

SUMMARY, OF THE UGC SPONSORED MINOR RESEARCH PROJECT
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Since the inception, mining has been the backbone of Goa's economy, providing employment to a large section of society and ancillary industries. In the year 2012, the court banned mining and ore exports. Till then Goa exported nearly 20-25 million tonnes of ore a year. In April 2014, the ban was partially lifted. This led to rampant mining with figures touching 54 million tonnes of iron ore.

The main aim of the present investigation was to study the effect of manganese toxicity on the biochemical parameters especially enzymes related to metabolism and few metabolites. As this species is a part of marine biota, has biological as well as economic value, moreover, a tough animal to withstand the drastically changing estuarine environment and such type of work will impart knowledge about their physiological adaptation as well. *Paphia malabarica* is one of the important seafood in Goa, India. It is being favoured due to its delicacy and high protein content. They are commercially exploited for local and external markets, such as European countries, as it forms one of the nutritious and inexpensive source of food (Girish & Gopinathan, 2008). Over a period of time it has been observed that there is drastic decrease in the population of bivalves in Goa since last five years. This has affected the fisherfolks and local people who used to be dependent on these bivalves for food as well as their economy.

The above overview of mining scenario in Goa is in lieu of the present study in minor project sponsored by UGC, undertaken on Venerid Clam *Paphia malabarica*. *Paphia malabarica*, an

edible bivalve is commonly known as Tisreo and forms a secondary source of livelihood in Goa and harvested round the year. St. Jacinto, Island located at Chicalim, Vasco, Goa, has been a natural bed for harvesting *Paphia* in large quantities. The clams were marketed at Vasco, Margao, Panaji, and other places. During the course of study, the major problem faced was the non-availability of *Paphia* on a regular basis. As started above rampant mining lead to heavy pollution of waters. Bivalves being filter feeders were the worst affected. The runoff from mining waste caused wiping out of *Paphia* in many estuarine waters of Goa. This was reported in the local newspapers in 2014. Substantial work has been carried out on determination of bioaccumulation heavy metals in bivalves but no work has been done on the effect of manganese on the metabolic enzymes and metabolites.

The data is based on the preliminary investigation done for a period of two years 2015-2017. In the present investigation it is been observed that the most affected tissue is gills, probably because *Paphia* is a filter feeder and uses gills frequently, for filtering. This is perfectly indicating the effect of manganese on *Paphia malabarica* in the laboratory condition compared to the control ones. It can be concluded that the pollutant that enters the water bodies in the natural condition definitely affects the filter feeders first among the aquatic organisms. This could be one of the reasons for decline in population of *Paphia* in Goa since 2014. Besides, mining effluents there are anthropogenic wastes that enters the aquatic habitat disturbing these organisms inturn affecting the economy.

This leaves scope for further analysis on the subject.

It is heartening to note that following the Supreme court ban on mining in Goa in March 2018, Goa's waters appear far more cleaner and conducive for the replenishment of bivalve fishery, the production of which has not been reported so far.

Therefore, there should be a sustainable mining process avoiding the effluents and drainage directly entering into the water bodies, rather it could be treated before releasing into the natural habitats.