



Comparative Study of Diatoms Flora in Various Place of Raipur C.G.

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ABSTRACT

Diatoms are microscopic, unicellular, eukaryotic algae abundant in most aquatic habitats. Majorly diatoms are found in river, pond, marines and also in fresh water. They are characterized by their highly ornamental siliceous cell wall. Their silica-based skeletons do not readily decay. Diatoms are found in drowning and suicidal cases. They can sometimes be detected in heavily decomposed bodies. Presence of diatoms in a sufficient amount on certain distal vital organs can establish ante-mortem drowning up to certain extent. The samples for the present study were collected from river (Mahanadi), various ponds, debris and fresh water from different region of Raipur C.G. The water samples were collected in an air tight bottles so that it cannot get contaminated. Each water sample collected in 200ml from various places 4 samples from each direction were collected and analyzed by acid digestion method.

Keywords- Diatoms analysis, Drowning deaths, Acid digestion method, Ante & Post mortem drowning.

1. INTRODUCTION

Water is a clear, pellucid, transparent fluid which forms the streams, lakes, oceans and rain, and is the major constituent of the fluid of living things chemical compounds, and the most widely used of all solvents. A water molecule contains one oxygen and two hydrogen atoms that are connected by covalent bond, water is a liquid at standard ambient temperature and pressure, but it often co-exist on earth with its solid state, ice, and gaseous state, steam.

Drowning is death caused by the submersion of the body in water (or any other liquid). The cause of death is irreversible cerebral anoxia, because the atmospheric air is prevented from entering the lungs. Diatoms are found in almost all water bodies.

Composition of diatoms- Diatom is a unicellular algae with a siliceous cell wall. Diatoms may be extremely abundant in both fresh and marine ecosystem; it is estimated that 20% to 25% of all organic fixation on the planet (transformation of CO₂ and H₂O into sugar, using light energy) is carried out by diatoms. This is possible because they contain chlorophyll, diatoms are thus major food recourse for marine and fresh water micro organism and animal larvae, and are a major source of atmospheric oxygen. Diatoms are a major component of plankton, free floating micro organisms of marine or fresh water environment. Not all diatoms float freely through; many cling to surface such are aquatic plants, mollusks, and even turtles. Whales may carry dense growth of diatoms on their skin.

Classification- The classification of heterokonts is still unsettled, and they may be treated as a division (or phylum), kingdom, or something in between. Accordingly, groups like the diatoms may be ranked anywhere from class (usually called diatomophyceae) to division (usually called bacillariophyta), with corresponding changes in the rank of their sub groups. Diatoms are traditionally divided into two orders;

- 1.- Centric diatoms (Centrales), which are radially symmetrical
- 2.- Pinnate diatoms (Pennales), which are bilaterally symmetrical

Types of diatoms- There are about 10,000 species and 174 genera of diatoms reported which are having different shape and sizes varying from 1um to 500um. Diatoms are traditionally divided into two orders; centric and pinnate diatoms, but Round et.al(1990), classified diatoms into three classes; Centric diatoms (Coscinodiscophyceae), pinnate diatoms without a raphe (Fragilariophyceae), and pinnate diatoms with a raphe (Bacillariophyceae). Most diatoms exists singly, although some join to form colonies. They are usually yellowish or brownish, and are found in fresh and salt water, in moist soil, and also on the moist surface of plants (Wikipedia).

There are 9 morphologies of diatoms- 1- Centric, 2- Araphic, 3- Symmetrical biraphid, 4- Asymmetrical biraphid , 5- Nitzschoid, 6- Epithemoid, 7- Surrielloid, 8- Monomorphid, 9- Eunotioid.

2. SAMPLE COLLECTION AND METHODOLOGY

In the present study entitled “COMPARATIVE STUDY OF DIATOMS FLORA IN VARIOUS PLACE OF RAIPUR C.G.” the following materials were used.

Selection of study area- 1st and 2nd samples are from Mahanadi under the Lakshman Jhoola, 3rd and 4th samples from Katora Talaab, 5th, 6th, 7th and 8th samples from Vivekanand Talaab, 9th and 10th samples from Kankali Talaab, 11th, 12th and 13th samples from Marine Drive Telibandha. These water samples collected in BOD plastic bottles.

Diatoms can be collected not only from natural surface but also from other substrates or surface type in equatic environment. Phytoplankton samples were collected on August 2021 from the natural surface water in the plastic BOD bottles and after filter the water sample in filter paper. The collected samples were preserved in 5% neutralized formaldehyde and used for diatom analysis before diatoms can be examined, they have to be cleaned. This involves the removal of cell contents, pigments, sand, mud or other material likely to interfere with microscope examination.

Chemicals- 5% Formaldehyde, Conc. Sulfuric acid, 3% hydrogen peroxide, Dpx etc.

Sulfuric Acid Method-

- Take the river water sample and add 5% of formaldehyde, and add the conc. Sulfuric acid.
- Add conc. Sulfuric acid until the volume is twice that of the original sample.
- Let stand for 24 hour or more, or speed up the reaction in a hot plate 90 degree and heat for 2hours. Even so it may take several hours before the sample is clean. The sediment should look grayish and no plant fragments etc should remain.
- Let stand for 24 hours or more when sample has settled completely, discard supernatant.
- Let settle completely, discard supernatant and rinse several times as described above the sulfuric acid method seems to remove resistant, “dirt” somewhat better than the hydrogen peroxide method mainly because the oxidation reaction is not as abrupt as with peroxide.
- Let three to four time washing after the boiling the acetic water sample and discard the supernatant materials.
- Take the cover slip and add the water sample with the help of dropper.
- Let stand for 24 hours or more, when sample dried completely in cover slip and hot 60 degree Celsius under the hot plate.
- Take the glass slide and mounting the Dpx and under the microscope examination on 40X and 100X with the help of oil emulsion.
- Observation of the diatoms in prepared slide.

3. RESULT AND DISSCUSSION

The study of distribution of diatoms from different places of Raipur city of C.G is useful to recognize different type of diatoms present on different water bodies present at different area. Numbers of variation as well as some similarities in structure of diatoms are found in this examination. It might happen due to the water supply, pH, and geographical conditions that can affect the nutrient content of water for the growth of diatoms. Change in diatoms diversities in different water bodies can be used as an identification key in forensic investigation of drowning and suicidal cases. Due to the siliceous wall of diatoms they cannot be easily digested in human body therefore diatoms can also be extracted from decomposed body. Diatom frustules are examined routinely during autopsies of deaths due to drowning. Presence of same species of diatoms (in similar concentration) as that of the putative drowning medium from the internal organs of the drowning victims constitute a corroborative or even conclusive evidence to support the diagnosis of the death.

S.No.	Sample location	Species name
01.	Mahanadi River (City side)	<i>Pronia, Fragilaria, Synedra, Asterionella, Pinnularia</i>
02.	Mahanadi River (Opposite of city side)	<i>Pronia, Pinnularia,</i>
03.	Katora Talaab (East direction)	<i>Navicula, Pinnularia, Achanthes, Cocconeis, Cymbella, Amphora</i>
04.	Katora Talaab (West direction)	<i>Navicula, Pinnularia, Achanthes, Cocconeis, Cymbella, Amphora</i>
05.	Vivekanand Talaab (East)	<i>Cymbella, Amphora, Navicula, Pinnularia</i>
06.	Vivekanand Talaab (South)	<i>Cymbella, Amphora, Navicula, Pinnularia</i>
07.	Vivekanand Talaab (West)	<i>Navicula, Pinnularia</i>
08.	Vivekanand Talaab (North)	<i>Cymbella, Amphora, Navicula, Pinnularia</i>
09.	Kankali Talaab (North)	<i>Cymbella, Amphora, Achanthes, Cocconeis, Nitzschia, Denticula</i>
10.	Kankali Talaab (South)	<i>Cymbella, Amphora, Achanthes, Cocconeis, Nitzschia, Denticula</i>
11.	Marine Drive (North)	<i>Navicula, Pinnularia, Eunotia, Cymbella, Amphora, Rhoicosphenia</i>
12.	Marine Drive (East)	<i>Navicula, Pinnularia, Eunotia, Cymbella, Amphora, Rhoicosphenia</i>
13.	Marine Drive (South)	<i>Navicula, Pinnularia, Cymbella, Amphora, Rhoicosphenia</i>

CONCLUSION

Diatoms are found in most aquatic environments and the systematic and taxonomic investigation of modern and fossil diatoms have been supported by numerous study of distributional ecology. Furthermore, diatoms can provide a record of environmental conditions because their relationship to water quality and aquatic habitat is known as the diatoms cell wall, which is silicified to form a frustules, it well preserved, easily detectable and occurs in high numbers in sediment in water. On the above examination the data shows that the more number of diatoms present in fresh water. On the other hand in contaminated water either diatoms are also present but may or may not be they belongs to the same species.

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