Activitatea antibacteriana a unor nanostructuri de TiO_2 simple sau dopate

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Scopul studiului:

- Identificarea unei actiuni potentiale de inhibare a dezvoltarii bacteriilor in functie de:

- **morfologie**
- **compozitie chimica**

Nanostructuri

TiO_2

PEG (0.01M - 0.1M) +

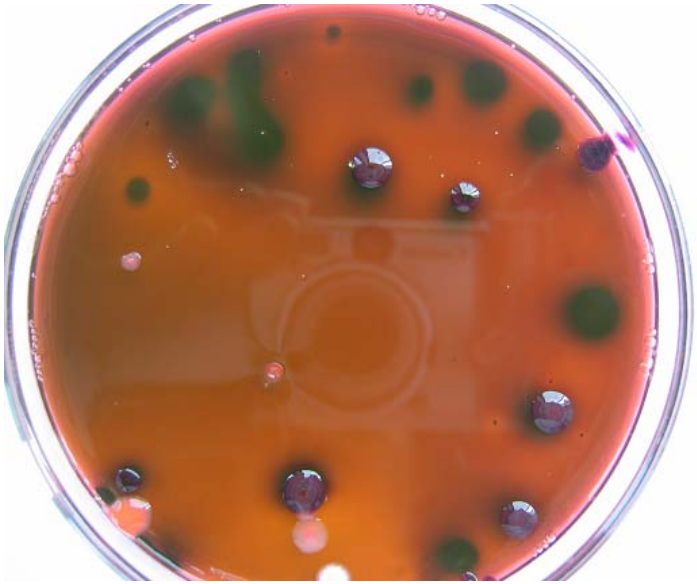
Fe (1.23% sau 7%)

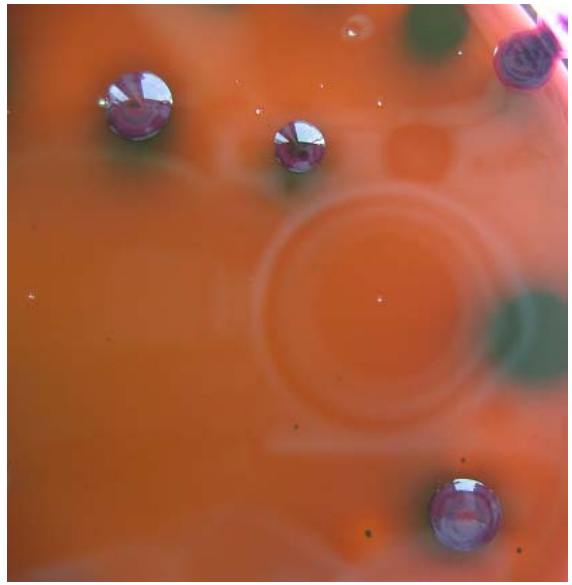
dopate cu N

tratament termic (500–1000^{0}C)

- efectul compozitiei nanostructurii TiO_2 asupra cresterii *E. coli*
-aderenta celulelor microbiene la suprafata structurilor studiate (spectrofotometric)

- activitatea antibacteriana a nanostructurilor (u.f.c / lumina artificiala)





Escherichia coli (Levine)

izolata din efluent de la statia de tratare a apelor uzate Buzau

Sample No.	Fe (%)	PEG_{600} (M)	Time of Thermal Treatment (h)
1	1.23	0.06	1
2		0.029	
3		0.014	
4		0.11	
5		0.00	
6	7	0.069	3
7		0.017	
8	Glass sample, free of coatings		

Efectul compozitiei

Fig. 1 Dinamica dezvoltarii tulpinii *E. coli* in functie de compozitia nanofilmelor

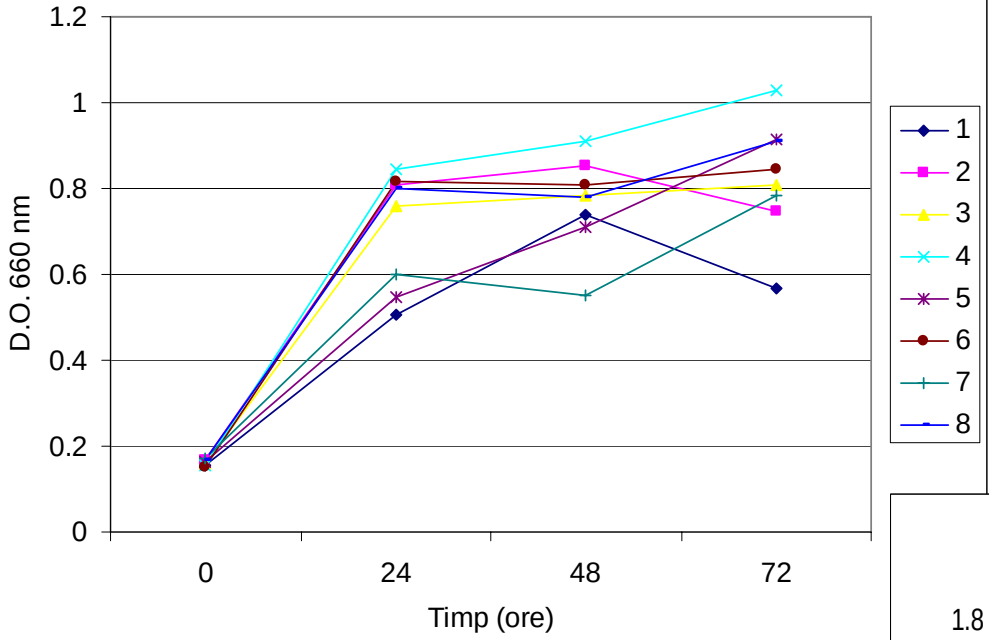


Fig. 3 Aderenta bacteriei *E. coli* la nanofilme depuse pe sticla

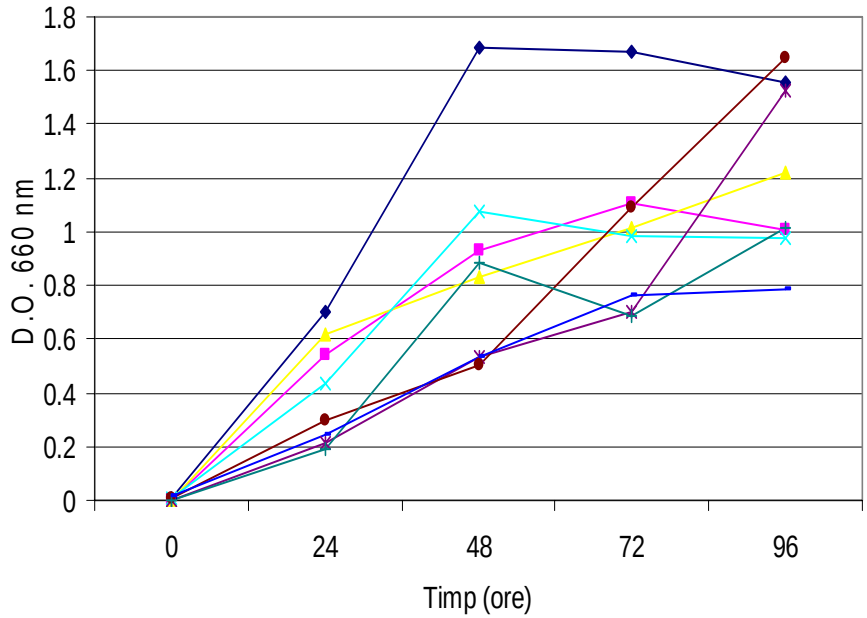


Fig. 2 Efectul inhibitor al compozitiei nanofilmului asupra dezvoltarii tulpinii *E. coli*

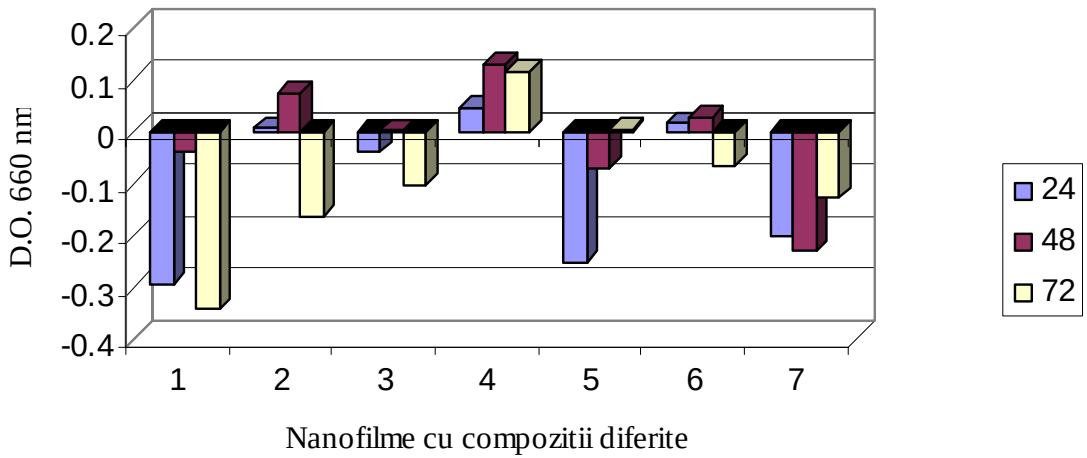
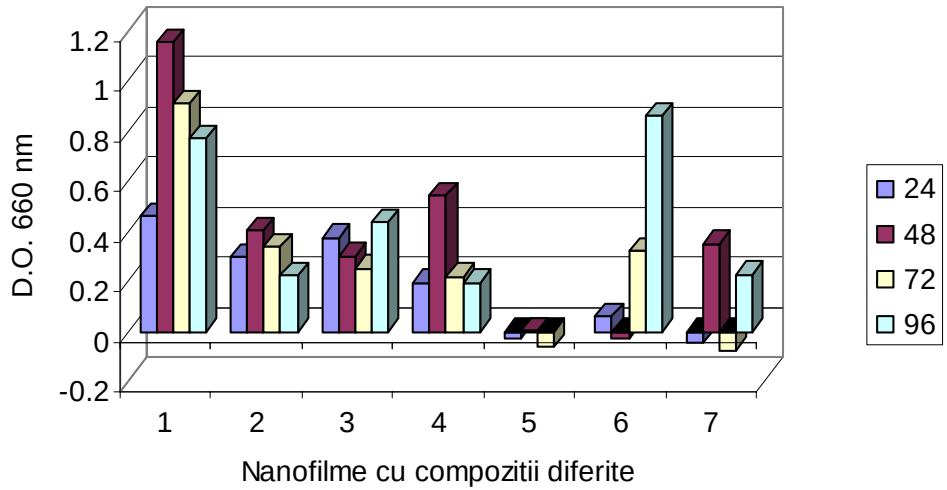
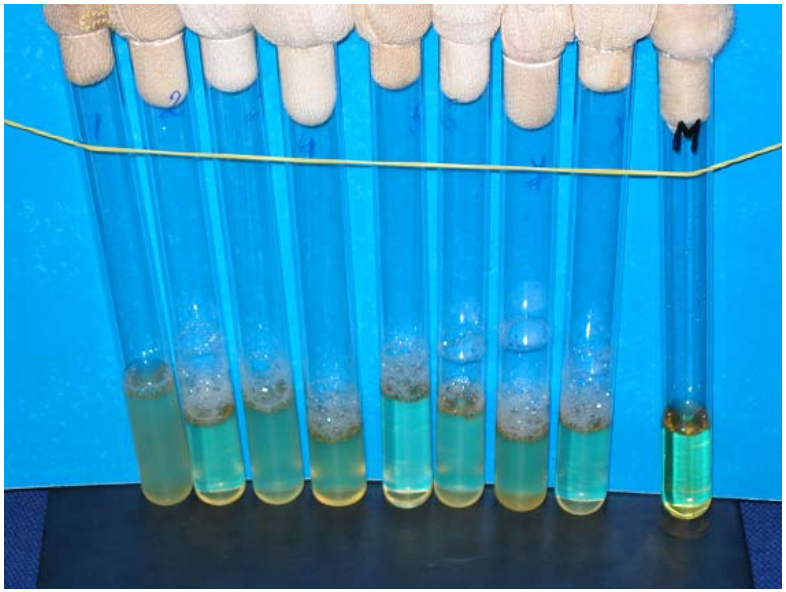
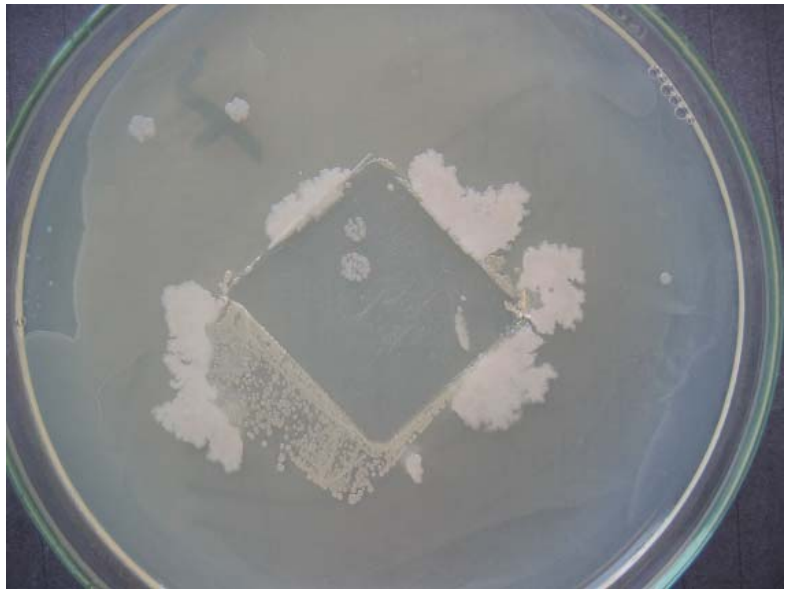


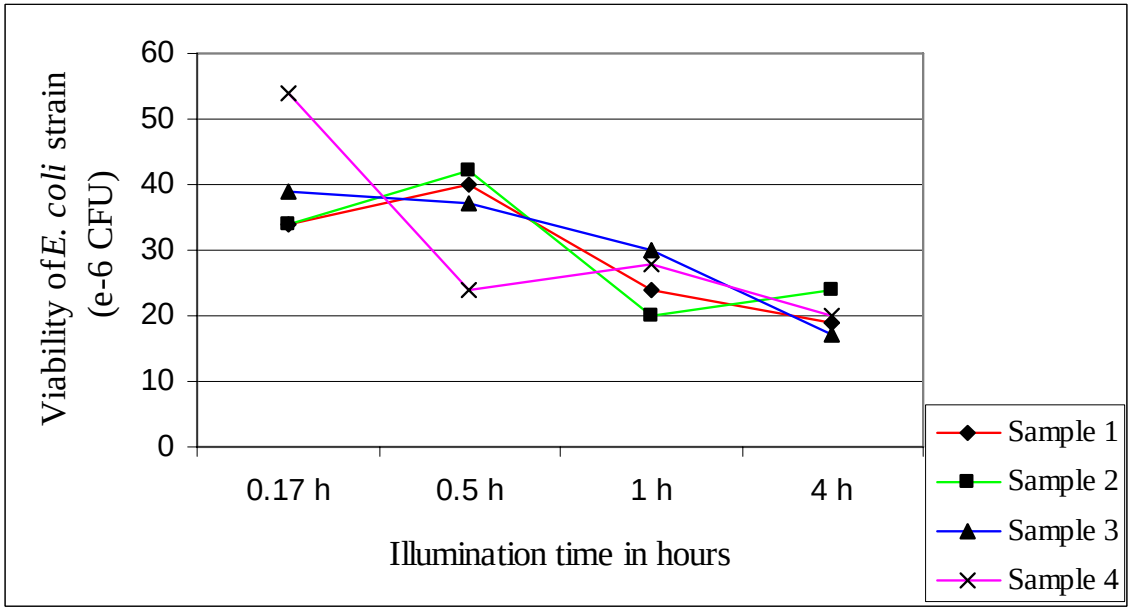
Fig. 4 Viabilitatea tulpinii *E.coli* la suprafata nanofilmelor depuse pe sticla

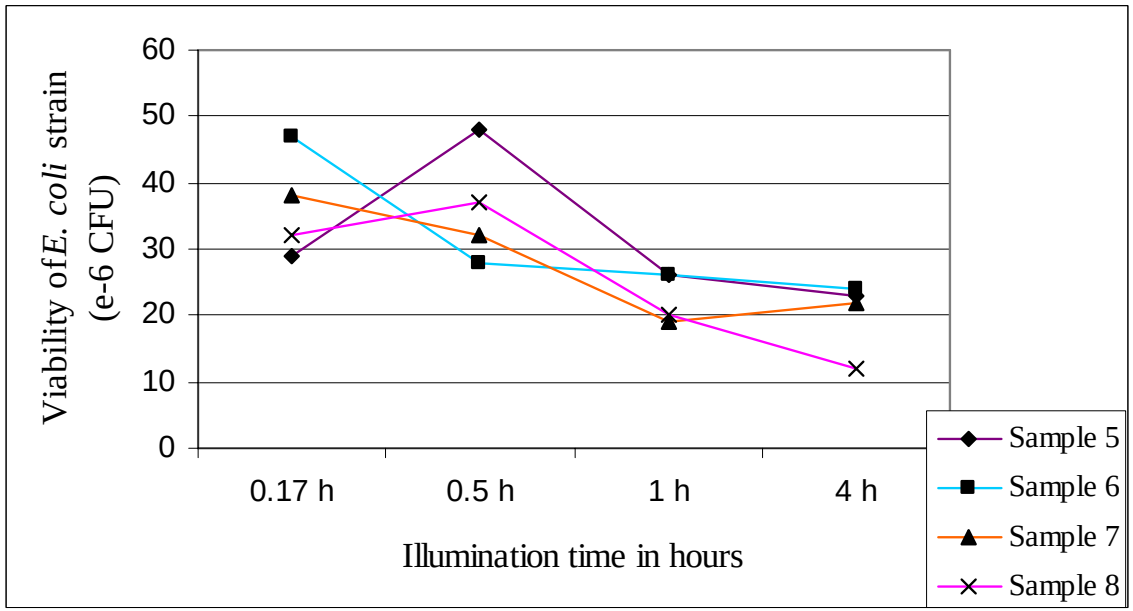



M



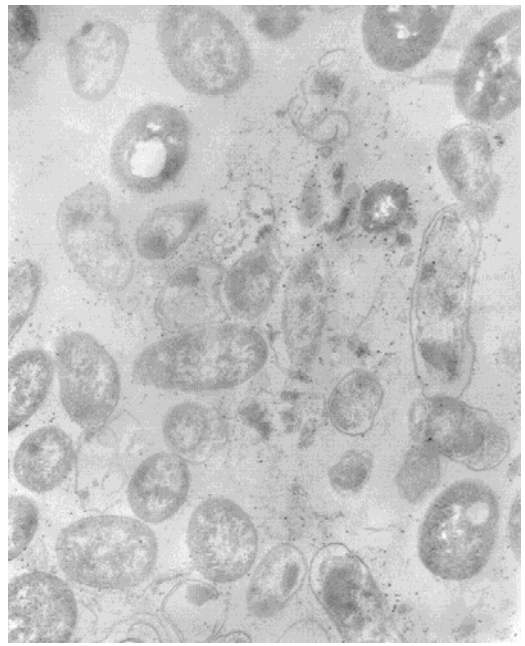
Number of sample	Number of layers	Temperature of thermal treatment (^{0}C)	Atmosphere of the thermal treatment	Time of thermal treatment (h)	*N content (%)
1	5	500	O_2	2	0
2			NH_3		0
3		600	NH_3		0
4			O_2		34.5
5	3	400	NH_3		0
6		500			0
7		800			20
8		1000			37.91


Viability of E. coli strain (e-6 CFU)
60
50
40
30
20
10
0
0.17 h
0.5 h
1 h
4 h
Illumination time in hours
Sample 1
Sample 2
Sample 3
Sample 4


Viability of E. coli strain (e-6 CFU)
60
50
40
30
20
10
0
0.17 h
0.5 h
1 h
4 h
Illumination time in hours
Sample 5
Sample 6
Sample 7
Sample 8

Martor

V3 (5 straturi)



V8 (3 straturi)

CONCLUZII

- structurile testate prezinta activitate antibacteriana
- aceasta activitate este corelata cu compozitia chimica si morfologia nanostructurii