English Summary

The present work represents the interest in our laboratory to synthesized and evaluate the biological activity of some new quaternary ammonium polymers.

The work here can be classified into three parts according to type of halide agents . The first , represents the reaction of Hexa-methylenetetramine(HMTA)- as starting material- with different dihalide agents, they are methylenechloride to produce poly(HMTA-CH_2Cl_2) **(1)**, 1,2-dichloroethane to give poly(HMTA-$ClCH_2CH_2Cl$) **(4)**, and 1,2-dibromoethane to prepare poly(HMTA-$BrCH_2CH_2Br$) **(15)**. The second part of this work shows reaction of HMTA with three different trihalide agents, they are chloroform to prepare poly(HMTA-$CHCl_3$) **(2)**, trichloroacetic acid to obtain poly(HMTA-Cl_3CCOOH) **(6)**, and chloral hydrate to prepare poly(HMTA-$Cl_3CCH(OH)_2$) **(7)**. The third part of this work carried out to prepare another two polyquats that from reaction of HMTA with tetrahalide agents, they are carbontetrachloride to produce poly(HMTA-CCl_4) **(3)** and 1,1,2,2-tetrachoroethane to give poly(HMTA-$Cl_2CHCHCl_2$) **(5)**.

After that, the polymeric quaternary ammonium chloride salts were converted into acetate salts by the reaction with lead acetate , they are poly HMTA with (-CH_2Cl_2) **(8)**, (-$CHCl_3$) **(9)**, (-CCl_4) **(10)** , (-$ClCH_2CH_2Cl$) **(11)**, (-$Cl_2CHCHCl_2$) **(12)**, (-Cl_3CCOOH) **(13)**, and (-$Cl_3CCH(OH)_2$) **(14)**.

Finally, all the polymeric quaternary ammonium chloride, bromide, and acetate salts were tested against *Escherichia coli* (Gram-

negative) and *Basalts cereus* (Gram-positive) bacteria, and they showed high antibacterial activity. The polymer **(5)** and **(12)** showed powerful inhibition to the growth of the examined bacteria, that was expected because of increasing the biocidal centers (quaternized nitrogen atoms) on the polymers increase their activities against bacteria, and the photos were taken for the examined bacteria dishes.