CHAPTER-6

Conclusions and future Scope of Work

6.1 Conclusions

- The present investigation was a culmination of an effort to study the dissipation pattern and effects of factors on dissipation of triazole group fungicide, tebuconazole in soils of different physico-chemical properties and water at different pH normally found in environment. Also, studied the adsorption-desorption behavior of this compound in soils of Bardoli, Paria, Vansda and Pondaghat locations and further Nanivahiyal soil was amended with dead plant leaves for increasing SOC to determine the effect of soil organic carbon contents on mobility behavior of tebuconazole. The mobility study of tebuconazole in soils gives useful information for ground water contamination through leaching.
- Adsorption-desorption of tebuconazole in the different location soils studied namely Bardoli, Nanivahiyal-amended, Paria, Vansda and Pondaghat. The results indicated that the tebuconazole is moderately sorbed in soils having low OC. Hence, more adsorption in Nanivahiyal-amended and Bardoli soils while less desorption from these two soils while Vansada, Pondaghat and Paria soils shows less sorption and more desorption, indicating tebuconazole is moderately mobility in all soils. Therefore on the basis of tebuconazole mobility, the ground water contamination through leaching is excluded.
- Capillary GC-NPD followed by ultra-sound assisted extraction (UAE) method was showing mean recovery values higher than 95 % and RSD generally below 5%. Therefore, the proposed method is a viable alternative for determination of trace levels of tebuconazole residues in soil, water and garlic samples. UAE has been successfully applied to the determination of tebuconazole residue in soils, waters and garlic samples.

- The rate of tebuconazole dissipation was found slightly more in pH 4.0 followed by pH 9.0 and pH 7.0, thereby, indicating the stability of the molecule in neutral and basic pH. Thus it can be concluded that hydrolysis will not be a major degradation pathway for tebuconazole.
- Dissipation of the fungicide in all three Paria, Bardoli and Vansda location soils followed first order dissipation kinetics at all application rates under non-sterile and sterile conditions. It was greatly influenced by soil organic carbon contents and application rates. Under biotic condition, the dissipation was higher in Paria soil compared to the Bardoli and Vansda soils. Tebuconazole is not likely to persist more than 2-months in all three soils, suggesting that natural biodegradation may be sufficient for the removal of contaminants from the soils. Faster dissipation in biotic than abiotic soil, indicated microbial degradation of this fungicide.

  So, the limited use of tebuconazole in Indian agriculture is safe.

6.2 Future Scope of the Work

- The dissipation study need to be done at field conditions in multi season crops that help to known the effect of weather (temperature, moisture and sunlight etc.) on dissipation of tebuconazole.
- The microbial test needs to be done in the soils used in present study that help to know the contribution of microbial for dissipation of tebuconazole in these soils.
- The present study has not focused on tebuconazole transformation products derived from abiotic and biotic processes. The potential formation of various triazole TPs is particularly relevant, because they are recalcitrant to

biodegradation. Studies in this direction are necessary for environmental fate studies to become more comprehensive.

- Further, Tebuconazole comprises two enantiomers, the activity of (-)-R tebuconazole is higher than that of (+)-S-tebuconazole which exhibits high toxicity to non-target organisms. Moreover, (-)-R-tebuconazole degrades slower than (+)-S-tebuconazole in aerobic and anaerobic soil. It is thus further necessary to establish an appropriate method for the separation and study of the enantioselective dissipation kinetics of tebuconazole residues. Such a study would provide more information relevant to environmental and ecological risk assessment.