

# “To study Pollution effect on Nutrient contents in *Melania tuberculata* from Gangapur dam of Nashik district”

L.S.Chandore<sup>1</sup>

Assistant professor, G.M.D Arts, Commerce & Science College, Sinnar Dist-Nashik MH (India)

P.L. Sawant<sup>2</sup>

Associate professor Shri. Chhatrpati shivaji college Omerga Naldurg, Dist; Osmanabad. MH (India)

## Abstract:

The nutrients are the rich source of energy to all living organisms to generate energy for their metabolic activities like growth and reproduction. The carbohydrate is the fundamental biomolecule that provide energy for metabolic processes. It is also important component of the structural material of living organisms. Proteins are present in all the tissue as it is a major building block of the body of an animal. The lipid plays their role as major storage of energy in the body and also acts as insulator to the body. The pollution stress on bivalve disturbs their biological function in the body. The present study was carried out to determine the nutrient contents like Glycogen, protein and lipid content in treated group was found to be decreased at significant level in foot, mantle and gill as compare to control group of animal.

**Keywords:** Pollution, Snail, Nutrients, freshwater, Amphibian, Seasonal.

## Introduction:-

Freshwater molluscan play an important role in aquatic ecosystems. *Melanoides tuberculata* is a freshwater snail with an operculum, aquatic gastropod mollusc belongs to the family Thiariidae. It is commonly called as red rimmed Melania. It is widely distributed in Africa and Asia. Mostly they feeds on organic matter, bacteria, and phytoplankton. *Melanoides tuberculata* thrives in a wide range of pH and hardness and it is found in different kinds of substrate but most commonly in rock or mud (Vogler et al., 2012; Shanahan et al., 2005). The species colonises stable water bodies such as rivers, dams, streams, lakes and levees with for the most part low flow rates and furthermore is known to utilize environments with diverse amount of eutrophication and is tolerant to harsh conditions such as low oxygen concentration, high levels of pollutants and periods of drought. (Vogler et al., 2012) Siphoned material is either transferred to the mouth for digestion or sloughs off the gills and exits via the ventral margin of the shell. Digested material is either used as fuel for various life processes or excreted as faeces. The amount and rate of particulate matter removed from the water column and subsequent deposition of waste is largely dependent on temperature, particle concentration, flow regime, mussel size, and species. (Vaughn and Hakenkamp 2001) While the siphoning activities of mussels are often overlooked, they provide an integral resource link between pelagic and benthic habitats (Nelepa et al. 1991; Howard and Cuffey 2006). Juvenile mussels have demonstrated the ability to pedal feed by sweeping their foot to collect food particles from sediments. Researchers reported increased shell growth and survival rates when algal diets were supplemented with a fine sediment substratum. Since very little work have been done to observe the toxicity with environmental pollution, the investigation have been made to estimate the contents of glycogen, protein and lipids in the foot, mantle and gill of the mollusc. There was a great

damage observed in the tissue may result in quantitative alteration in nutrients present in the tissues like foot, mantle and gill of the animal. The carbohydrates are the biomolecule present in the body of the animal and considered as cheapest source of energy for the metabolic activities. The Protein are most abundant macromolecule constitute over half of the dry weight of most organisms. Proteins are the organic compound, which made up of carbon, hydrogen, oxygen and nitrogen. It acts as biological catalyst and restores the genetic information. In addition to these protein also used as source of energy. Proteins are the polymers of amino acids, which play a vital role in maintaining the intracellular osmotic balance during physiological stress condition. Lipids are the rich source of energy. It also acts as insulator. The lipid associated with other components in the physiological function of the animal body. Pollution stress may alters the total biochemical makeup of the body of mollusc. The metabolic responses of the fresh water animal to various toxic substances were studied by the many workers. Lomte and Deshmukh (1996) studied the effects of pollutants on fresh water animals for their toxic action on biochemical composition. Erande, (1998), Chaudhari (1999) studied the effects of various pesticides on biochemical alteration in various groups of aquatic ecosystem. The pollution stress by different heavy metals followed by alter biochemical composition was studied by Verma and Tonk (1987), Deshmukh and Lomte (1998) and Chaudhari (1999). All of them reported significant variations in biochemical contents of the tissues of fresh water bivalves. According to Barton and Iwama, (1991); the utilization of glycogen is the only energy precursor that can be used an aerobically during the stress. Chapekar, (1991) reported that the depletion of glycogen in the body as physiological adaptation and the adapted organisms capable of whistling stressors at the expense of more energy.

### **Material and Methods:**

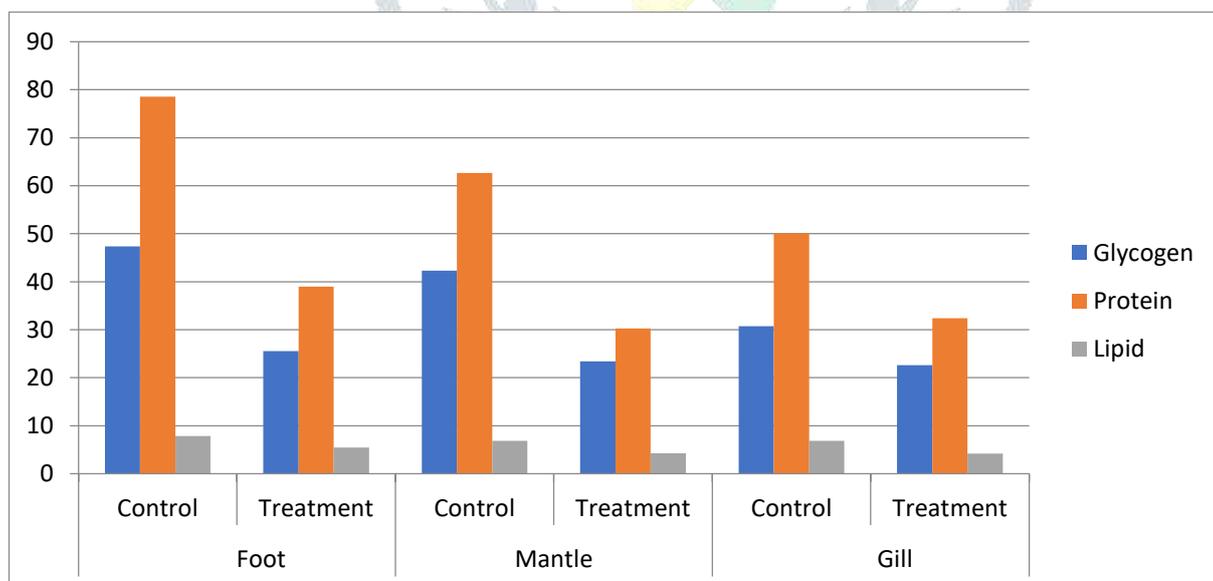
The *Melanoides* snail species of freshwater lentic (ponds, reservoirs, dams etc.) and lotic (rivers, streams, canals etc.) habitats of Nashik district of Maharashtra were collected seasonally from almost each water body by hand or by hand net. These snails were then brought to the departmental laboratory and maintained in separate aquaria containing tap water and a few aquatic plants. Snails were also collected from aquatic weeds spread in water bodies. These snail species were identified morphologically or by their shell structure as described earlier (Tonapi 1980; Subba 1989). After dissecting the snail, the tissues of foot, mantle and gill were collected and used for considering control and treated group sample for the experiment. The nutritional value was estimated by using Dezwan, A. and Zandee, D.I., (1972) method for glycogen, Lowry's method (Lowry, et al., 1951) for total protein content and Barnes and Blackstock., (1973) method for lipid estimation.

**Observation Table:**

| Sr. No. | Body organs | Sample    | Glycogen     | Protein      | Lipid       |
|---------|-------------|-----------|--------------|--------------|-------------|
| 1       | Foot        | Control   | 47.34 ± 0.22 | 78.53 ± 0.27 | 7.84 ± 0.14 |
|         |             | Treatment | 25.52 ± 0.54 | 38.95 ± 0.23 | 5.44 ± 0.27 |
| 2       | Mantle      | Control   | 42.28 ± 0.25 | 62.65 ± 0.33 | 6.83 ± 0.30 |
|         |             | Treatment | 23.42 ± 0.33 | 30.26 ± 0.08 | 4.23 ± 0.15 |
| 3       | Gill        | Control   | 30.73 ± 0.42 | 50.09 ± 0.53 | 6.85 ± 0.10 |
|         |             | Treatment | 22.61 ± 0.11 | 32.37 ± 0.23 | 4.18 ± 0.42 |

All values expressed in % mg/100mg in dry weight of the tissue.

± indicates S.D.

**Graph-****Result and discussion:**

The nutrients plays a great role in living organism. The food contain particular nutrients which is necessary for our physical and mental growth of an organism. A particular level of nutrients maintain is essential for the bodysothe metabolic processes of the body perform their function properly. In case of gastropod mollusc the nutrients present in different form in tissue. It is one of the most important source

in the body to generate energy. Due to water pollution problem and its habitat consideration the level of nutrients critically decreased and indirectly it may effect on the metabolic activities.

The essential nutrients requires for proper growth and development of an organism was found that, the contents of glycogen in treated organism the foot, mantle and in gill was 25.52, 23.42, and 22.61% mg/100 mg respectively while in the control it was found 47.34, 42.28 and 30.73% mg/100 mg. The Protein contents in treated organism the foot, mantle and in gill was 38.95, 30.26 and 32.37% mg/100 mg respectively while in the control it was found 78.53, 62.65 and 50.09% mg/100 mg. The Lipid contents in treated organism the foot, mantle and in gill was 5.44, 4.23 and 4.18% mg/100 mg respectively while in the control it was found 7.84, 6.83 and 6.85% mg/100 mg.

In the present investigation, it was found that the Glycogen, protein and lipid content in treated group was found to be decreased at significant level in foot, mantle and gill as compare to control group of animal. The decreased level of nutrient in the body tissue effects on the health of an organism.

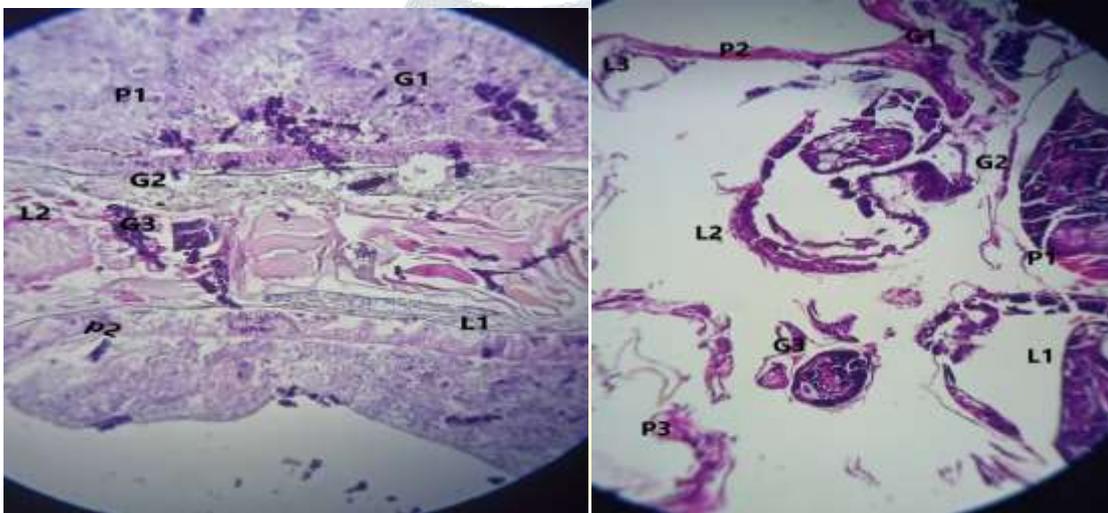


Plate-1-P-protein G-Glycogen L-Lipid  
Level of nutrients critically decreased and disturb Indirectly it may effect on the metabolic activities.

Plate-2 -P-protein G-Glycogen L-Lipid  
Effect of water pollution that changes contain of bio molecules.

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