Supplementary Material to the article "Effect of selenium, copper and silver microparticles obtained in viscous media on the gram-positive and gram-negative bacteria survival"

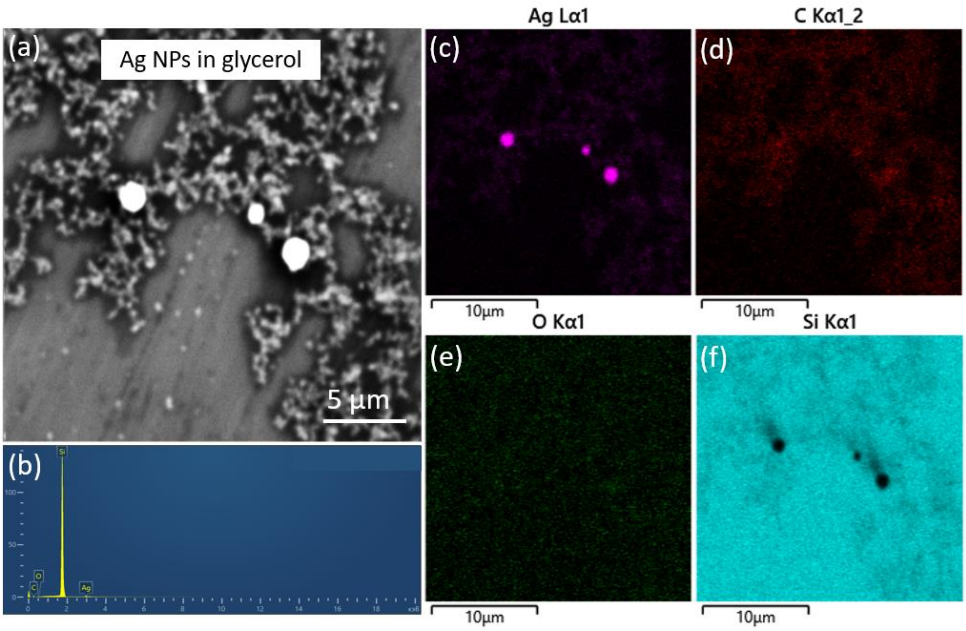

Figure S1. (a) SEM image of Ag NPs, produced in glycerol; (b) the EDX spectrum and the corresponding maps of elements' distribution (c – f).

Table S1. Distribution of elements, acquired by EDX analysis of Ag NPs in glycerol.

Element	Atomic %
Si	64.92
C	33.16
Ag	0.67
O	1.25
Total	100.00

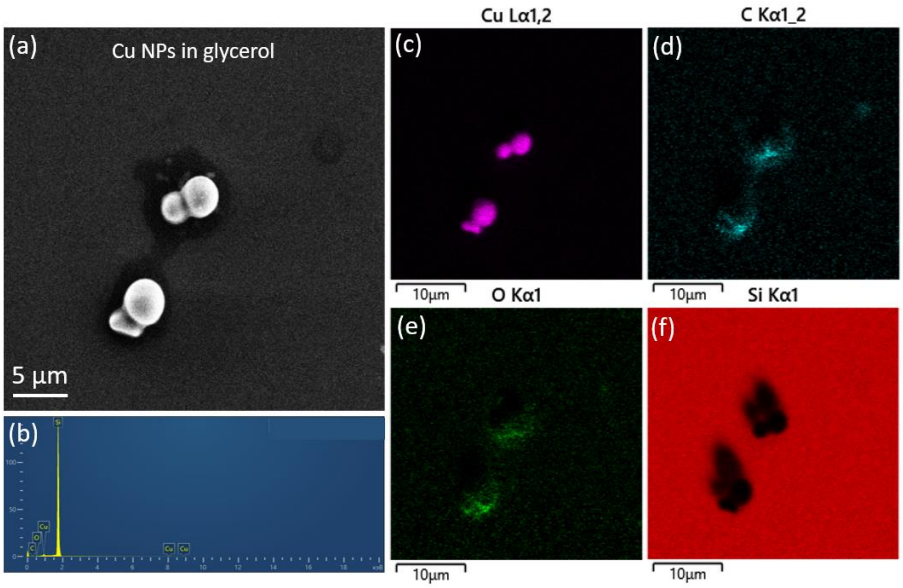

Figure S2. (a) SEM image of Cu NPs, produced in glycerol; (b) the EDX spectrum and the corresponding maps of elements' distribution (c – f).

Table S2. Distribution of elements, acquired by EDX analysis of Cu NPs in glycerol.

Element	Atomic %
Si	82.03
C	16.18
O	0.84
Cu	0.95
Total	100.00

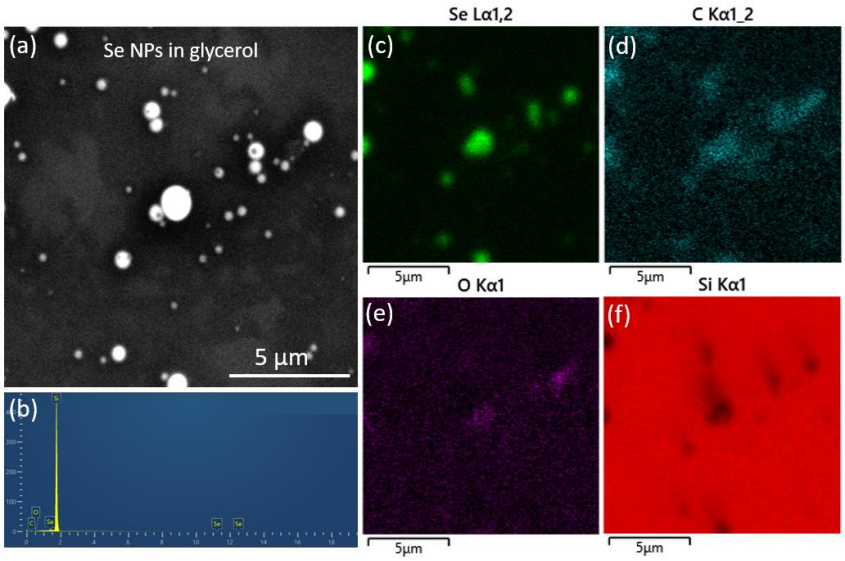

Figure S3. (a) SEM image of Se NPs, produced in glycerol; (b) the EDX spectrum and the corresponding maps of elements' distribution (c – f).

Table S3. Distribution of elements, acquired by EDX analysis of Se NPs in glycerol.

Element	Atomic %
C	24.93
Si	73.82
O	0.92
Se	0.32
Total	100.00

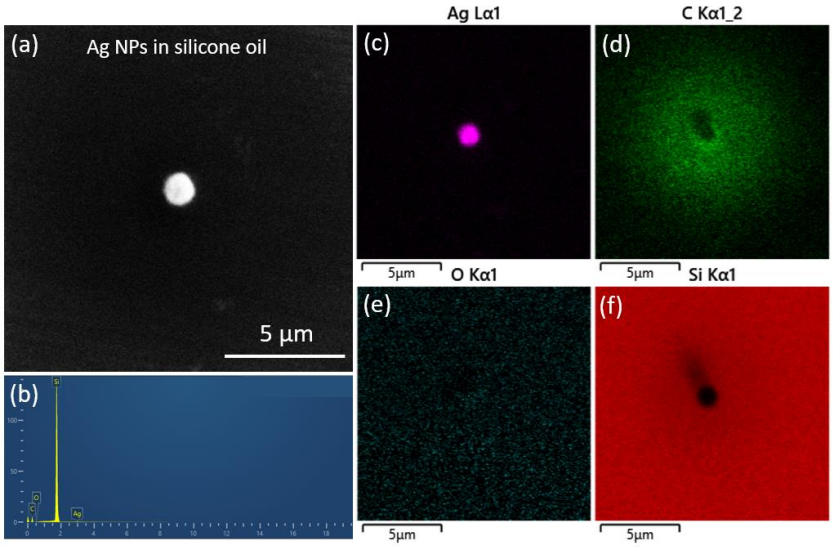

Figure S4. (a) SEM image of Ag NPs, produced in silicone oil; (b) the EDX spectrum and the corresponding maps of elements' distribution (c – f).

Table S4. Distribution of elements, acquired by EDX analysis of Ag NPs in silicone oil.

Element	Atomic %
C	63.98
Si	35.31
O	0.62
Ag	0.10
Total	100.00

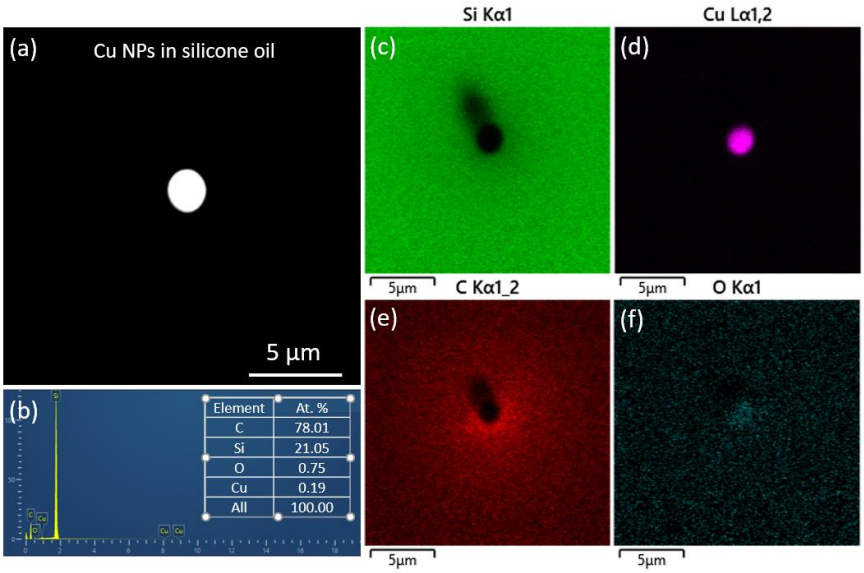

Figure S5. (a) SEM image of Cu NPs, produced in silicone oil; (b) the EDX spectrum and the corresponding maps of elements' distribution (c – f).

Table S5. Distribution of elements, acquired by EDX analysis of Cu NPs in silicone oil.

Element	Atomic %
C	78.01
Si	21.05
O	0.75
Cu	0.19
Total	100.00

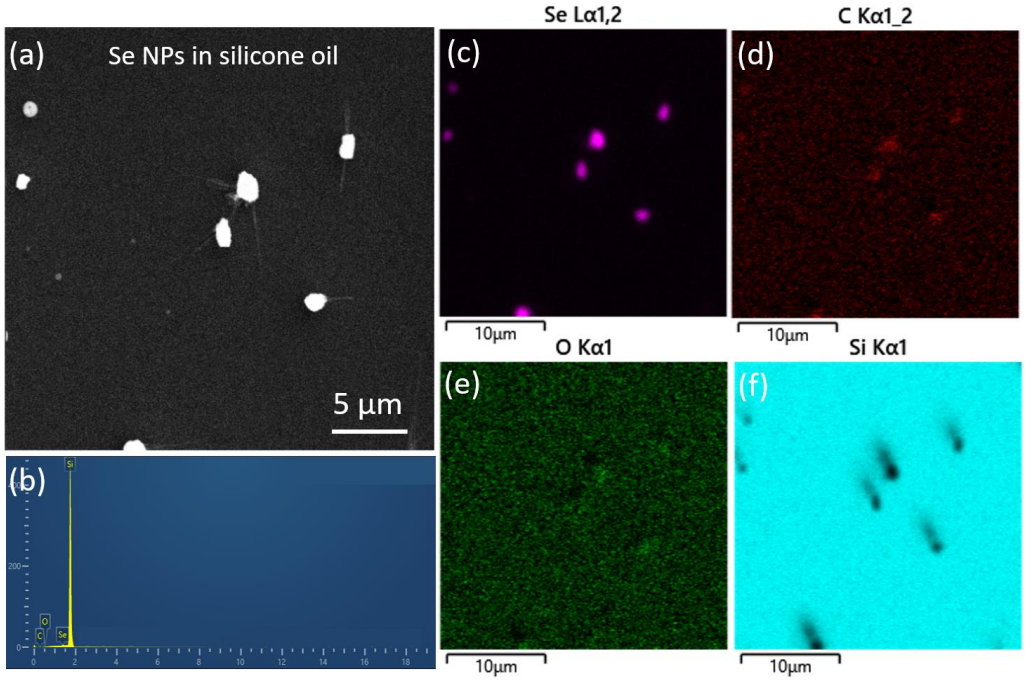

Figure S6. (a) SEM image of Se NPs, produced in silicone oil; (b) the EDX spectrum and the corresponding maps of elements' distribution (c – f).

Table S6. Distribution of elements, acquired by EDX analysis of Se NPs in silicone oil.

Element	atomic %
Si	84.47
C	14.73
O	0.60
Se	0.19
Total	100.00

(a)

(b)

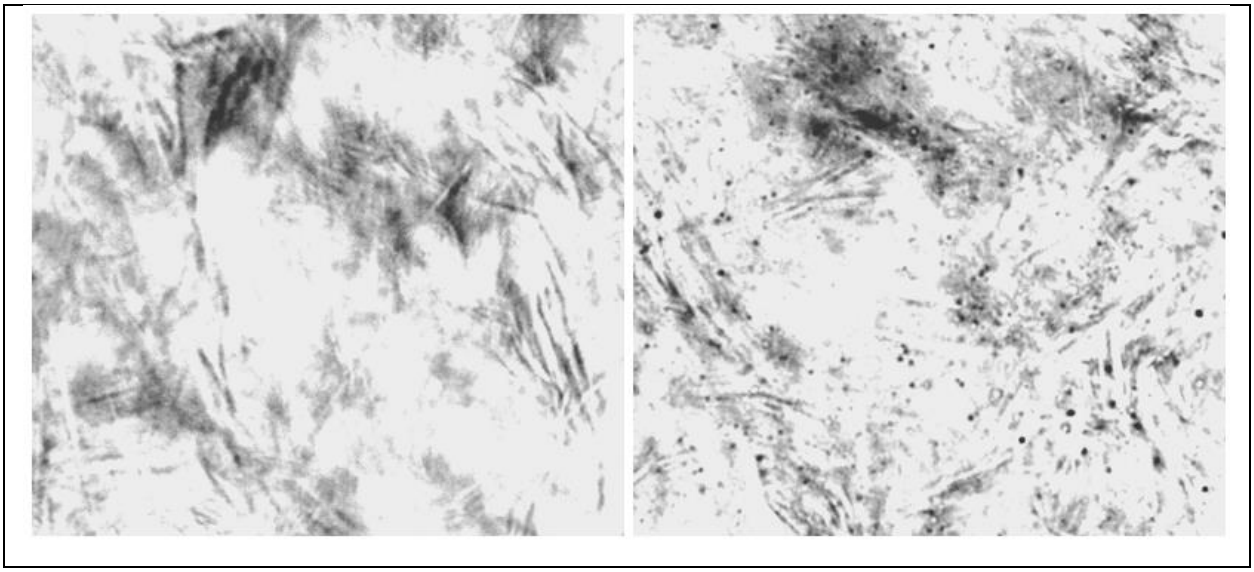

Figure S7. (a) A photograph of gold, copper, selenium and silver NPs (left to right), produced in vaseline; (b) an optical microscope image of a vaseline drops without NPs (left) and with selenium NPs (right). Magnification x100.

Table S7. Main FT–IR peaks in bacterial biofilms.

IR band, cm^{-1}	IR band assignment	Reference
960	C–C, P–O–P in nucleic acids	[1]
995	PO_2 in nucleic acids	
1029	CH_2OH in carbohydrates	
1060	C–O–C, P–O–C in polysaccharides	
1095	PO_2 in nucleic acids	
1114	C-C in nucleic acids	
1149	Glycogen	[2]
1168	C–OH, C–O in proteins	[1]
1238	PO_2 in nucleic acids	
1276	Amide III (C–N, N–H) in proteins	
1315		
1349	Collagen	[2]
1376	CH_3 in lipids	[3]
1415	COO^- amino acids, fatty acid chains	[1]
1442	CH_2 in lipids	[3, 4]
1461	$CH_3(OH)$ in lipids	[3]
1654	Amide I α-helix	[5]
1704	Amide I, backbone C=O	[6]

1751		
1060	CH_2 in lipids	[3]
2854	CH_2 in lipids	[1]
2900	CH in lipids	
2935	CH_2 in lipids	[3]
2958	CH_3 in lipids	[1]
3008	CH_3 in lipids (?)	

[1] Quilès, F., Humbert, F., & Delille, A. (2010). Analysis of changes in attenuated total reflection FTIR fingerprints of Pseudomonas fluorescens from planktonic state to nascent biofilm state. Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, 75(2), 610-616.

[2] Zohdi, V., Whelan, D. R., Wood, B. R., Pearson, J. T., Bambery, K. R., & Black, M. J. (2015). Importance of tissue preparation methods in FTIR micro-spectroscopical analysis of biological tissues:'traps for new users'. PLoS One, 10(2), e0116491.

[3] Brooks, A. L., Bruch, R. F., Afanasyeva, N. I., Kolyakov, S. F., Butvina, L. N., & Ma, L. (1998, January). Investigations of normal skin tissue using fiber optical FTIR spectroscopy. In Laser-Tissue Interaction, Tissue Optics, and Laser Welding III (Vol. 3195, pp. 323-333). SPIE

[4] Barry, B. W., Edwards, H. G. M., & Williams, A. C. (1992). Fourier transform Raman and infrared vibrational study of human skin: assignment of spectral bands. Journal of Raman spectroscopy, 23(11), 641-645.

[5] Balázs, B., Farkas, G., Berkesi, O., Gyulai, R., Berkó, S., Budai-Szűcs, M., Szabó-Révész, P., Kemény, L., Csányi, E. (2014). Protein structure is changed in psoriatic skin on the unaffected region—Imaging possibility with ATR-FTIR spectroscopy. Microchemical Journal, 117, 183-186.

[6] Pielesz, A. (2014). Temperature-dependent FTIR spectra of collagen and protective effect of partially hydrolysed fucoidan. Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, 118, 287-293.