Bio indicators (Mussels) are at Danger along Karachi Coast affecting Economy in Pakistan

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In the present study an attempt has been made to investigate economic importance of mussels (*Perna viridis*) and discussed major problems responsible for their mortality. Mollusks are good source of protein intake in the world and they have economic importance in the seafood industries of several countries. *Perna viridis* occurs in the Asia-Pacific region used as bio indicator of pollution. *Perna viridis* are abundantly found along Karachi Coast but due to environmental problems this specie is at danger. Marine economy of Pakistan could lead in the international seafood market if proper strategies applied to protect this worthy creature.

**[Key words: Perna viridis, Mussel, Bio-indicator, Karachi Coast]**

**Introduction**

The Asian green mussel (*Perna viridis*), has economic importance. It is not only found in the Asia-Pacific region but also in the waters of North and South America. *P. viridis* is harvested in the Indo-Pacific region as a food source. It can also be used as a bio indicator of pollution produced by heavy metals, organo- chlorides and petroleum products.

Studies have shown bivalves are the most commonly used bio indicators as they are able to accumulate toxins up to high levels. *P. viridis* respond rapidly to changes in ambient levels of PCBs. This quality of mussels as bio indicator is very useful in monitoring aquatic pollution by PCBs. In the native tropical waters of the Asia-Pacific and Indo-Pacific regions, the Asian green mussel, *Perna viridis* (Linnaeus, 1758) formed the basis of aquaculture industry.

The coastal region of Karachi, (Pakistan) is filthy by organic and inorganic chemicals from industrial and farm wastes. Untreated industrial and municipal wastes from Korangi/Phitti Creek and municipal from Karachi are released directly into the Arabian Sea. Due to high incidence of water pollution many trace metals have been detected during a survey near Karachi Harbour.

Quality of sea water has been deteriorated as an impact of coastal development. Effluents flowing out from industries are another cause of coastal and marine ecosystem imbalance. Coastal areas of Karachi are polluted heavily by untreated domestic and industrial waste i.e., 350 million gallons per day. Nature has provided sea with novel creatures which serves as bio indicators of pollution mainly presence in marine coastal environment. Potential bio indicator organisms are *Perna viridis*, *Crassostrea glomerata* which served as a tool for calculating water quality and pollutants along Karachi coast.

The environmental problems are worsened by waste from cattle farms and slaughterhouses which mixed organic waste with blood and release them into the Korangi Creek. Endocrine disrupting chemicals (EDCs) are introduced into the aquatic environment through industrial and municipal effluents along with agricultural
runoffs may lead to hormonal disruption and adverse health effects\textsuperscript{15,16}.

**Material and Methods**

A comprehensive literature review related to mollusks was used to achieve the objective of this study. The information was collected from the concerned institution and some authentic publications.

![Figure 1-A. Manora channel, which receives domestic sewage through Layari river heavily polluted place near Karachi Coast.](image)

![Figure 1-B. Perna viridis get attached on rock they are abundantly near polluted water.](image)

**Results**

The Mollusk industry of the Pakistan has contributed to the economic development of the country in terms of food production and dollar earning. The industry has continuously progressing. The mollusks especially *Perna viridis* is an important source of protein. *Perna viridis* is harvested in many parts of the world including Pakistan. Gastropods shell can be used for making ornament.\textsuperscript{15}

The outcomes of the pilot project on the raft culture of the green mussel (*Perna viridis*) indicated the possibility of the culture of green mussels using rafts. During the piloting, a satisfactory growth rate has been attained reach a length of about 11-12 cm with weight of about 40-45 g after a period of one year. This specie is native to Pakistan which naturally occurs in the beaches and creeks at the coastal belt of Sindh in Pakistan.\textsuperscript{16}

**Discussion**

Pakistan is thus providing a good opportunity to benefit marine economy from its geo-strategic position. However the increase level of pollution in the coastal regions and degradation of marine resources are suspecting marine environmental threat that need immediate action. There are a number of laws governing efforts to protect air, water, oceans, waste management practices, but most of these laws are outdated and do not comprehensively address. There are some specific laws and regulations to check industrial waste disposal into inland water ways, however, there are inadequate resources to monitor effluent discharges. There is a need for a single wide-ranging law that control and protect marine environment in Pakistan.

The coastal environment has affected greatly by huge takeoff from Indus River which is a main cause of pollution in the coastal region of Karachi. The major reason behind this is degradation of Mangrove forests which caused lethal affects on aquatic lives. Karachi is heavily polluted by marine coastal zone pollution. Untreated industrial waste, domestic sewage and agricultural overflow from Indus River fall into Sea which is the major reason of heavy pollution along Karachi Coast. The Ministry of Environment, Local Government and Rural Development in collaboration with NIO (National Institute of Oceanography) has developed Pakistan’s National Programme of Action under the Global Programme of Action for the safety of marine life. More strategies are required to activate Government and private agencies to carry out the national program of action to control marine pollution. Pakistan Navy is now manipulating a variety of projects to control marine pollution in Pakistan.

**Conclusion**

The study indicated *Perna viridis* has great importance in the marine economy of Pakistan and they might be used as indicator to measure levels of aquatic pollution. Coast of Karachi is contaminated by organic and inorganic chemicals from industrial and farm
effluents which endangered aquatic life of this worthy specie. The intensity of industrial pollutants is rapidly increasing in Pakistan which is responsible to create many worse impacts on health of the common men. Effluents (waste water, oils) from industries is causing severe problem which are endangering marine life and contaminating Sea water. To deal with these problems Government of Pakistan has been taken many steps towards self monitoring and reporting system of effluents by the industry management. Government is enforcing for the joint ventures that facilitate industries with advance filtering technologies to dump effluents. Improved training and extension are required to upgrade knowledge and to survive coastal resources and aquatic life.

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