SUMMARY

Adhesion of bacteria and infection of non- biological surfaces are quite serious problems in areas that complete sterilizing conditions are needed like food industry, medicine e.t.c. Adhesion of bacteria at different surfaces is caused by a series of interactions between them and which depend on the physicochemical properties of cells and substrate. For this reason, the discovery of new materials which will prevent adhesion of bacteria is a necessity. The area of polymers and thin film technology give significant help towards this effort.

At present study was examined the adhesion of three bacteria, Staphylococcus aureus, Escherichia coli and Bacillus thuringiensis (Bt) to the surface of polymer PET and the surface of a thin film of amorphous carbon, which was deposited on PET substrate by physical vapor deposition technique (PVD). The method that was used was the plate – counting method in which, after the appropriate preparation of the samples, it was possible the counting of the steadily adherent colonies on the surfaces of the samples. According to the results, PET and the thin film of amorphous carbon on PET (PET/a-C) show minimal adhesion to S.aureus (~0.1-0.3 %) and zero adhesion to E.coli and Bt. The thin film PET/a-C appear to have bigger adhesion to S.aureus in relation to clear PET in a percentage of 200 %.

Also, the activity of thymol, a component of the essential oil that comes from origanum, was examined against S.aureus. For this reason, the plate – counting method and the method of tracing zones of inhibition of S.aureus growth were used. The experiments showed a reduction in S.aureus adhesion on the surfaces of the samples, which were dipped in thymol, in relation to clear PET or PET/a-C, depending on the concentration of thymol which was used. So, when thymol of 1/100 dilution was used, there was a reduction in S.aureus adhesion of about 70%.