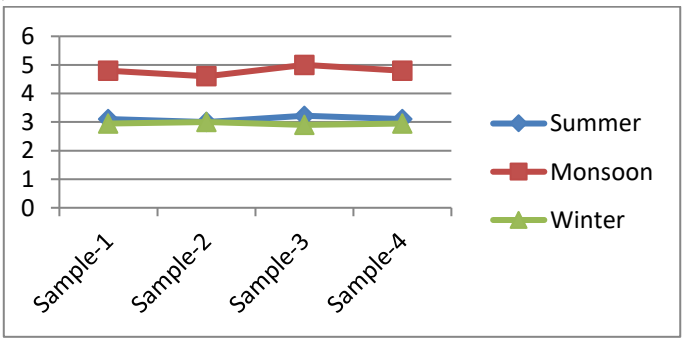


Station-6 having the dissolve-oxygen of year 2020-2021

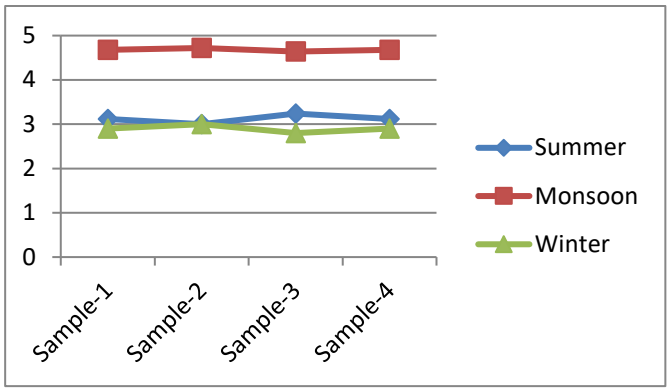


B- Analysis of Chemical Oxygen Demand of the river MOHAND-RAO flowing in the lower hills of Himalayas in Doon Valley.

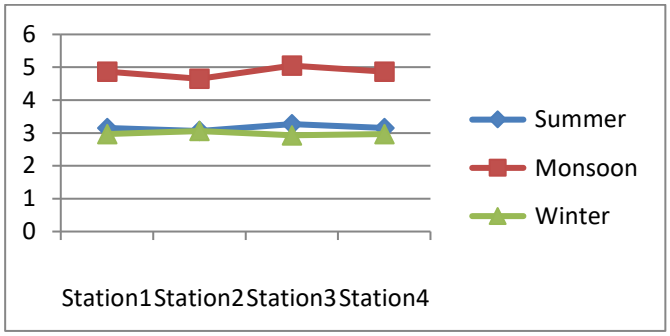
Station-1: having Chemical-Oxygen-Demand of the year 2016-2017



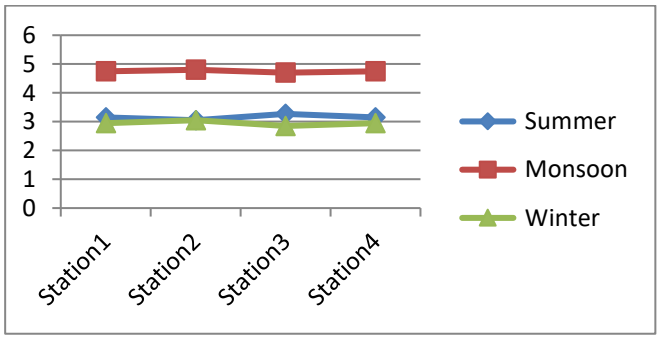
Station-1: having Chemical-Oxygen-Demand of the year 2017-2018



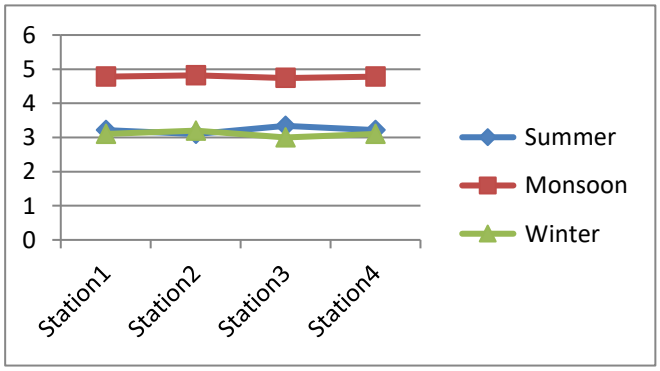
Station-1 Having the Chemical-Oxygen-Demand of the year 2018-2019



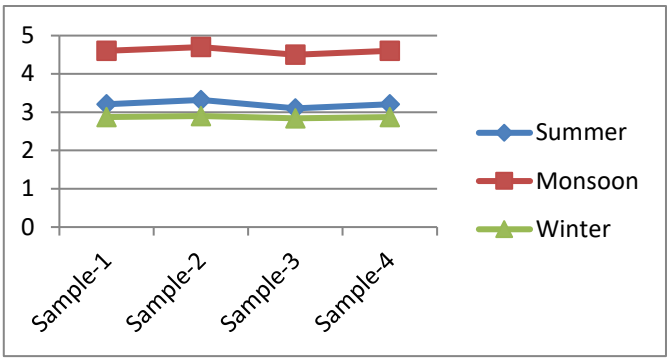
Station-1 Having the Chemical-Oxygen-Demand of the year 2019-2020



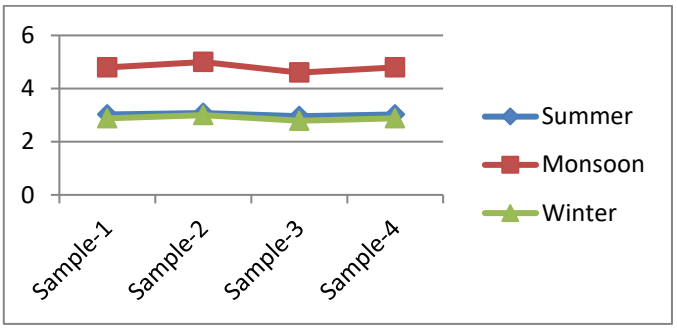
Station-1 Having the Chemical-Oxygen-Demand of the year 2020-2021



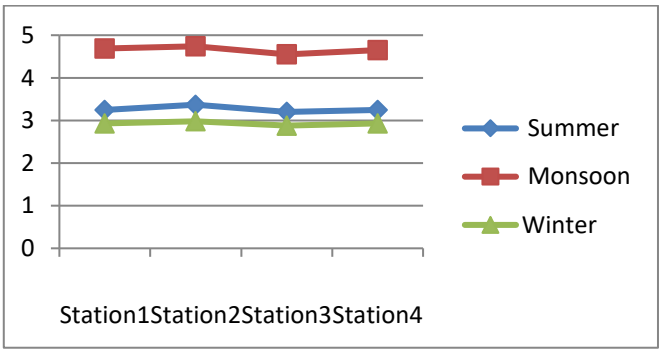
Station-2: having Chemical-Oxygen-Demand of the year 2016-2017



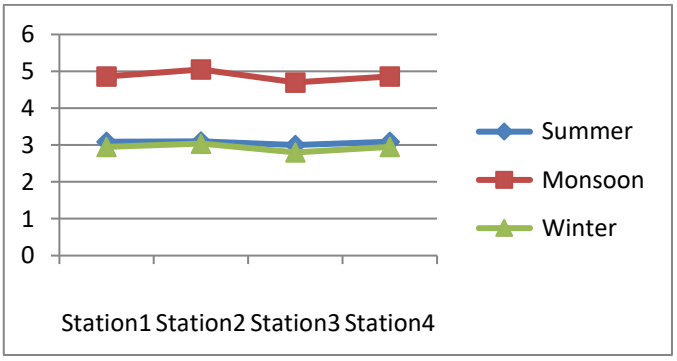
Station-2: having Chemical-Oxygen-Demand of the year 2017-2018



Station-2: having Chemical-Oxygen-Demand of the year 2018-2019



Station-2 : having Chemical-Oxygen-Demand of the year 2019-2020



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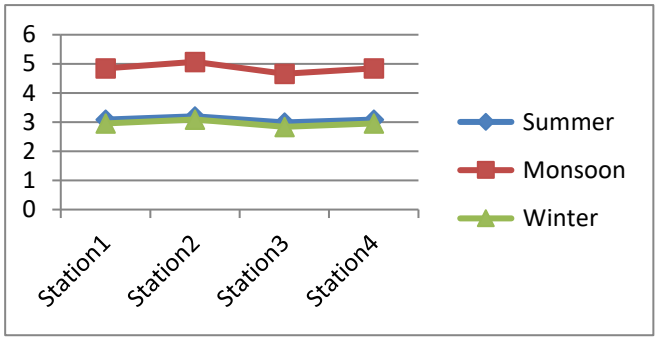
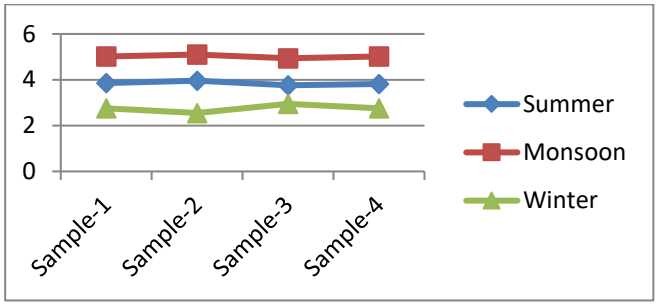
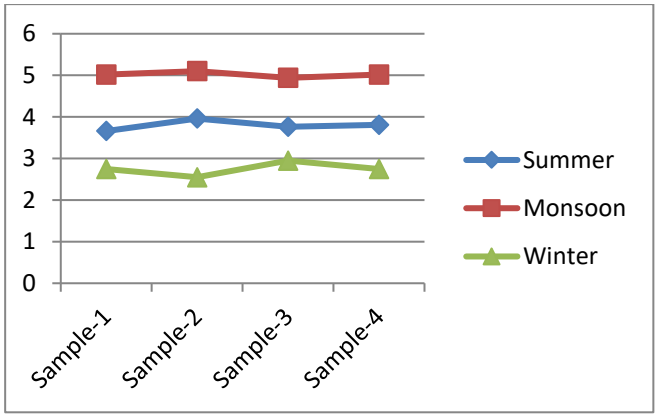


Station-3: having Chemical-Oxygen - Demand of the year 2016-2017



Station-3: having Chemical-Oxygen-Demand of the year 2017-2018



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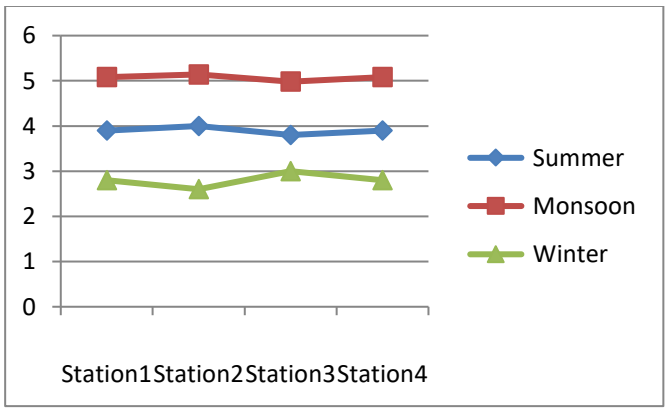
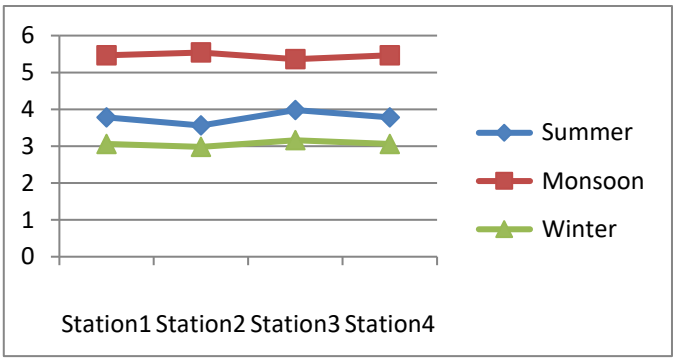
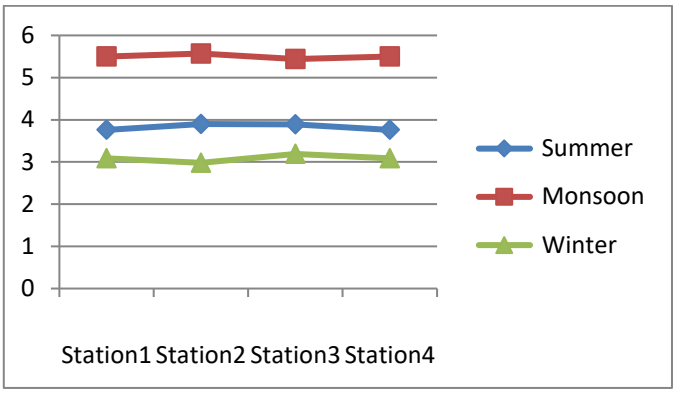


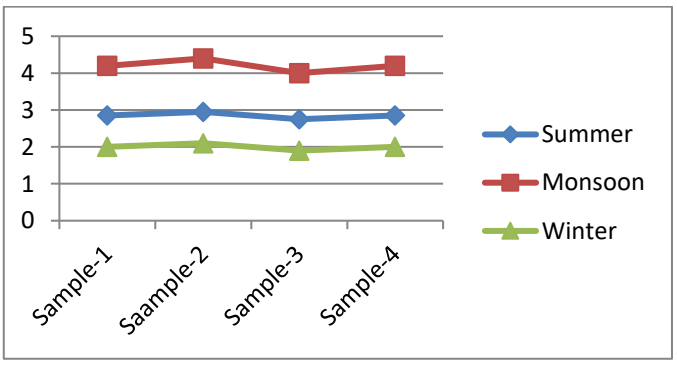
Station-3 : having Chemical-Oxygen-Demand of the year 2019-2020



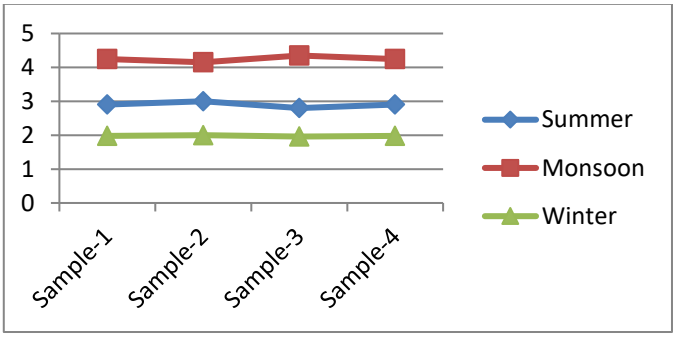
Station-3: having Chemical-Oxygen-Demand of the year 2020-2021



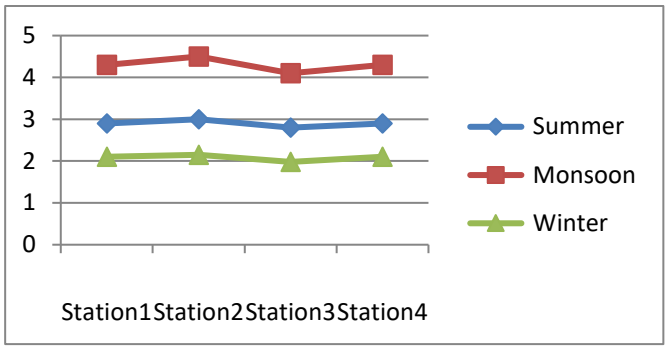
Station-4: having Chemical-Oxygen-Demand of the year 2016-2017



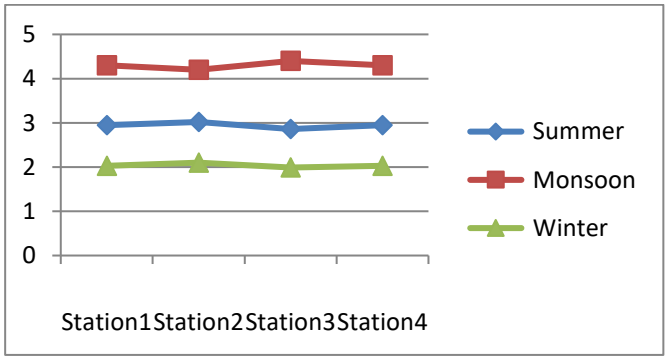
Station-4: having Chemical-Oxygen-Demand of the year 2017-2018



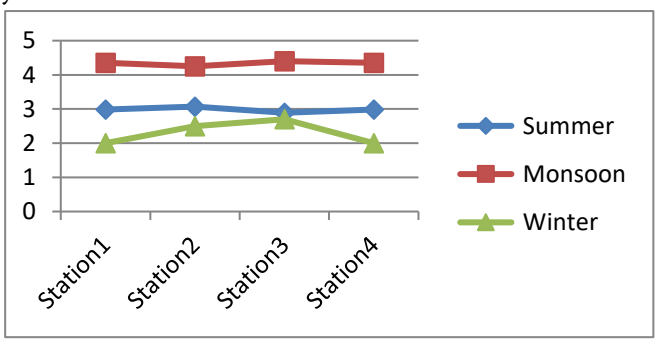
Station-4: having Chemical-Oxygen-Demand of the year 2018-2019



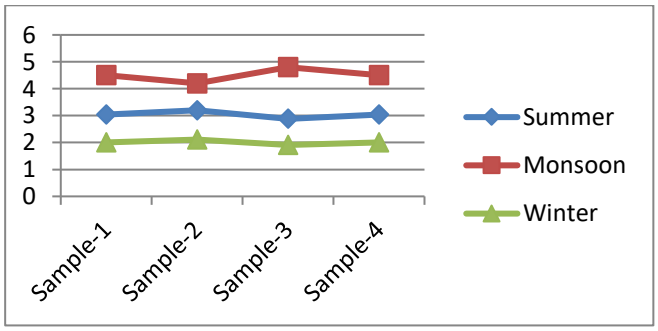
Station-4: having Chemical-Oxygen-Demand of the year 2019-2020



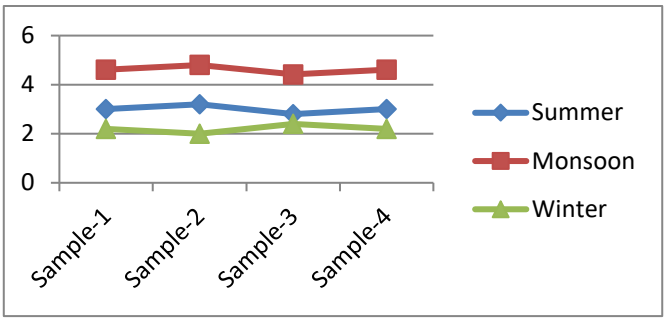
Station-4: having Chemical-Oxygen-Demand of the year 2020-2021



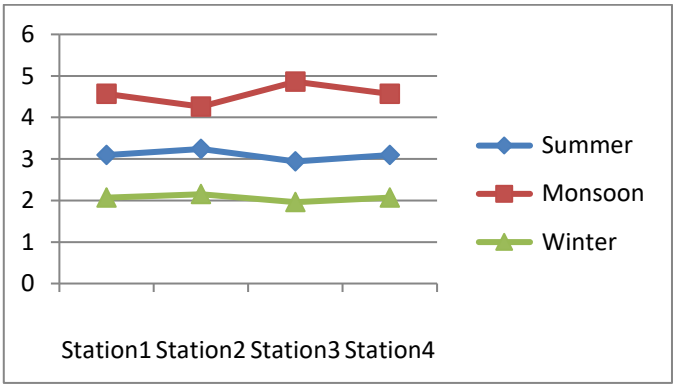
Station-5: having Chemical-Oxygen-Demand of the 2016-2017



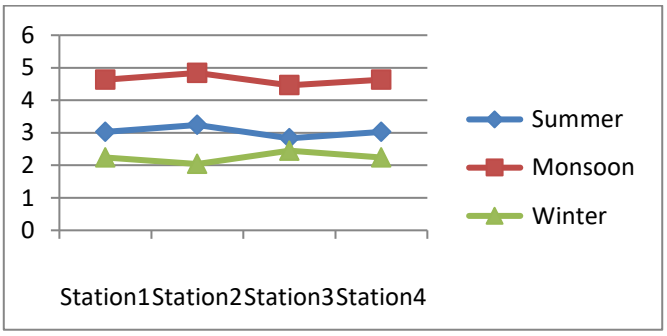
Station-5: having Chemical-Oxygen-Demand of the year 2017-2018



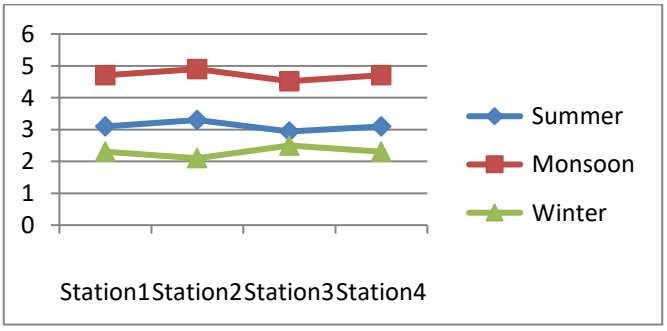
Station-5: having Chemical Oxygen Demand of the year 2018-2019



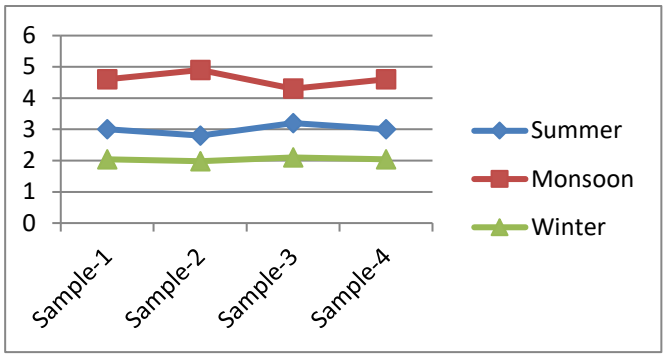
Station-5: having Chemical-Oxygen-Demand of the Year 2019-2020



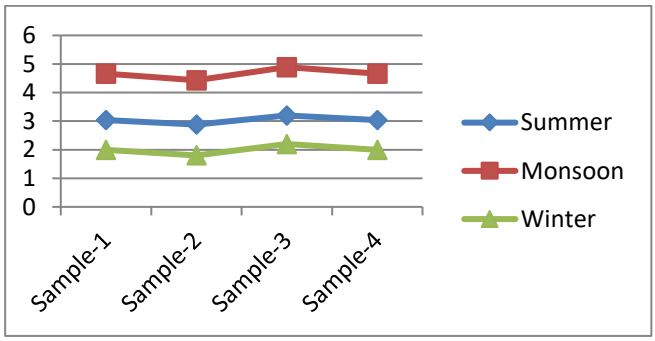
Station-5:having Chemical-Oxygen-Demand of the year 2020-2021



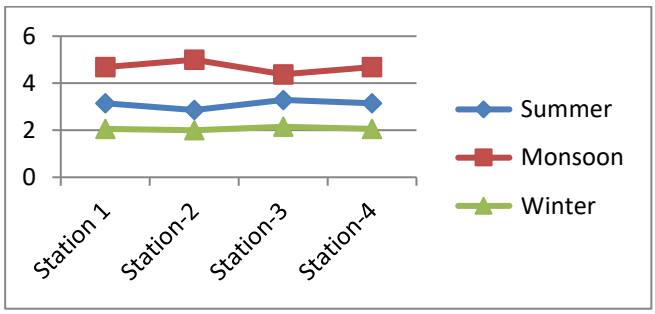
Station-6: having Chemical-Oxygen-Demand of the year 2016-2017



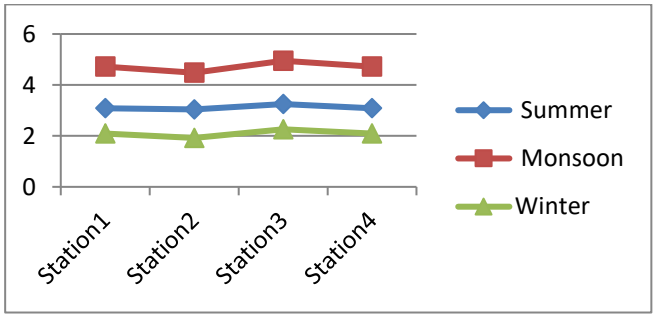
Station-6: having Chemical-Oxygen-Demand of the year 2017-2018



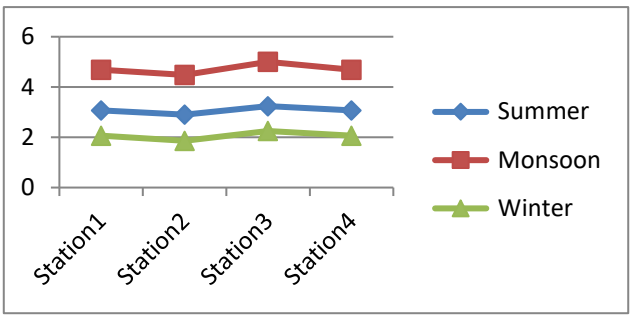
Station-6:having Chemical-Oxygen-Demand of the year 2018-2019



Station-6: having Chemical-Oxygen-Demand of the year 2019-2020

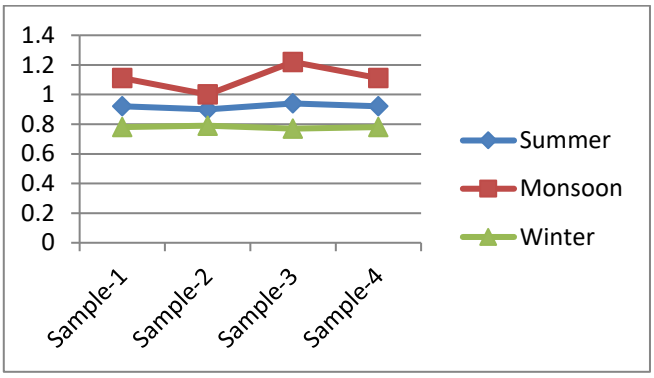


Station-6:having Chemical-Oxygen –Demand of the year 2020-2021

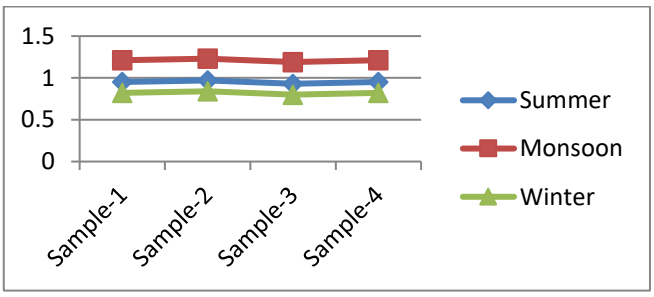


C- Analysis of Bio- Chemical Oxygen Demand of the river MOHAND-RAO flowing in the lower hills of Himalayas in Doon Valley.

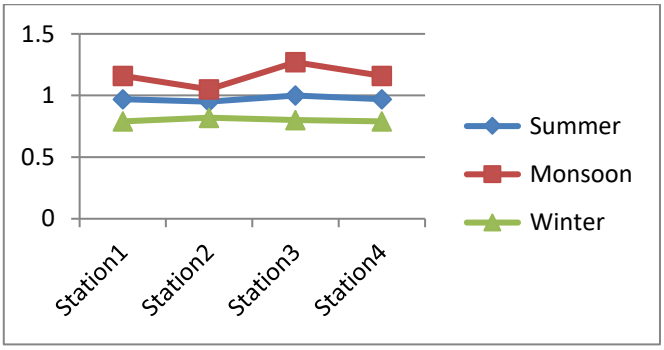
Station-1: having Biochemical-Oxygen-Demand of the year 2016-2017



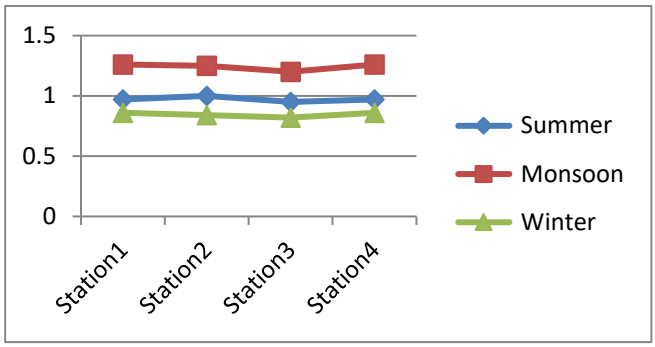
Station-1: having Biochemical-Oxygen-Demand of the year 2017-2018



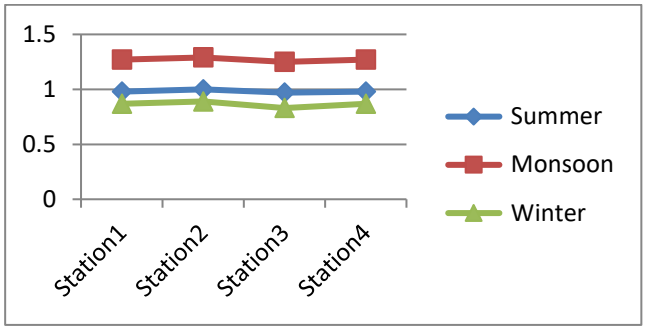
Station1 having Bio-Chemical Oxygen Demand of the year 2018-2019



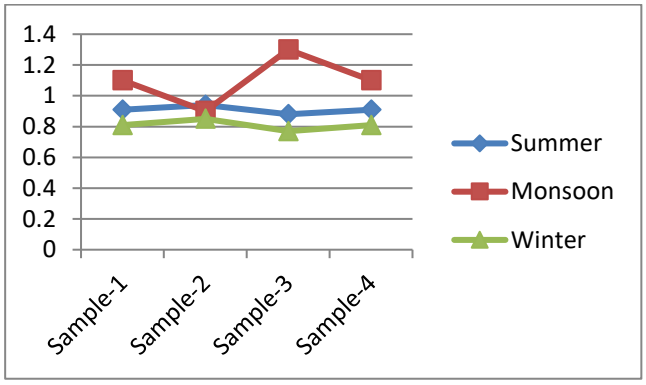
Station1: having Biochemical-Oxygen Demand of the year 2019-2020



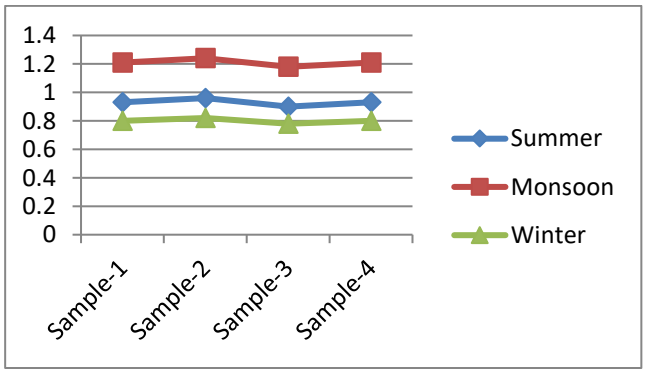
Station1: having Bio-chemical-Oxygen Demand Of the year 2020-2021



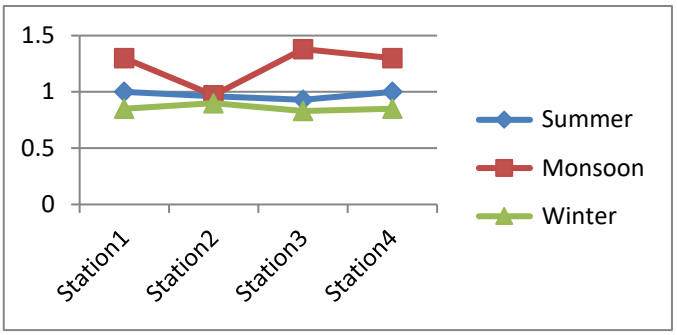
Station-2: having Biochemical-Oxygen-Demand of the year 2016-2017



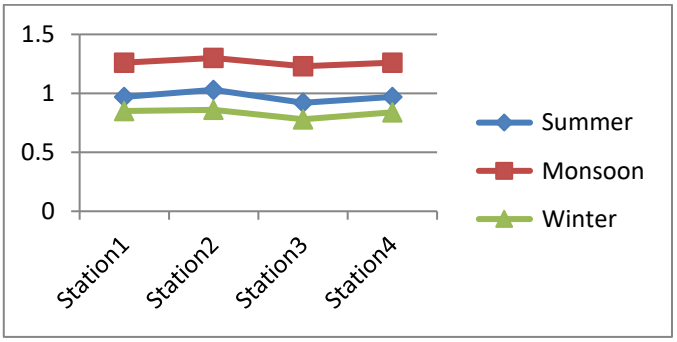
Station-2: having Biochemical-Oxygen-Demand of the year 2017-2018



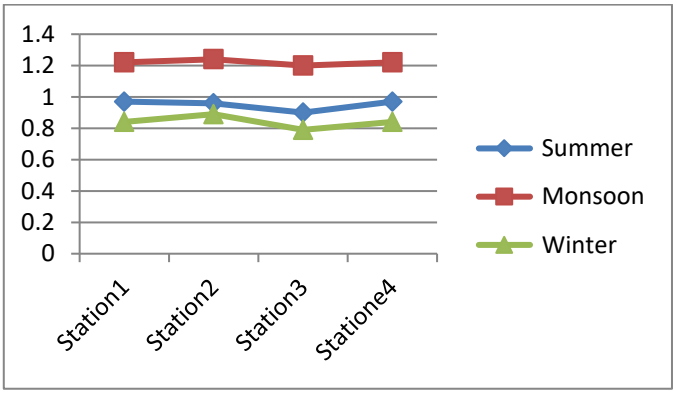
Station-2: having Bio-chemical Oxygen Demand of the year 2018-2019



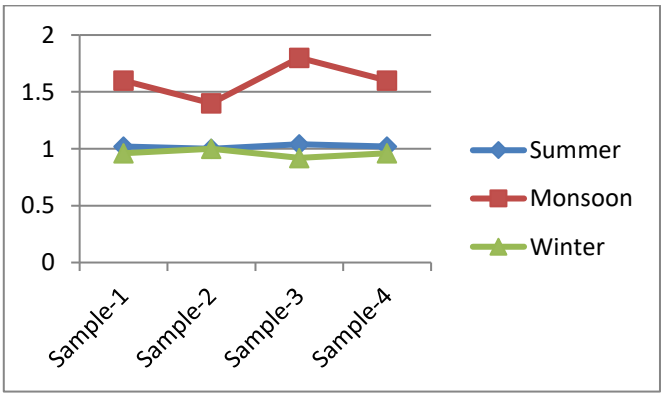
Station-2 : having Bio-chemical Oxygen Demand of the year 2019-2020



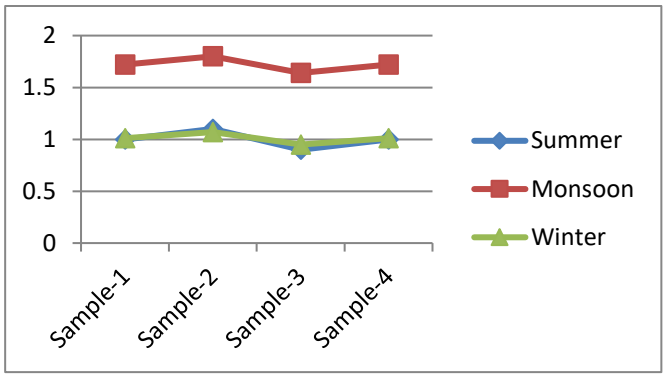
Station-2: having Bio-Chemical Oxygen Demand of the year 2020-2021



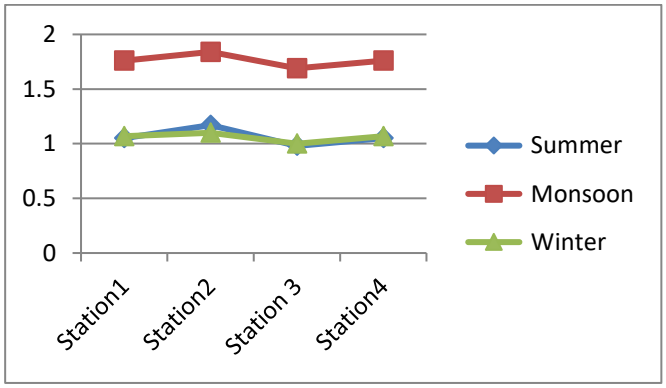
Station-3: having Biochemical-Oxygen-Demand of the year 2016-2017



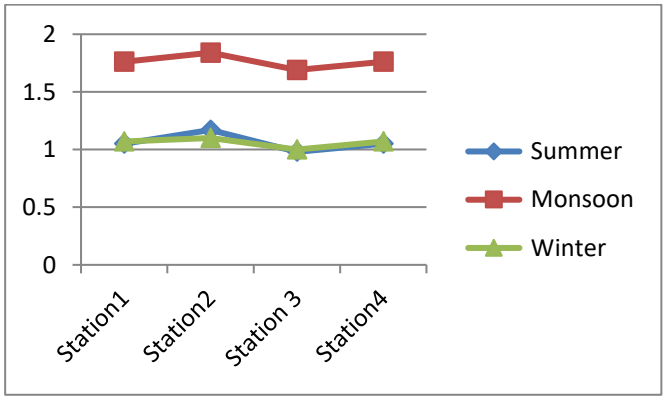
Station-3: having Biochemical-Oxygen-Demand of the Year 2017-2018



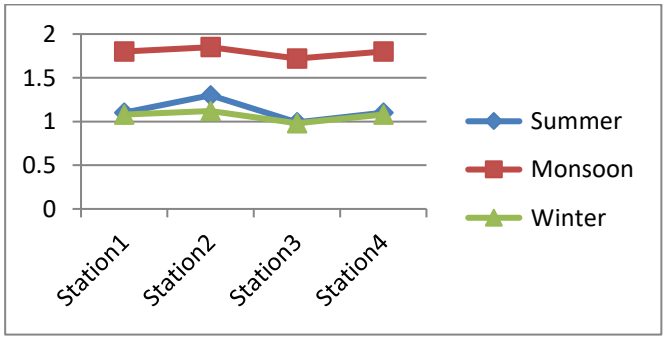
Station-3: having Bio-chemical-oxygen Demand of the year 2018-2019



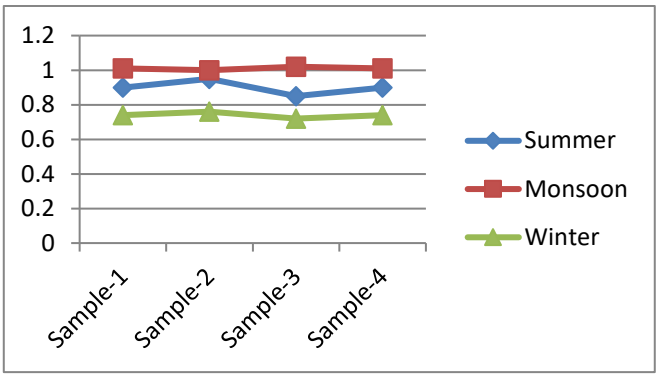
Station-3:having Bio-Chemical-Oxygen Demand of the year 2019-2020



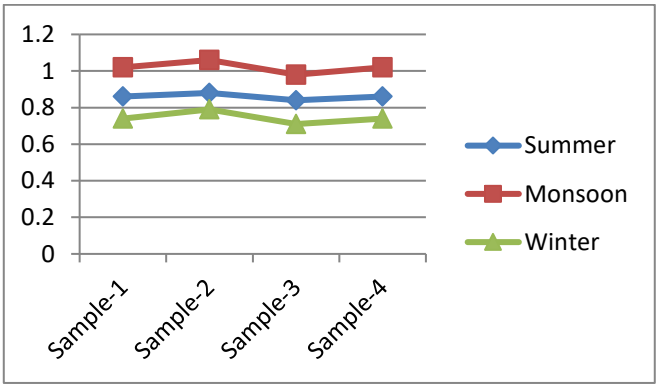
Station-3 : having Bio-Chemical-Oxygen Demand of the year 2020-2021



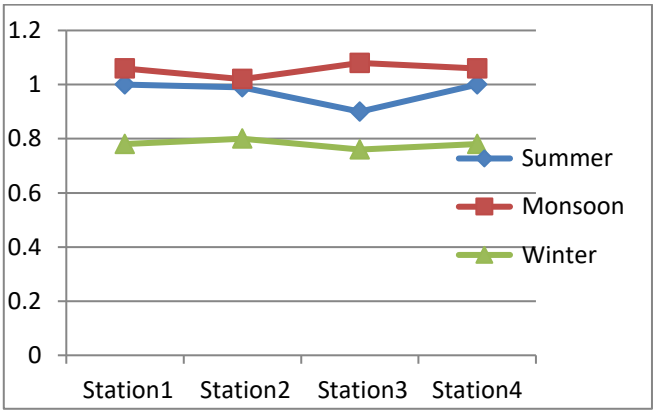
Station-4: having Biochemical-Oxygen-Demand of the year 2016-2017



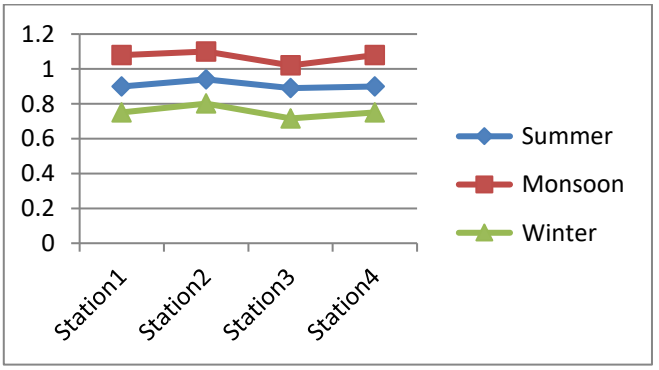
Station-4: having Biochemical-Oxygen-Demand of the year 2017-2018



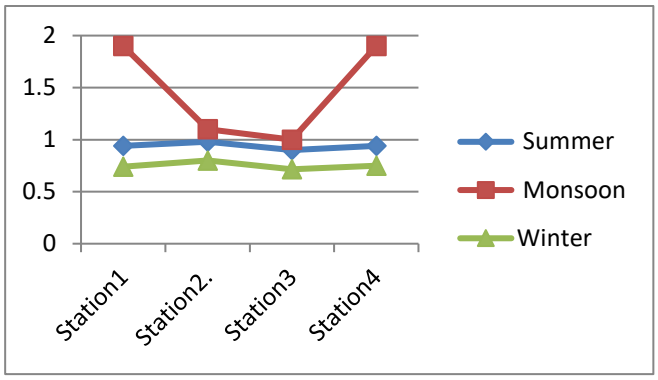
Station-4: having Bio-Chemical-Oxygen Demand of the year 2018-2019



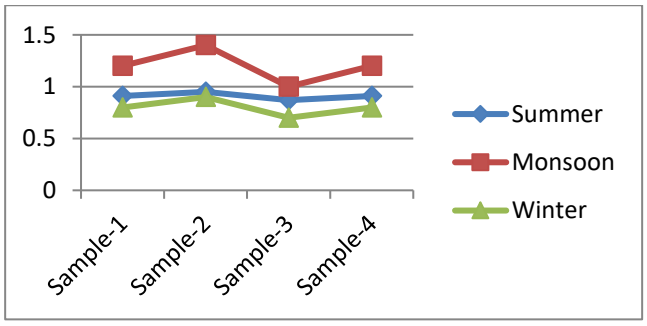
Station-4: having Bio-Chemical-Oxygen Demand of the year 2019-2020



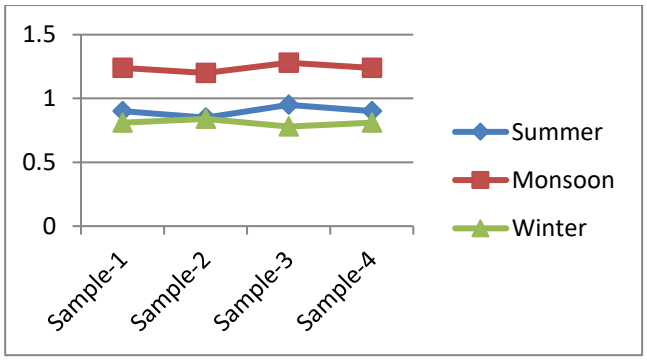
Station-4: having Bio-Chemical-Oxygen Demand of the year 2020-2021



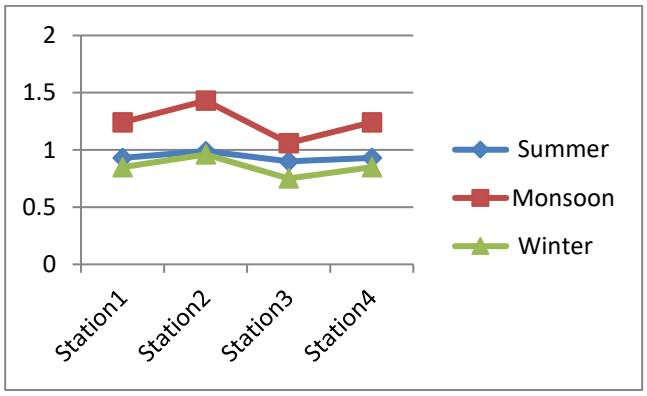
Station-5:having Biochemical-Oxygen-Demand of the year 2016-2017..



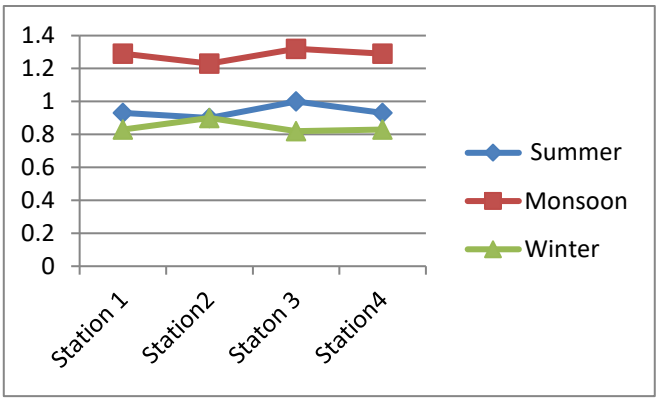
Station-5: having biochemical-oxygen-demand of the year 2017-2018



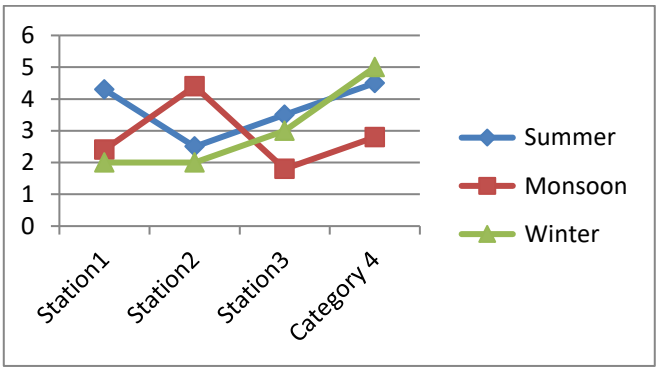
Station-5: having bio-chemical-oxygen demand of the year 2018-2019



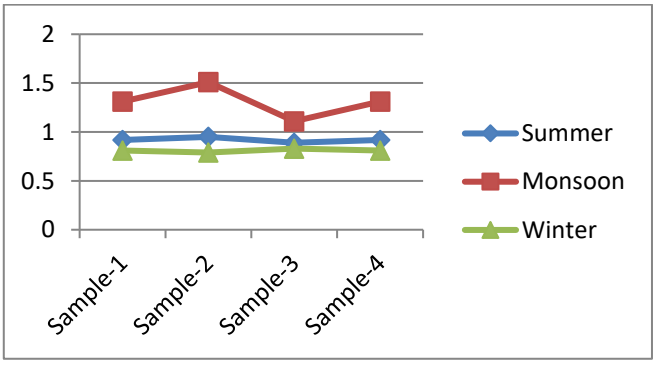
Station-5: having Bio-chemical-Oxygen Demand of the year 2019-2020

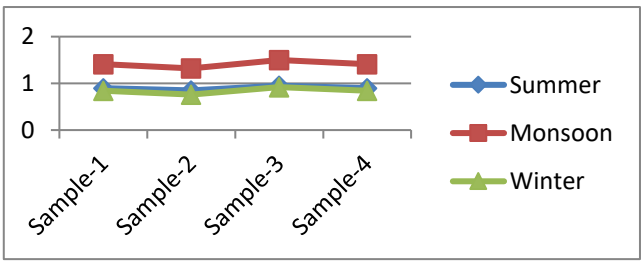


Station-5: having Bio-Chemical-Oxygen Demand of the year 2020-2021



Station-6: having biochemical-oxygen-demand of the year 2016-2017

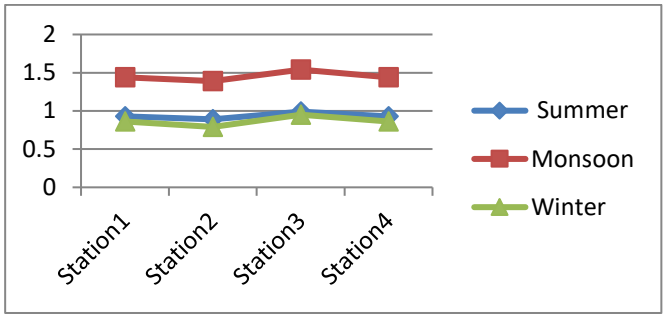




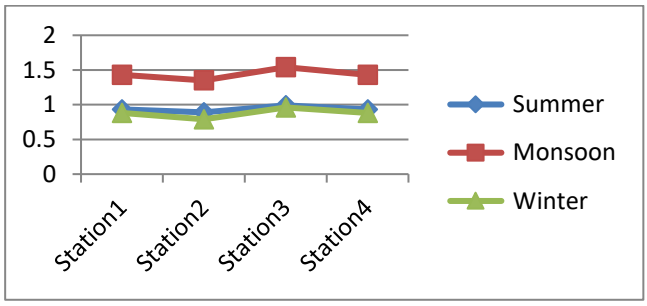
Station-6: having the biochemical-oxygen-demand of the year 2017-2018..

Station-6: having the bio-chemical-oxygen demand of the year 2018-2019

Station-6: having the bio-chemical-oxygen demand of the year 2019-2020



Station-6 : having the bio-chemical-oxygen demand of the year 2020-2021



All the graphical analysis of the different sample at different station on the flowing river water of MOHAND-RAO river in the foothills of Himalayas in Uttarakhand and Uttar-Pradesh of INDIA.

In these analysis of river water quality explain that the water of the river is suitable to support the ECO-SYSTEM around the river.

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