

ADHESION OF BACTERIAL FILMS ON POLYMER FOOD FILMS INCORPORATED DETONATION NANODIAMOND PARTICLES

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Introduction

Bioactive food packaging should protect food from bacterial and fungal pathogens. An important aspect is the attempt to integrate food packaging with detonating diamond nanoparticles in order to give it antioxidant properties [1-3].

Materials and Methods

Detonation nanodiamond particles produced by Danilenko characterized the single grain sizes from 2 to 4 nm and high chemical polarity. The bacteriostatic properties of nanodiamonds were investigated. The tests used standard strains that are representative pathogens; *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* NCTC 12903 / ATCC 27853, *Staphylococcus aureus* ATCC® 25923, *Streptococcus mutans* ATCC 35668, *Streptococcus sanguis* ATC 10556.

The assessment of antibacterial activity was made using the direct method based on the criteria contained in the description of SN 195920: by modified circular diffusion according to Czerwińska.

Subsequently, the studies of adhesion of bacterial biofilms to food films with fluorescent nanodiamonds were carried out on a fluorescent microscope (MOTIC B1410E, 400x magnification).

Results and Discussion

The results of the study indicate the lack of bacteriostatic properties of nanodiamonds and the presence of bacterial biofilms on food films.

Conclusions

Food films with incorporated nanodiamonds do not exhibit bacteriostatic or anti-adhesive properties onto polymer food films.

References

- [1] K.Mitura, E. Włodarczyk, *Journal of AOAC Inter.* 101 (2018) 1- 11.
- [2] M.Rossi at all, *Trends in Food Sciences and Technology*, 40, (2014), 127-148.
- [3] Mitura, K., Wyrębski, K., Zarzycki, P.K., 2017, in: A.M. Grumezescu (Eds.), *Nanotechnology in Food Industry. 7*, chapter 9 (2017) 295-328, ELSEVIER.