The literature survey discussed in the preceding text, has shown that the bioremediation of metals from effluents and waste streams is well documented. However, these studies have concentrated more on Ag, Au, Cd, Cr, Cu, Ni and U removal. Successful commercial applications are found only on mine sites where the processed leach liquor is subjected to microbial remediation, using a consortium of bacteria, algae and higher plants in wetland systems.

Mercury is an important metal used mainly in chloroalkali plants, pesticides and scientific instrument manufacturing units. The recycling of used mercury is being done in some of the scientific instrument manufacturing units and chloroalkali plants, but the pesticide industries have no means for recycling of mercury (4). Hence considerable volumes of mercury containing effluents are being discharged into public sewer systems from many of the above mentioned plants. Thus mercury containing waste becomes the most serious environmental problem.

Sparse literature is available for mercury removal from the waste. Whatever information available is focussed upon its volatilization. An important and versatile strain of *Pseudomonas putida* FB-1 have been found to volatilize mercury from HgCl₂ with an efficiency of 99.2 to 99.8% maintaining residual mercury concentration below 5 µ/l (119). Mercury volatilization from inorganic mercuric compounds using *Thiobacillus thiooxidans* and *T. ferrooxidans* have been cited in literature as mercury is often found present along with various minerals and may be responsible for cessation of bioleaching due to its high toxicity if the organisms are not mercury resistant (120,187). In recent years mercury resistance among microorganisms is studied extensively (28,31). Organic mercuric compounds such as methoxy ethyl mercuric chloride and phenyl mercuric acetate which are commonly used as fungicides can also be subjected to volatilization. Nitrogen fixing bacteria like *Beijerinckia mobilis* and *Azotobacter vinelandii* isolated from, soil exposed to these fungicides, have been reported to carry out volatilization of mercury (121). Nakamura et al (188) have also reported volatilization of mercury using indigenous microorganisms from mercury polluted sediments of Minimata bay, Japan.

Volatilization of mercury though efficient, does not hold much practical applications.
as till now no effective trapping system have been developed. Inefficient trapping system may result in atmospheric pollution (114).

Hansen et al (189) and Choudhary and Hansen (190) have shown biosorption of mercury by natural consortium like sewage sludge during aerobic treatment of sludge. On the other hand Glombitza et al (191) have reported mercury uptake by laboratory grown bacteria and yeast.

On the basis of the information depicted in the previous chapter it seems that indigenous microorganisms and waste biomass from industries could prove effective absorbent for mercury removal from the contaminated effluents. But uptil now no viable process have been developed which would hold potential to treat mercury loaded waste. In this context work had been initiated using different microorganisms and spent biomass from industries for mercury removal. The main objectives of the study are:

1. To isolate and screen microorganisms viz., bacteria, yeast, fungi and actinomycetes for mercury removal.
2. To develop mercury resistant mutants growing at high concentration of mercury.
3. To study and optimize physicochemical parameters influencing mercury removal with different biosorbent.
4. To develop the spent mycelia as efficient mercury sorbents.
5. To apply the developed biomass for treatment of mercury containing laboratory and industrial waste.
6. To scale up the process.