CHAPTER V

CONCLUSIONS AND SUGGESTIONS FOR FUTURE STUDIES

5.1 Conclusions

The major objectives of this study are: (1) to study the sorption of MT onto different types of soils and sediments, (2) to study the effect of pH on sorption of MT, and (3) to study the effect of salinity on the sorption of MT.

For the five soils and a sediment tested, the percent organic content was found to be the major physical chemical soil property that was well correlated with the sorption coefficients, K_d. There was no correlation between the percent clay content and percent sand content in soils with the sorption coefficients.

For soils with low percent organic contents, the sorption of MT was found not to be dependent on the percent organic content but on the surface area. The effect of surface area on sorption of MT was observed when sorption of MT on sand and laterite soil were considered. Sorption of MT was observed to be higher for sand as compared to laterite soil which could result from sand having a higher surface area than the laterite soil.

The effect of pH on the sorption of MT was found only with the sediment and not for sand and Garden soil. In the case of sediment, sorption of MT increased when the pH decreased (acidic conditions). This may be due to MT having a lower solubility which favors transfer of MT from liquid phase to the solid phase leading to higher adsorption.

For sand and garden soil-1, the K_d values were not affected by different salinity. However, the sorption coefficients for sediment were found to increase for increasing salinity.

The effect of pH and salinity on sorption was observed only on sediment and not on other soil types. The possible cause may be due to the high percent organic content of the sediment which may have resulted in significant changes. In addition, the increase in K_d values may be due to the salting out effect. The presence of salts in

solution decreased the solubility of MT, resulting in the compound being more attracted to the sediment particles (Bowman et al., 2002).

5.2 Suggestions for future studies

Fate, transport, and occurrence of MT are essential in estimating their risks to the environment and humans. There have been limited reports on fate, transport and occurrence of MT in the environment. Detailed surveys are necessary to understand the distribution of MT in the environment, especially in sediments and wastewater from fish farms. Therefore, it is vital to estimate the input of MT and their possible movement into surface and groundwater through runoff and leaching. There is also a scarcity of data on the MT loads and the metabolites of MT from fish farms. Accordingly, both batch and column studies are needed to study the sorption of MT and the impact on environmental factors on sorption. Studies should be conducted in the low concentrations range as in the original environment to understand the micro-processes affecting the fate of MT. In addition, the exposure and risk associated with these chemicals are not adequately understood and further researches are needed.

The study on the degradation of MT such as biological degradation, photodegradation and chemical degradation are lacking and warrants additional investigation.