CHAPTER 6: CONCLUSION

The present study is the first conducted on the effect of heavy metals *on A. convolutus*, a freshwater microalgae isolated from the tropical waters of Malaysia. It was important here to screen for a potential Malaysian freshwater microalgal species for use in bioassays.

Although laboratory based studies yield valuable information and may provide a means of indirectly monitoring heavy metal pollution, they connot provide a complete picture of heavy metal bioaccumulation by aquatic plant. The quantity of heavy metal present in plant material at any given time reflects accumulation which occurred over a sometimes-unknown time span, during which environmental parameters such as light, temperature and external metal concentration may have varied considerably. Even if these parameters have been monitored, statistical correlation will only reveal the degree to which the variables are related and may not establish cause-effect phenomena. Although laboratory studies cannot duplicate field conditions, it is only through such studies, which allow control of environmental parameters, that certain aspects of bioaccumulation (such as those examined in this study) may be ascertained. It is obvious then that combined field-laboratory investigations could be most enlightening and should be encouraged.

The following conclusions may be made from this present study:-

i.

Metal	Microalga as potential bioindicator
Cu	*Chlorella vulgaris*, *Scenedesmus* sp., *Synechococcus* sp.
Zn	*Mougeotia* sp.
Mn	*Euglena* sp., *Ulothrix* sp.
Fe	*Chlorella* sp., *Chlorococuum* sp., *Oocystis polymorpha*
Co	*Ankistrodesmus convolutus*
Cr	*Ankistrodesmus arcuatus*

ii.

Metal	Tolerant microalgae
Mn	*Chlorella vulgaris*, *Scenedesmus* sp., *Mougeotia* sp., *Synechococcus* sp., *Chlorella* sp., *Ankistrodesmus arcuatus*
Cd	*Chlorococuum* sp., *Euglena* sp., *Oocystis polymorpha*
Cr	*Chlorella* sp.
Cu	*Ankistrodesmus convolutus*

iii. *Ankistrodesmus convolutus* response to heavy metals exposure:-

Metal	96 h IC_{50} (mgL^{-1})	96 h IC_{25} (mgL^{-1})
Fe	0.52	0.26
Co	0.58	0.29
Cr	7.29	0.97
Cu	11.14	4.66
Cd	12.02	6.52
Zn	16.14	8.57
Mn	16.14	8.57

iv. The bioaccumulation of metals by *Ankistrodesmus convolutus* followed several pattern in the short-term studies:-

(a) Rapid uptake - gradual release

(b) Alternating uptake - release

(c) Uptake - equilibrium - release

(d) Uptake - release till equilibrium

v. In general, metal uptake increased with increasing concentration of metals in the medium.

vi. In general, cells at logarithmic growth were more actively accumulating metals than cells at stationary growth.

vii. Maximum metal uptake occurred after the first hour of exposure.