

## CHAPTER IV

### CONCLUSION

Six water soluble tributyltin compounds were synthesized by direct reaction of bis(tributyltin) oxide (TBTO) with various alkanolamines or glycols. These tributyltin compounds were obtained in high yield (>99 %). The products except cpd.1, had one hydroxy group at the end of the molecule .

The structures of tributyltin compounds were characterized by various spectroscopic techniques, such as IR,  $^1\text{H}$  NMR and  $^{13}\text{C}$  NMR and elemental analysis. The formation of products were confirmed by comparison of their IR and NMR spectra with those of the corresponding reactants.

IR spectra showed that all products except cpd.1, were quite similar and were characterized by a strong broad band in the region of 3600 - 3100  $\text{cm}^{-1}$  due to  $\nu(\text{O-H})$  stretching of free hydroxy group and the region of 715 - 470  $\text{cm}^{-1}$  of all products were the characteristic of the tin atom which attacked to other atoms (Sn-O, Sn-C).

$^{13}\text{C}$  NMR spectra of tributyltin compounds showed the peak of (C-O-Sn) in region of 65.22 - 75.01 ppm., which were the hydroxy group of alkanolamines or glycols that connected to the tin atom of TBTO. This chemical shifts showed more down field shift than the chemical shift of

free C-OH. The results of  $^1\text{H}$  NMR spectra, were in agreement with those of  $^{13}\text{C}$  NMR spectra.

The determination of water solubility of tributyltin compounds showed that the solubility of these compounds increased with the number of oxygen atoms in the molecule of the products and it was found that cpd. 6 could be the most dissolved tributyltin compound in water (1.05 %w/v).

The tributyltin compounds were test for biological activity against *Aspergillus* sp., *Penicillium* sp. and *Trichoderma reesei*. It was found that cpd.2 was the most effective against all strains of fungi.[MIC (30 days) of cpd.2 for *Aspergillus* sp.,*Penicillium* sp. and *Trichoderma reesei*. at 35, 70 and 70 ppm. respectively.]



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