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PHYSIOCHEMICAL PROPERTIES OF STUDY MATERIAL IN GANGAPUR DAM IN NASHIK SHOWING MELANIA TUBERCULATA AND MELANIA SCABRA

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ABSTRACT:

There are some environment aquatic indicators which perform behavior of snail. Aquatic indicator such as water salinity according to the localities of water resources. Physical indicator photo toxic, temperature shows the behavioral changes in the intermediate host snails related to the patency and normal activities of the snails. Mostly snails are aquatic in natural habitat some time Melania scabra found on the terrestrial habitat. Respiration through gill lamdae is the main function of aquatic animals Melania tuberculata is sometime benthonic in nature so that they are merge in to the mud region it burrows the mud and receive the oxygen from this mud region but too much period they floating on the surface other water with some vegetation sub spectrum. According to the water BOD the snails are shows variation in their activities.

KEYWORDS : *environment aquatic , patency and normal activities , vegetation sub spectrum.*

INTRODUCTION:

The O_2 and CO_2 level depends on the contaminant particles of water it is the main factor for maintenance of respiratory system of snails. At the time of emerging cercariae the snails are also changes their behavior changing movement and mostly show increasing gaseous bubbles around snails. From that number of radiae cercariae and metacercariae emerging from the infected snails. Due to oxygen consumption requirement of snails shows variation due to water quality and water contamination. Von Brand et.al (1948), Lee and Cheng (1971) using monometric method. The effect of water quality and quantity as well as water nature shows effect on the body of snails. There is change in oxygen consumption rate in the body of infected snails. Berg and Ockelmnn (1959) polaromteric method. According to some researchers the oxygen consumption rate in infected and non-infected snail not shows the changes its surprise fact because of struggle for existence. The levels of physiological variations differ widely depending on stability of environment and amount if genetic interchange taking place between populations. Melania tuberculata and Melania scabra the rate of oxygen consumption also shows variation according to food, nature, water stability and temperature of water.

Gangapur Dam in Nashik, the longest earthen dam in Asia was built in 1954. This dam is built on the river Godavari outside the city of Nashik. This was the first dam constructed in the district. The dam is located in Gangawadi village, just 10 km from Nashik. Gangapur Dam has a catchment area of 357.4 sq km and a maximum elevation of 36.57 m. There are two canals from the dam to the surrounding area. The length of the right bank canal is only 30 km, while the length of the left bank canal is 64 km. The dam can release 81013 cusecs (2294 cumecs) of water through its 9 radial gates.

Apart from dam related activities, Gangapur Dam is a great place for many outdoor activities. It is an amazing place very close to Sula Vineyards, so you can always mix a trip to Sula Vineyards with Gangapur Dam. A short walk across the barren land can take you to the lake formed by the Gangapur Dam. You can see the moonrise from the top of the dam. You can spend some happy time in the garden near the dam which serves as a good picnic spot, but you have to take permission from the chief executive engineer of the dam. If you are a nature lover, you may have some interest in the algal forms of the taxonomic groups of the fresh water ecosystem of Gangapur Dam. The dam is constructed of clay, stone, soil and sand materials. It is also counted as one of the largest dams built on the Godavari River. Gangapur Dam provides many benefits including river transport, water supply, waste management and ecological balance. The dam also has a religious aspect as it impounds the water of the holy Godavari River. On weekends, you can see a good crowd, especially young people.

Climatic Condition of Gangapur Dam:

Chankapur Dam Acute Conditions scenario for two years from study period to February 2009 to January 2010.

Physiochemical Characteristics of Water:

Physico-chemical characteristics of Gangapur dam were recorded in three different seasons namely summer, monsoon and winter during the two-year study period. In summer the water was found to be colourless, odorless and clear. During the rainy season (June to September) the color and odor become muddy and turbid. In winter the water becomes semi-clear in the month of October, muddy in smell and muddy in nature. During the remaining three months of winter, the water is colorless, odorless and clear.

Temprature:

The ambient temperature ranges from 34.2°C to 39.9°C during the summer months. During the same period the water temperature ranged from 26.9 ± 1.18 °C to 27.1 ± 0.49 °C.

Atmospheric temperature ranges from 29.9 ± 0.88°C to 31.76 ± 0.82°C during monsoon, while water temperature ranges from 21.9 ± 0.20°C to 22.65 ± 0.16°C. During winter the ambient temperature ranges from 27.81 ± 0.69°C to 27.92 ± 0.79°C and the water temperature ranges from 20.79 ± 0.94°C to 21.10 ± 1.31°C.

Humidity and Rainfall:

No rainfall was recorded during summer and winter seasons during the study period while humidity ranged between 37.8 ± 1.82% to 38.6 ± 0.67% in summer, while it ranged from 48.1 ± 2.21% to 49.25 ± 1.22% in winter. On the other hand, maximum rainfall was recorded between 72.1 ± 9.81 mm to 75.80 ± 7.51 mm during monsoon. and humidity ranged from 87.13 ± 1.28 % to 87.5 ± 2.62 %. Overall rainfall and humidity are maximum during rainy season and minimum during summer season.

Total Hardness (SO_4, HCO_3, CO_3, Cl):

ETDA Titrimetric Method:

Principle:

Ethylenediamine tetracetic acid (EDTA) and its sodium salt form chelated soluble complex when added to a solution of certain metal cations. If a small amount of dye such a trichrome black T is added to an aqueous solution containing calcium and magnesium ions at a pH of 10.0 ± 0.1 the solution

becomes wine red. If EDTA is then added as a titrant, calcium and magnesium will be complexes. After sufficient EDTA has been added to complex the solution turna from wine red to blue indicating the end point of titration.

Regent:

- 0.01M EDTA solution: 3.723 gm. of dry reagent in 1000 ml. distilled water.
- Buffer solution: (A) 16.9 gm. of NH4CL in 143 ml. concentrated NH4OH. (B) 1.179 gm. EDTA and 0.780 gm. MgSo4, 7H2O in 50 ml. distilled water.
- A and B mixed and diluted to 250 ml.
- Trichroma black T: 0.5 cm. dye mixed with 100 gm. NaCl.

Procedure:

To a 50 ml. sample in a 250 ml. conical flask was added 1 ml. of buffer solution and an appropriate amount of Trichrome black T indicator and titrated against 0.01M EDTA solution in burette. Titration reading was noted.
End point: wine red to blue

Calculation:

$$Total\ Hardness\ in\ PPM = \frac{ml.of\ titrating\ Solution}{50\ ml\ Sample}\ X\ 103$$

(Parts per 10, 00, 00 = ppm.)

Permanent hardness (as SO_4, Cl): Non- carbonate hardness.

If the total hardness is greater than the alkalinity, salts other than carbonate are responsible for the extra hardness. Non- carbonate hardness may be determined directly as follows:

Soda reagent method:

- Soda reagent: 2 gm. of NH4OH and 2.65 gm. of sodium carbonate in 1000 ml. distilled water.
- Standard N/10 sulphuric acid solution: 3 ml. of concentrated H2SO4 diluted to 1000 ml. in distilled water.
- 0.02N H2SO4: 0.6 ml. concentrated H2SO4 diluted to 1000 ml. in distilled water.
- Methyl orange indicator. (pH, 3.0 -4.0)

Procedure:

- In a conical flask 200 ml. of water sample was boiled for fifteen minutes to remove dissolved oxygen.
- Blank: 200 ml. of distilled water was also boiled for fifteen minutes.
- 25 ml. of soda reagent were added to each of the two flasks. Both boiled for ten minutes.
- The solutions were cooled and made up to 200 ml. with distilled water and filtered.

50 ml. of each titrated against N/10 H2SO4 using methyl orange indicator.
End point: Yellow to pink.

Calculation:

$B - R_1 = R$

Where B = Blank reading
R1 = Sample reading
R = Actual reading
Permanent hardness in ppm. = R X 2 X 100

Total Solids (Organic and Inorganic):

Principal:

A well-mixed sample is evaporated in a weighing dish and dried in an oven at 103°C to 105°C to constant weight. The increase in weight over the empty dish represents total solids.

Procedure:

- A 100 ml sample in a weighing dish was evaporated on a steam bath.
- The sample was then dried in an oven at 103°C to 105°C for one hour.
- The dish was cooled in a desiccator and the residue weighed.
- The drying cycle is repeated until a constant weight of residue is obtained.

Calculation:

$$Total\ Residue\ in\ ppm = \frac{(A - B)\ x\ 1000}{100\ ml\ (sample)}$$

Where, A = Residue weight of sample + dish
B = Empty dish weight

Fixed Solid (Inorganic)

Procedure:

- The total residue obtained in total solids is ignited in a muffle furnace at 550°C ± 50°C.
- The dish was allowed to partially cool in air and then transferred to a desiccator for further cooling.
- Weighed the plate.

Calculation:

$$Fixed\ Solid\ in\ ppm = \frac{(A - B)\ x\ 1000}{100\ ml\ (sample)}$$

Where, A = Residue weight of sample + dish
B = Empty dish weight

Total Alkalinity:

Principle:

Numerically, alkalinity is the equivalent concentration of a titratable base and is determined by titration with a standard solution of a strong acid to specific equivalence points given by the indicator solution.

Substance:

- 0.02N H_2SO_4
- Methyl Orange Indicator

Procedure:

- A 50 ml sample was taken in a conical flask and 3 to 4 drops of methyl orange were added as indicator.
- It was titrated against 0.02N H_2SO_4
  - End Point – Orange to Pink
  - Alkalinity – Burette reading X 20ppm

Chlorides (Cl)

Principle:

A silver nitrate titration of potassium chromate chloride in a neutral or slightly alkaline solution may represent the end point. Quantitative precipitation of silver chloride occurs before red silver chromate is formed.

Substance:

- 5% potassium chromate indicator solution in redistilled water,
- N/35.5 standard silver nitrate solution.

Procedure:

- To 50 ml of sample, 1 ml of potassium chromate indicator was added.
- This was titrated against the N/35.5 standard $AgNO_3$ solution reading.

Calculation:

$$Chloride\ in\ ppm = ml\ of\ titrating\ solution\ X\ 20$$

Ammonium Nitrogen (NH_3)

Principle:

The so-called free ammonia found in water probably exists in combination with certain mineral acids. Ammonia is liberated after boiling with very dilute alkali. It can be collected in condensed steam and then determined very easily by Nesslerization. Samples containing residual chlorine must first be dechlorinated with sodium sulphite (Na_2SO_3).

Substance:

- Dissolve 35 g of potassium iodide in 100 ml of distilled water. of a cold saturated solution of mercuric chloride until a slight red precipitate remains after thorough mixing. Now, add 120 g of sodium hydroxide and after dissolving dilute it to 1000 ml. Add a little more or mercuric chloride solution to produce a red color, set aside for clearing. The reagent should be stirred occasionally.
- Stock solution of ammonium chloride: Dissolve 3.14 g of pure ammonium chloride (oven dried at 105°C) in 1000 ml of distilled water (1 ml = 1 mg of ammonia.).
- Standard Solution of Ammonium Chloride: Dilute 10 ml of stock ammonium chloride solution to 1 liter and mix (1 ml = 0.01 mg of ammonia). From this prepare a dilution of 0.2 to 2 ppm of ammonia for calibration and a Nesslerizations standard.

Procedure:

- A 500 ml sample was taken in a thoroughly cleaned distillation flask. Add pumice power to this to avoid bumping while boiling.
- The flask was then connected to the condenser by a bent glass tube. A 50 ml Nessler tube was placed below the condenser. Distillation is done with controlled heat.
- The distillate was collected in a Nessler tube until it reached the 50 ml mark.
- Another tube was used to collect another 50 ml of distillate.
- 1 ml of Nessler reagent was added to the Nessler tube and the solution was mixed well. Two to three minutes were allowed for color development.

Albuminoid Nitrogen (NH_3)

Principle:

The procedure adopted to obtain this rough index of the amount of organic matter in solution is always carried out with water from which free ammonia is obtained by distillation. Ammonia produced by the action of permanganate is estimated in the distilled distillate by the method described above.

Substance:

- Nessler's reagent.
- A stock solution of ammonium chloride.
- Ammonium chloride standard solution.
- A strong alkaline solution of potassium permanganate.
  - Dissolve 8 grams of potassium permanganate in one liter of distilled water with the help of heat.
  - Dissolve 200 g of sodium hydroxide in 500 ml of distilled water.

Procedure:

- 100 ml of water from 500 ml of treated sample was removed by distillation for estimation of ammonia nitrogen.
- To the remaining 400 ml of sample was added 50 ml of alkaline solution of $KMnO_4$ and distillation was slowly resumed.
- Three successive 50 ml portions were distilled and the ammonia present was estimated from the ammonia nitrogen estimate.

Nitrate Nitrogen (N_2O_5)

Principle:

The yellow color produced by the reaction between nitrate and phenol disulfonic acid obeys Beer's law to a minimum of 12.0 ppm at 480 mm wavelength when a light path of 1 cm is used. Wave length 410 mm maximum observation point, determined up to 2 ppm in the same way.

Substance:

- Phenol disulfonic acid: Dissolve 25 g of pure white phenol in 150 ml of cubic H_2SO_4. Slowly add 75 ml of fuming H_2SO_4 (20%, SO_3) and heat on a steam bath for 2 hours.
- ammonium hydroxide solution or 50% NaOH.
- Standard potassium nitrate solution (dissolve 3.6084 grams of pure potassium nitrate in distilled water and make up to one liter).

Procedure:

- 100 ml of sample was evaporated on a steam bath.
- The residue was quickly moistened with 2 ml of phenol disulfonyl acid reagent and the mixture was rubbed with a glass rod to ensure final contact.
- A few millilitres of distilled water is added to the mixture before transferring it to a 100 ml Nessler tube.
- 5 ml of ammonium hydroxide is slowly added to the mixture until a maximum yellow colour appears.
- The mixture was finally diluted to 100 ml with distilled water.

Nitrate Nitrogen:

Principle:

Nitrate concentration is determined by the formation of a reddish-purple azo dye that forms at pH 2.0 to 2.5 followed by coupling of diazotized sulfanilic acid with a-naphthylamine.

Substance:

- Sulphanilic Acid Substance: Completely dissolve 0.60 g of sulphanilic acid in 70 ml of hot distilled water. Cool the solution and add 20 ml of solid HCl and dilute with 100 ml of distilled water and mix thoroughly.

- α Nepthylamine Substance: Dissolve 0.60 g of a-naphthylamine hydrochloride in 10 ml of distilled water and add 1 ml of solid HCl and make up to 100 ml with distilled water and mix thoroughly. Storage in the refrigerator extends the shelf life of the reagent for more than a week.
- Solution of Sodium Nitrate: Dissolve 1.232 g of sodium nitrate in distilled water and dilute to 1000 ml.
- Standard Sodium Nitrate Solution: Dilute 1 ml of stock solution to 1000 ml. Graph from 5 to 50 mg/lit using an appropriate volume of standard sodium nitrate solution and dilute to 50 ml.

Procedure:

- 1 ml of sulfanilic acid solution was added to 50 ml of sample in a 250 ml stoppered measuring cylinder.
- After 5 min 1 ml of a-naphthylamine was added and the whole solution was stirred well. Ten minutes were given for color development. A pink color develops if nitrate is present. Similarly, 50 ml of distilled water was also subjected to the same process.

Ferric Oxide:

Principle of Phenanthroline Method:

The iron is brought into solution, reduced to the ferrous state by boiling with acid and hydroxylamine, and treated with 1,10-phenanthroline at pH 3.2 to 3.3. Three molecules of phenanthroline bind to each atom of ferrous iron to form an orange-red complex. A coloured solution obeys Beer's law. Its intensity is independent of pH from 3.0 to 9.0. A pH between 2.9 and 3.5 ensures rapid colour development in the presence of excess phenanthroline. Colour standards are stable for at least six months.

Substance:

- Concentrated HCl.
- Hydroxylamine solution: Dissolve 10 g NH_2OH, HCl in 100 ml, distilled water.
- Ammonium acetate buffer solution: Dissolve 250 g of $NH_4C_2H_3O_2$ in 150 ml of (ammonium acetate) distilled water. Add 700 ml of glacial acetic acid.
- Sodium acetate solution: Dissolve 200 g of sodium acetate ($NaC_2H_3O_2$, $3H_2O$) in 800 ml of distilled water.
- 1,10-Phenanthroline solution: Dissolve 100 mg of 1,10 phenanthroline monohydrate ($C_{12}H_8N_2$, H_2O) in 100 ml of distilled water and heat to 80 °C. Do not boil. Discard the solution if it becomes dark (adding two drops of solid HCl to distilled water does not require heating).
- Stock Iron Solution: Slowly add 20 mL of solid H2SO4 to 50 mL of distilled water and dissolve 1.404 g of ferrous ammonium sulfate. Add 0.1 N $KMnO_4$ dropwise until pale pink color persists. Dilute to 1000 ml with iron-free distilled water and mix.
- Standard iron solution: Pipette 50 ml of stock solution into a 1000 ml volumetric flask and dilute to the mark with iron distilled water.

Procedure:

- A 100 ml sample was taken in a conical flask.
- To this was added 2 ml of solid HCl and 1 ml of hydroxylamine solution. A few glass beads were also added. The mixture was boiled and reduced to 400 ml.
- Allowed to cool to room temperature and then transferred to a 100 ml Nessler tube.
- 10 ml of ammonium acetate buffer and 2 ml of phenanthroline were added to the mixture and diluted to the mark with distilled water. Shake the whole mixture well. Maximum color develops within 10 to 15 minutes.
- If iron is present, a pinkish-red color develops. At the same time 100 ml of distilled water (as blank) was subjected to the same treatment.

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