

APPLICATION OF DC ATMOSPHERIC PRESSURE PLASMA JETS FOR INACTIVATION OF MICROORGANISMS CONSORTIUMS

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Experimental results for inactivation of microorganism test strains of *S. aureus*, *E. coli*, *P. aeruginosa* separately and in such consortium by air plasma jet are presented. For monocultures of *S. aureus*, *E. coli*, *P. aeruginosa* the characteristic D-times are practically the same and are around 1.5 min, while for the consortium these is 3 min.

This report presents experimental results for inactivation of planktonic microorganism test strains of *S. aureus*, *E. coli*, *P. aeruginosa* separately and in their consortiums *E. coli* + *P. aeruginosa* and *S. aureus* + *E. coli* + *P. aeruginosa*. The total initial concentration in each experiment is 10^5 CFU/ml. The DC atmospheric pressure air plasma jet at 40 mA [1] is used for microorganisms inactivation. The concentration of bioactive molecules are $\text{NO} = 180$ ppm, $\text{NO}_2 = 140$ ppm, $\text{HNO}_2 = 25$ ppm. The efficiency of plasma exposure is estimated with a percentage of the survived cells in the strains. The temperature in Petri dish was controlled with a thermal imager FLIR E4 and did not exceed 30°C .

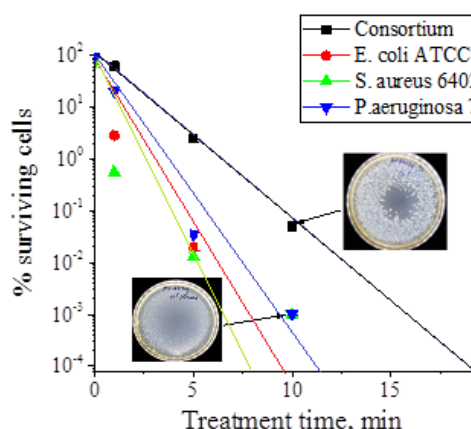


Fig.1. Inactivation curves of individual microorganisms and their consortium in result of plasma jet exposure

The efficiency of plasma exposure is estimated on the percentage of the survived cells in strains of the planktonic microorganisms and the consortium (Fig. 1). It is shown that the characteristic D-times defined as the time interval during of which the number of surviving microorganisms is reduced by 10 times were rather different. Thus, for monocultures of *S. aureus*, *E. coli*, *P. aeruginosa* the characteristic D-times were the same and were about 1.5 min. At the same time, the D-time for consortium of all these three strains of microorganisms exceeded 3 min. Therefore, microorganisms are steadier in the consortiums.

REFERENCES

1. A.V. Kazak, A.A. Kirillov, I.V. Lipsky, L.V. Simonchik, M.S. Usachonak, *ESCAMPIG XXIII, Bratislava, Slovakia, July 12-16, 2016* / edited by: V. Medvedka, P. Papp, J. Orszagh, S. Matejcek – Bratislava, 2016 – P. 365-366.