

## VARIATIONS IN THE RATE OF OXYGEN CONSUMPTION, AMMONIA EXCRETION AND O:N RATIO OF FRESHWATER BIVALVE MOLLUSC, *INDONAI CAERULEUS* IN RELATION TO BODY SIZE DURING SUMMER SEASON

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**ABSTRACT** – Considering the size specific variations in metabolic rates of bivalve shell-fishes we report here the size dependent variation in the O: N ratio in freshwater bivalve molluscs, *Indonai caeruleus* from the banks of Godavari river at Paithan, near Aurangabad. The freshwater bivalves with specific size i.e. small (42-48mm in shell-length) and large (56-63 mm in shell-length) were selected for determination of changes in the rate of oxygen consumption, rate of ammonia excretion and O:N (oxygen : nitrogen) ratio on April and May during summer. The adult bivalves with small size, showed high values of O:N ratio compared to large ones. The values of O:N ratio were found greater in large sized bivalves on May during summer season. The results are discussed in the light of metabolic processes in fresh-water bivalve molluscs.

**Key words** : Size specificity, oxygen consumption, ammonia excretion, O:N ratio, bivalve molluscs freshwater.

### INTRODUCTION

The respiration rates could be used to evaluate mussel stress and over all fitness for survival and reproduction. The O:N ratio is an index of protein utilization in energy metabolism. O:N ratio are useful for assessing the relative contribution of protein to total catabolism (Bayne and Widdows, 1978). The body weight or body size of the bivalve mollusc is an important parameter, which influencing the pattern of metabolic responses. In bivalve molluscs, the relationship between the rate of ammonia excretion and the body size can be variable due to a disproportionate reliance of protein catabolism for energy production. In aquatic animals, particularly in bivalve molluscs, regulation of chemical composition of the body fluid is an important function of the ionic and somatic regulation and of excretion which helps in the elimination of waste and conservation of useful metabolites for growth, maintenance and reproduction. In bivalve molluscs, several workers have studies nitrogenous excretory products and their reports reveled that ammonia is the dominant products and large amount of amino-nitrogen are lost (Bayne, 1976), Bayne and Scullard (1977) reported that amount of nitrogen lost as amino acids relative to ammonia varied with season and location of collection, the held in laboratory and the feeding regiment. Segawa (1991) observed increased oxygen consumption and ammonia excretion linear with increase in weight and decreases with period of starvation in *abalone sulculus diversicular*. According to Ganzalo and Cancino (1988) reported that oxygen conception and ammonia excretion

of bivalve is a function of body weight. According to Barkai and Griffiths (1988) in abalone, 63% of energy content of the food consumed was lost as faeces and 32% expended on respiration. Energy losses in the form of ammonia excretion were negligible. While, Navarro and Torrijos (1994) reported that, energy utilized in oxygen uptake and ammonia excretion was depending on the season, temperature. A number of investigator have studied oxygen consumption, and ammonia excretion, according to envirmetal factors, turbidity (Grants and Thorpe, 1991), sized (Bhagde and Mane, 2005), time (Vitale and Friedl, 1984) growth (Bacon and MacDonald, 1991).

Review of literature reveled that very little information was available on fresh water bivalve molluscs from India, Howkins *et al* (1986) reported O:N ratio on *Perna viridis* and *Perna indica* from Cochin backwaters and recently Mathew and Menon (1993) reported heavy metal stress induced variation in O:N ratio in *Perna indica* and *Donax incarnates*. Considering the abundant distribution of bivalve molluscs along the banks of Godavari river and paucity of information on O:N in fresh water bivalves, the present study was undertaken on *Indonai caeruleus*.

### MATERIALS AND METHODS

The freshwater bivalve molluscs, *Indonai caeruleus* with vary in body size were collected from banks of Godavari of river at Paithan, 45 km away from Aurangabad during summer (April-May). The animals