ANALYSIS OF SEWAGE & WASTE WATER FROM CREEKS OF THANE.

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ABSTRACT

The present investigation deals with the assessment of pollution status along the wet land of Thane creek, which has been subjected to a lot of pollution from the industrial complexes and residential areas. This project advocates habitat conservation and ecological studies with special reference to the physiochemical characteristics and heavy metal pollution in the soil along the creek area. In present investigation the pH, BOD, COD values recorded. It was observed that the nitrate concentration increased with addition of point sources but remained with an acceptable range. Phosphate concentration increased with addition of point sources.The presence of harmful material have mark an effect on the aquatic flora and fauna, which through biomagnifications enter the food chain and ultimately affect the human beings as well. The present experimental of the samples collected along the Thane creeks points out to the need of regular monitoring of water resources and further improvement in the industrial waste water treatment methods.If the present condition continues for a long period the creek may soon become ecologically inactive.

INTRODUCTION

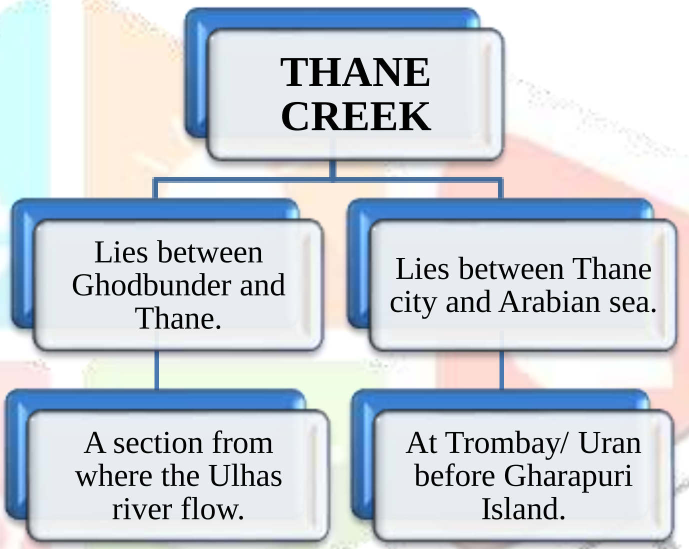
A Creek is a narrow place where the sea comes from long way into the land, in simple terms it is small stream or river. Indiscriminate release of untreated or partially treated waste without considering the assimilative capacity of the waste receiving water body have resulted in pockets of polluted environment with depleted coastal resources, public health risk and loss of biodiversity. The increased human aggression in the form of release of sewage and industrial waste, dumping of solid waste garbage's in the creeks caused stress on the ecosystem. In this project analysis of water at various creeks are done by testing it under BOD, COD, pH. Samples are collected from Thane &Dombivli creeks where domestic as well as industrial wastes are discharged.

PURPOSE & SCOPE OF STUDY

- Assess water quality in the creek at various places.
- Determine impacts from point and non-point sources of pollution.
- Determine the quantity of impurity a creek consist through waste discharge.
- To avoid recommendation to minimize impacts.
- Study of impurity level in creek due to waste discharge.
- Obtaining BOD of sample.
- Obtaining COD of sample.
- Get information regarding the nature of sample.

STUDY AREA

Thane Creek- Thane creek is an inlet in the shoreline of arabian sea that isolate the city of Mumbai from Indian mainland. It comprises the area between Mumbra, Retibunder&Mankhurd-Vashibridge.



BOD Level in mg/liter	Water Quality
1 - 2	**Very Good:** There will not be much organic matter present in the water supply.
3 - 5	**Fair:** Moderately Clean
6 - 9	**Poor:** Somewhat Polluted - Usually indicates that organic matter present and microorganisms are decomposing that waste.
100 or more	**Very Poor:** Very Polluted - Contains organic matter.

MATERIALS:

Field observation included:

Types of vegetation.

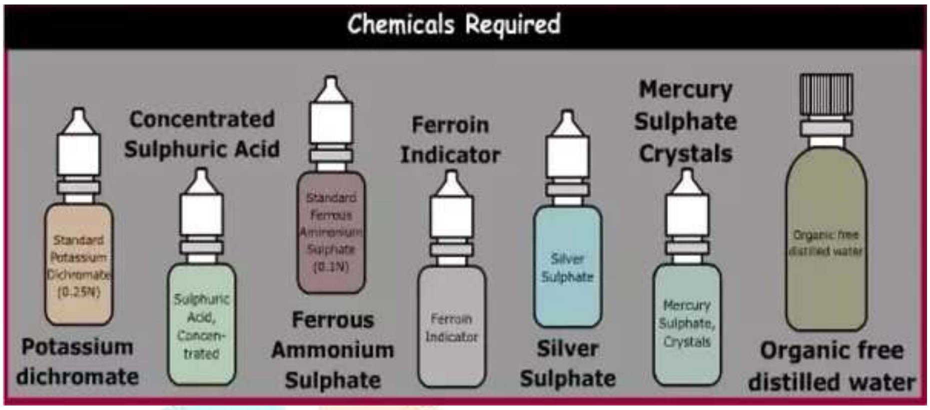
Substrate.

Land use.

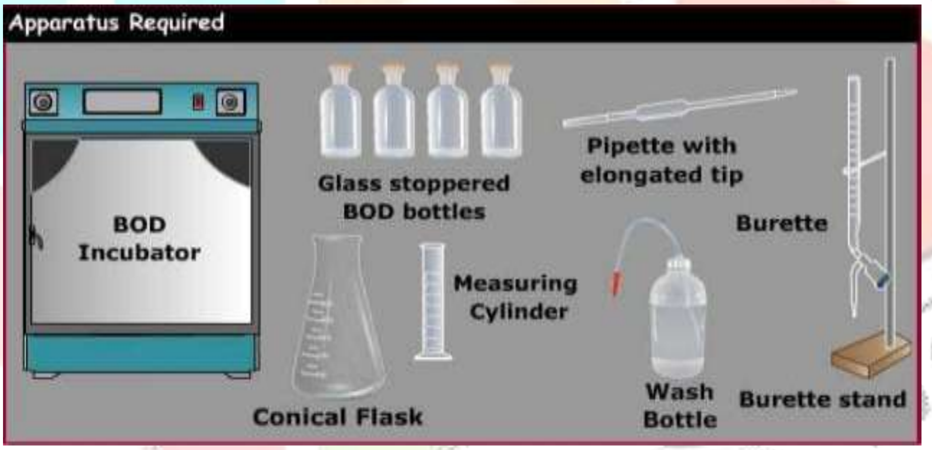
Samples are collected from various creeks.

Samples are analysed through various tests.

BOD



COD

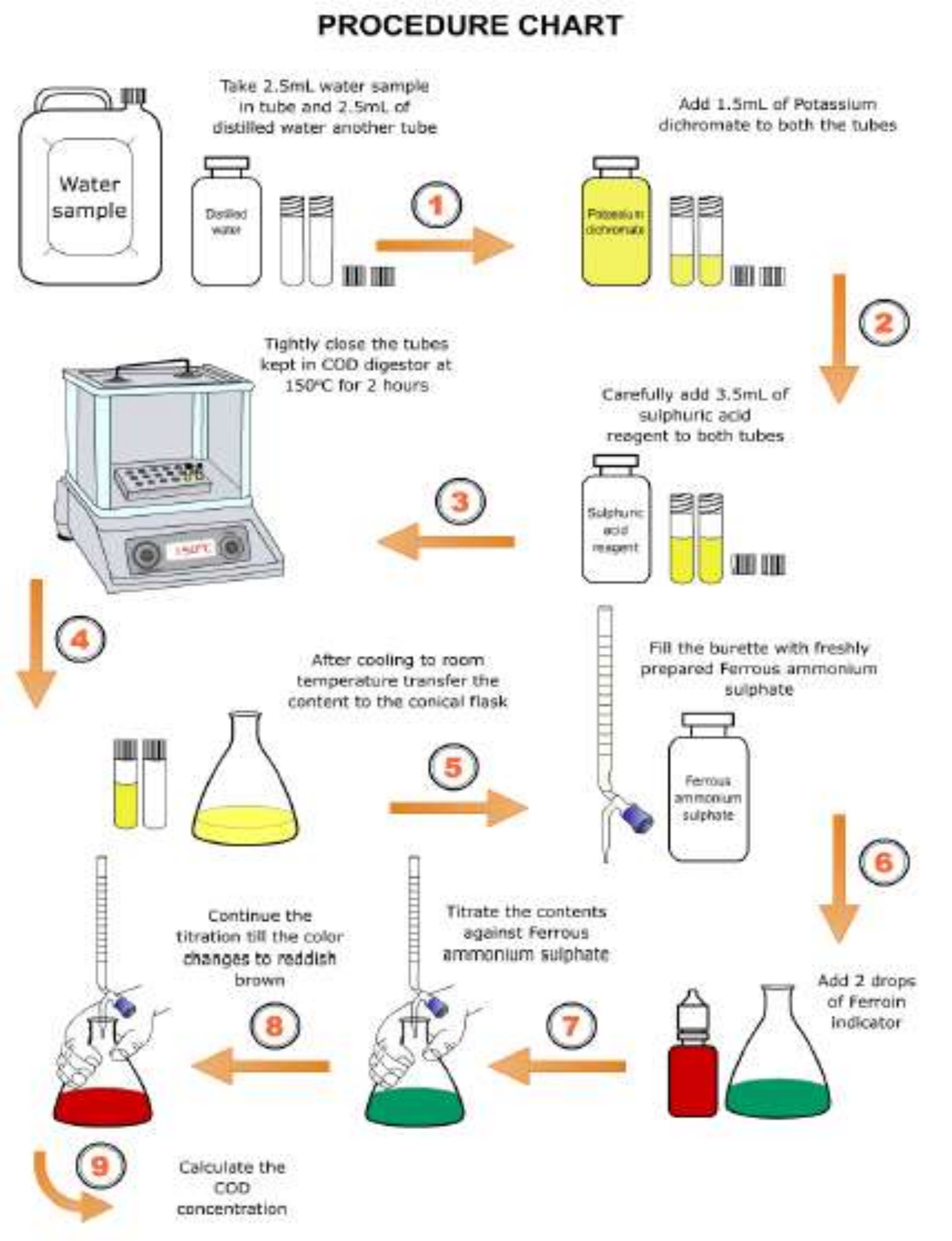


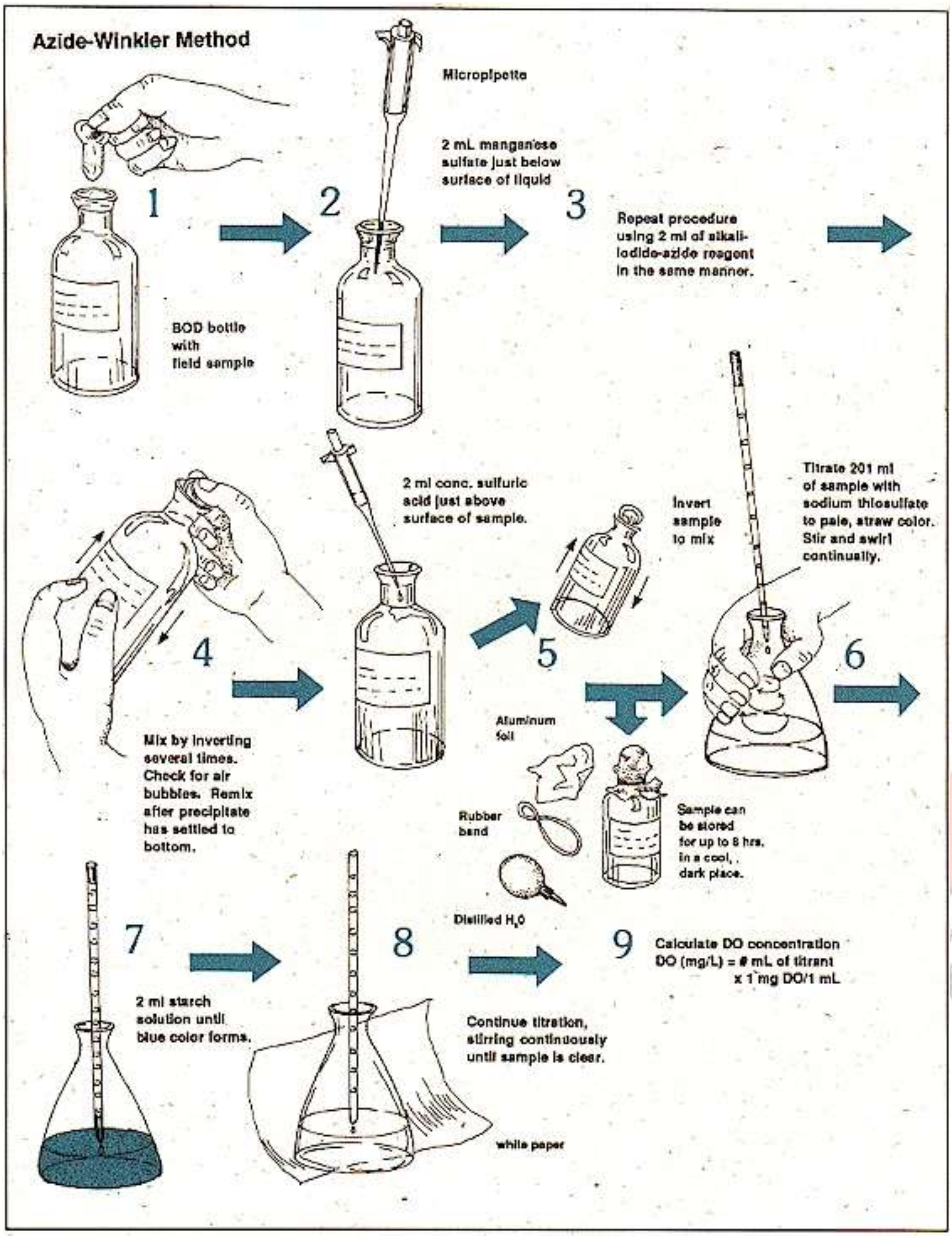
DISCRIPTION

Biochemical oxygen demand (**BOD**, also called **biological oxygen demand**) is the amount of dissolved oxygen needed (i.e., demanded) by aerobic biological organisms to break down organic material present in a given water sample at certain temperature over a specific time period. The BOD value is most commonly expressed in milligrams of oxygen consumed per litre of sample during 5 days of incubation at 20 °C and is often used as a surrogate of the degree of organic pollution of water.

In environmental chemistry, the **chemical oxygen demand** (**COD**) is an indicative measure of the amount of oxygen that can be consumed by reactions in a measured solution. It is commonly expressed in mass of oxygen consumed over volume of solution which in SI units is milligrams per litre(mg/L). A COD test can be used to easily quantify the amount of organics in water. The most common application of COD is in quantifying the amount of oxidizable pollutants found in surface water (e.g. lakes and rivers) or wastewater. COD is useful in terms of water quality by providing a metric to determine the effect an effluent will have on the receiving body much like biochemical oxygen demand (BOD).

In chemistry, **pH** (potential of hydrogen) is a numeric scale used to specify the acidity or basicity of an aqueous solution. It is approximately the negative of the base 10 logarithm of the molar concentration, measured in units of moles per liter, of hydrogen ions. More precisely it is the negative of the base 10 logarithm of the activity of the hydrogen ion.[1] Solutions with a pH less than 7 are acidic and solutions with a pH greater than 7 are basic. Pure water is neutral, at pH 7 (25 °C), being neither an acid nor a base. Contrary to popular belief, the pH value can be less than 0 or greater than 14 for very strong acids and bases respectively.pH measurements are important in agronomy, medicine, biology, chemistry, agriculture, forestry, food science, environmental science, oceanography, civil engineering, chemical engineering, nutrition, water treatment and water purification, as well as in many other applications.The pH scale is traceable to a set of standard solutions whose pH is established by international agreement.[3] Primary pH standard values are determined using a concentration cell with transference, by measuring the potential difference between a hydrogen electrode and a standard electrode such as the silver chloride electrode. The pH of aqueous solutions can be measured with a glass electrode and a pH meter, or an indicator.





LITERATURE REVIEW

A rapid, highly sensitive and selective detector is urgently required to detect contamination events in recycled water systems – for example, cross-connection events in dual reticulation pipes that recycle advanced treated sewage effluent – as existing technologies, including total organic carbon and conductivity monitoring, cannot always provide the sensitivity required. Fluorescence spectroscopy has been suggested as a potential monitoring tool given its high sensitivity and selectivity. A review of recent literature demonstrates that by monitoring the fluorescence of dissolved organic matter (DOM), the ratios of humic-like (Peak C) and protein-like (Peak T) fluorescence peaks can be used to identify trace sewage contamination in river waters and estuaries, a situation analogous to contamination detection in recycled water systems. Additionally, strong correlations have been shown between Peak T and biochemical oxygen demand (BOD) in rivers, which is indicative of water impacted by microbial activity and therefore of sewage impacted systems. Hence, this review concludes that the sensitive detection of contamination events in recycled water systems may be achieved by monitoring Peak T and/or Peak C fluorescence. However, in such systems, effluent is treated to a high standard resulting in much lower DOM concentrations and the impact of these advanced treatment processes on Peaks T and C fluorescence is largely unknown and requires investigation. This review has highlighted that further work is also required to determine (a) the stability and distinctiveness of recycled water fluorescence in relation to the treatment processes utilised, (b) the impact of matrix effects, particularly the impact of oxidation, (c) calibration issues for online monitoring, and (d) the advanced data analytical techniques required, if any, to improve detection of contamination events

REPORTS

PROJECTWORK

Followingsampleandvariouslocationpreferredforprojectwork

WaterSampleQuantitytaken

1.Dombivlicreek-west.9ml

2.Ulhasriver.12ml

3.Thanecreek(Northernarea)10ml

4.Kalwacreek.11ml

BOD

(BIOLOGICALOXYGENDEMAND)

CHEMICALS:-
WinklersAreagent:45gofMnSO4dissolvedin100mlofd/w
WinklersBreagent:15gKIdissolvedin100mlofd/w
StandardSodiumThiosulphateSolution(Na2S2O3)(0.014N):1.5gofNa2S2O3dissolvedinlittleamountofd/wandraisedto1000ml
ConcentratedHCl
StarchSolution(1%)

Method–WinklersTitrimetricMetho

OBSERVATION:-

Solutioninburette:0.014NNa2S2O3

Solutioninconical:20mlwatersample

Indicator:Starchsolution(1%)

Endpoint:Bluetocolourless

OBSERVATIONTABLE:-

a)ZeroHourIncubation:

Soilsampleno.	Readings
1	0.3
2	0.2
3	0.1
4	0.2

b)1/3/5Dayincubation:-

Soilsampleno.	Readings
1	0.5
2	0.6
3	0.4
4	0.3

c)Differenceinburettereadings(CBR)=B–A=

SoilSampleno	**C.B.R.**
1	0.2
2	0.4
3	0.3
4	0.1

CALCULATION:-

Since1meq.ofS_2O_3=½meq.OfO_2=8mgofO_2

BOD=CBRxNormalityof$Na_2S_2O_3$x8x1000/Voloftreatedwater

RESULT:-

BODofgivensoilsample=

SoilSampleno	BOD[mg/L/(1/3/5days)]
1	2
2	2.4
3	1.6
4	1.2

CONCLUSION:-

BODisameasureoftheoxygenusedbymicroorganismstodecomposewaste.Ifthelargequantityoforganicwasteinthesoilsampletherewillalsobealotofbacteriapresent. Inthiscasethedemandforoxygenwillbeverygood.Sotherewillnottomuchorganicwastepresentinthesample.

COD

(Chemical oxygen demand)

OBSERVATION:-

Solutioninburette:0.1Na2S2O3

Solutioninconicalflask:20mlH2Osample+

K2CrO4+KI+dil.

H2SO4

Indicator:1%starch

Endpoint:Bluetocolourless

OBSERVATION:

BLANK

1.Dombivlicreek-west.9.4

2.Ulhasriver.11.2

3.Thanecreek(Northernarea)13.7

4.Kalwacreek.8.6

TEST

1.Dombivlicreek-west.8.9

2.Ulhasriver.10.3

3.Thanecreek(Northernarea)14.5

4.Kalwacreek.7.1

CALCULATION:

COD=(blank-test)×N×8×1000÷20

=(blank-test)x0.1x8x1000/20

=(blank-test)x40

1.Dombivlicreek-west=(9.4-8.9)x40

=0.5x40=20

2.Ulhasriver=(11.2-10.3)x40

0.9x40=36.

3.Thanecreek(Northernarea)=(15.7-14.5)x40

=1.2x40=48

4.Kalwacreek=(8.6-7.1)x40

=1.5x40=60

RESULT:-Chemicaloxygendissolveofthefollowinggivensoilsampleare-

1.Dombivlicreek-west=20mg/L

2.Ulhasriver=36mg/L

3.Thanecreek(Northernarea)=48mg/L

4.Kalwacreek=60mg/L

CONCLUSION:-
Inconclusion,CODconcentrationshaveasignificantinfluenceonanaerobicammoniumoxidationbygranularsludge.

HARDNESS

OBSERVATION:-

Solutioninburette:0.01MNa2EDTA

Solutioninconicalflask:10mlofwatersample

+1mlofbuffer

Indicator:PinchofEriochromeBlackT

Endpoint:Wineredtopaleblue

1.Dombivlicreek-west.5.5

2.Ulhasriver.7.8

3.Thanecreek(Northernarea)9

4.Kalwacreek.6.3

CALCULATION:-

1000mlof1NNa2EDTA=40.08gofCa2+

Therefore,1mlof1NNa2EDTA=0.4008gofCa2+=40.08mgofCa2+

Totalhardnessof=MeanBRxNormalityof

watersampleNa2EDTAx40.08x1000/

Volumeofwatersample

=‘A'x0.01x40.08x1000/20

='A'x20.04

1.Dombivlicreek-west=5.5x20.04

=110.22

2.Ulhasriver=7.8x20.04

=156.31

3.Thanecreek(Northernarea)=9x20.04

=180.36

4.Kalwacreek=6.3x20.04

=126.25

RESULT:-Thetotalhardnessofthefollowinggivensoilsampleare-

1.Dombivlicreek-west=110.22mgof

Ca^{2+}/L

2.Ulhasriver=156.31mgof

Ca^{2+}/L

3.Thanecreek(Northernarea)=180.36mgof

Ca^{2+}/L

4.Kalwacreek=126.25mgof

Ca^{2+}/L

CONCLUSION:-
Inconclusion,theresultsfromthisexperimentwerereasonable.Thehardnessofawatersamplewassuccessfullydiscoveredbyfindingthe Calciumcarbonateinthissample.

OD

(Dissolved Oxygen Content)

OBSERVATION:-

Solutioninburette:0.014N $Na_2S_2O_3$

Solutioninconical:20mlwatersample

Indicator:Starchsolution(1%)

Endpoint:Bluetocolourless

OBSERVATIONTABLE:-

1	0.5
2	0.6
3	0.4
4	0.3

CALCULATION:-

Since1meq.Of(S_2O_3)=½meq.OfO_2=8mgofO_2

Amountofdissolvedoxygen=MeanB.R.xnormalityx8x1000/

inwatersampleVolumeofsample

=Xmg/L

AssumingNTPcondition,

1mgofO_2hasvolume22.4/32or0.7ml

Therefore,amountofdissolvedoxygeninsample=Xx0.7

=Yml

RESULT:-

1.Theamountofdissolvedoxygencontentinthegivensoilsample=

SoilSampleno.	Xmg/L
1	2.8

2	3.36
3	2.24
4	1.68

2.Theamountofdissolvedoxygencontentinthegivensoil

Sample,assumingNTPcondition=

SoilSampleno.	Readings
1	1.96
2	2.35
3	1.66
4	1.18

CONCLUSION:-
Anincreaseintemperatureandanincreaseinlightincreasestheamountofdissolvedoxygenwithinasoilsample.Ingeneralthehigherthelevelofdissolvedoxygenthelargerthepopulationofmicroorganisms.

CONCLUSION

Analytical result and spatiotemporal distribution of water quality access the impact of sewage and waste water in creeks. Water quality in terms of DO & BOD satisfies the compliance level in outer region of thane creek due to dilution. Water quality in stretch of thane creek is worst affected by influx of domestic and industrial waste in terms of non point pollution. Absence of DO and presence of high BOD warrants urgent mitigation measures in creeks. Measures include identification of non point sources and connected through city sewerage system, improvement in existing collection system, appropriate level of treatment and proper disposal may achieve designated water quality standards for the creek water environment. Impurities are effectively removed during treatment process. pH, BOD, and COD values were within acceptable range.

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