

RESEARCH PAPER:

Morphological variations in chlorophyceae(green algae) due to polluted water of Damodar river running through Kathara area (Dist. Bokaro) Jharkhand

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SUMMARY

The present communication elucidates morphological variations in Chlorophyceae (green algae) in relation to water quality of Damodar river along Kathara area. Damodar river is well known for establishment of coal based industries along its basin area. Kathara area of Bokaro district is one of the most productive coal mines. Mining activities like open cast mining, underground mining and coal washery have been conducted here. These mining activities release several kinds of pollutants like coal dust, ashes, oils and grease, floatation agents, flocculation agents etc. per day. All these effluents are directly added to river without recycling resulting in the change of physico-chemical characters of water and soil leading to morphological variation of algae. The study area has been divided into three sites as per quality of pollutants and their locations. Water as well as algal specimens were collected regularly from the above three sites for consecutive years 2005-07. Parameters taken were pH, Temperature, TSS, TDS, oils and grease, ammonical nitrogen, BOD, COD, arsenic, hexavalent Cr, fluoride and sulphide and estimated by standard procedure as prescribed by APHA(1985). Altogether 50 species of chlorophyceae belonging to 14 genera were recorded and studied. Morphological variations were clearly observed especially in species of *Ulothrix*, *Stigeoclonium*, *Oedogonium*, *Bulbochaete* etc. Severe morphological variations were observed in all the above genera during study. Cultural studies were also conducted in the laboratory in different culture media.

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Damodar river is one of the largest river of Eastern India and Jharkhand state. It originates from Chandwa village of Palamu district on the Chotanagpur plateau in Jharkhand and merges in the river Hooghly in West Bengal. Major catchment area of the river falls in the coal mining belts of Jharkhand. Kathara is one of the most productive mines of C.C.L(Central Coalfield Limited). It is surrounded from all the three sides by Damodar river and its tributaries as shown in the map. All the three types of mining activities like open cast mining, underground mining and coal washery is being conducted here throughout the year releases several tones of solid (raw coal stones, carbonaceous shale), liquid (oils and grease, flocculation agents, acid mine drainage) and gaseous (fly ashes, coal dust, fumes of organic and inorganic impurities like phenol, hexavalent Cr, SO₂ and NO_x etc.) pollutants are released. There is no management system of recycling of pollutants and are directly added to the river and environment. The physico-chemical and biological qualities of water, air and soil get changed at all the points where effluents are added.

MATERIALS AND METHODS

The study area:

Site-I : Jarangdih open cast mines with huge coal dumping yards and heaps of raw coal stones.

Site-II: Jarangdih underground mines with small puddles for siltation and railway siding for transportation of coal.

Site-III: Kathara washery having large ashes and slurry ponds along the river side.

For physico-chemical water analysis, water samples were collected regularly from the above three sites for the years 2005-07 as per APHA(1985).

– For physico-chemical analysis water samples were collected from a depth of 0.5m from all sides in natural glass containers up to the top and precaution was taken to maintain the temperature during transit period.

– For heavy metal analysis water samples were collected in plastic sample container and rinsed with 1+1 nitric acid then redistilled water before use. Then added 5 ml conc. HNO₃ to minimize absorption of metals on the container walls.

The algal specimens were also collected

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