

**Academia
Oamenilor de Știință
din România**



**Academy
of Romanian
Scientists**

RAPORT DE ACTIVITATE

**Acoperiri pe bază de hidroxiapatită substituită, cu proprietăți
funcționale îmbunătățite pentru stimularea fixării la interfața os-implant**

Director de proiect: Dr. Ing. Ionela Andreea NEACȘU

Membri echipei de cercetare: Dr. Ing. Alexandru Mihai GRUMEZESCU

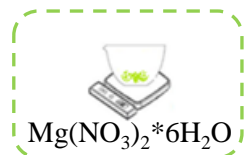
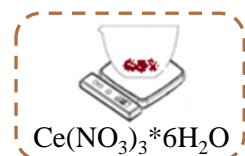
Drd. Ing. Alexandra Cătălina BÎRCĂ

Drd. Ing. Cristina CHIRCĂ

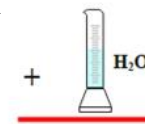
Drd. Ing. Alexandra Cristina BURDUȘIU

Iulie 2023

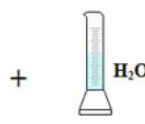
Sinteza HAp_M substituită cu ceriu și magneziu



Pulbere de cochilie
de melc calcinată



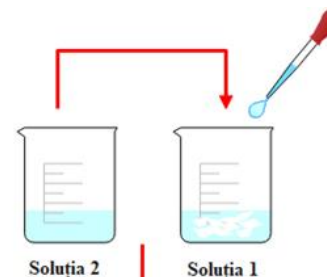
Soluția 1



Soluția 2



$(NH_4)_2HPO_4$



Transvazare în flacoane de Teflon

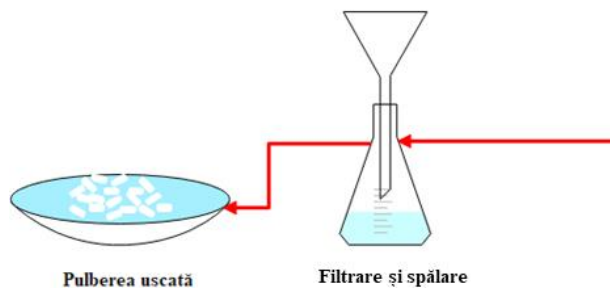


Aparatul SynthWAVE

P: 2 bari
t: 30 min
T: 150°C

HAp_1%Ce_M
HAp_3%Ce_M
HAp_5%Ce_M

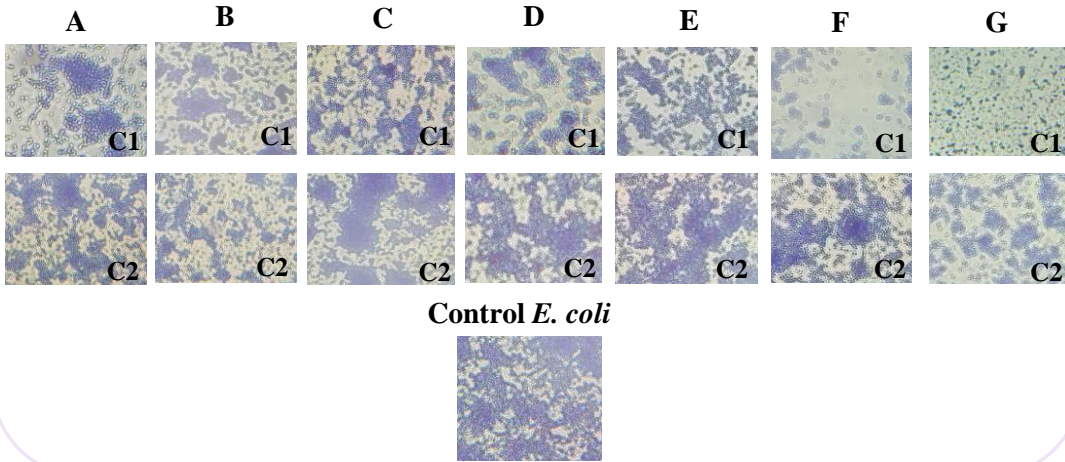
HAp_1%Mg_M
HAp_3%Mg_M
HAp_5%Mg_M



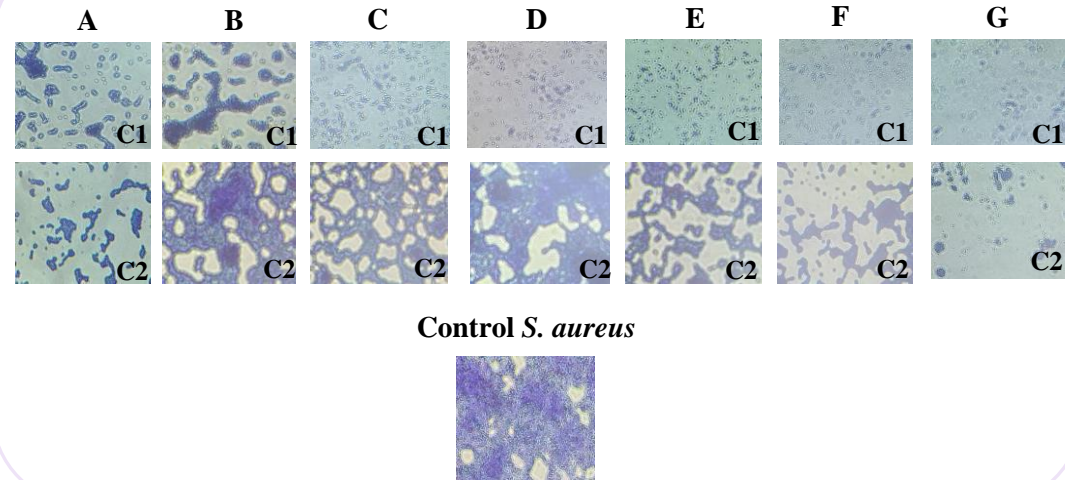
Evaluarea *in-vitro* a caracterului antimicrobian a HAp_M substituită cu Ce și Mg



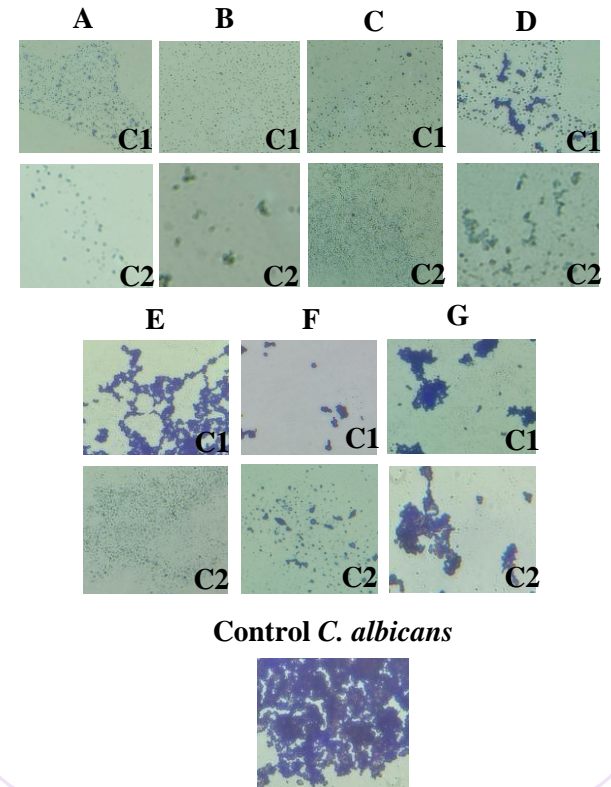
E. coli



S. aureus



C. albicans

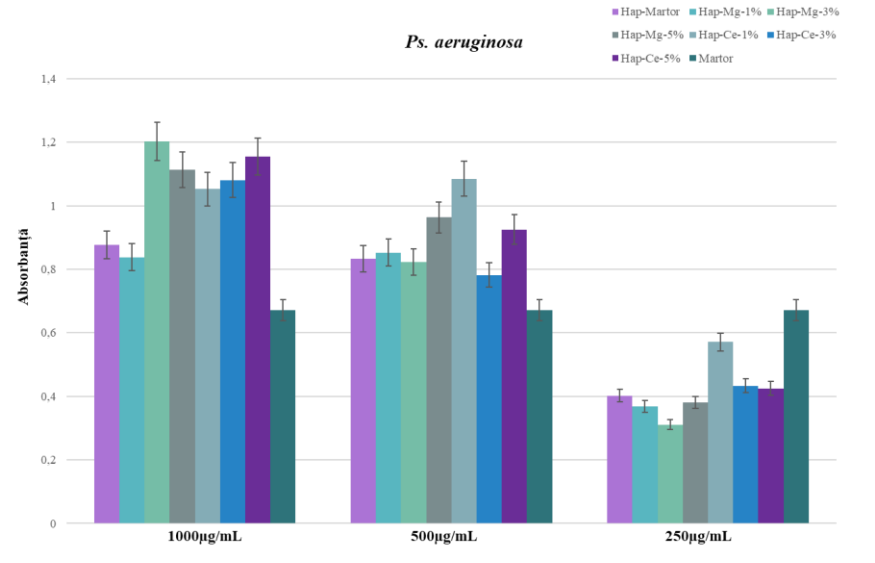
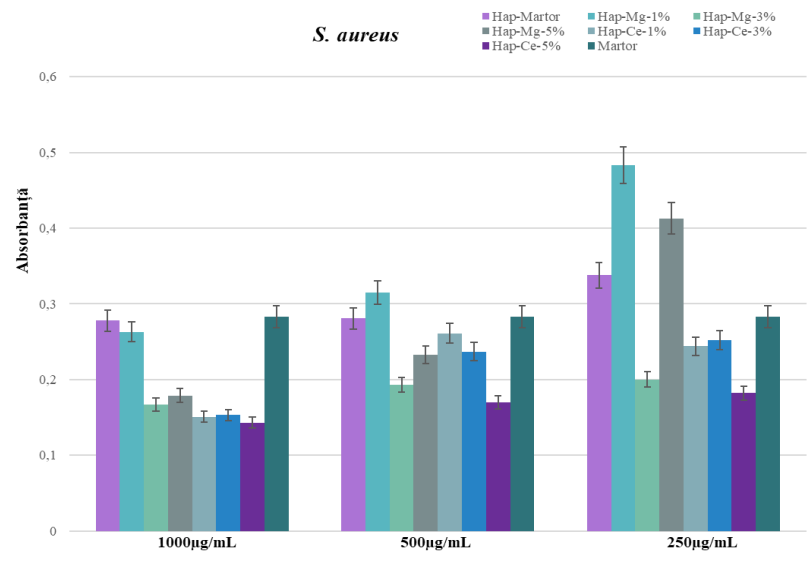
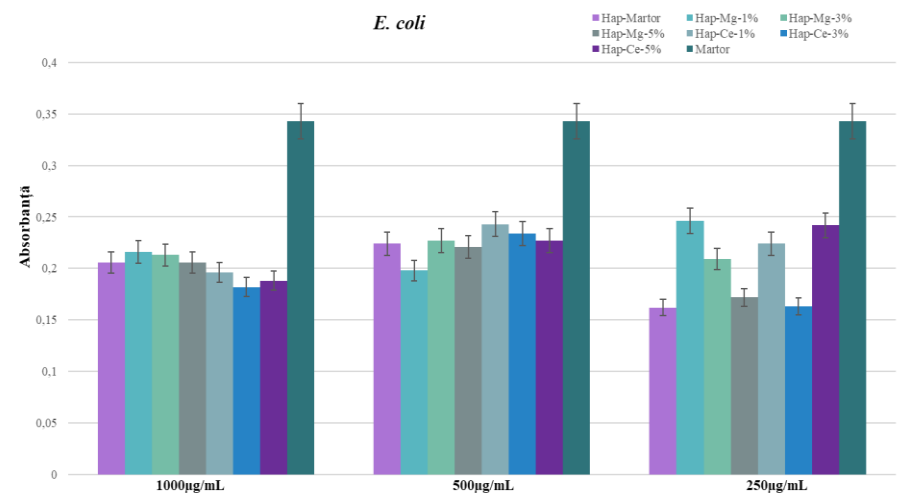
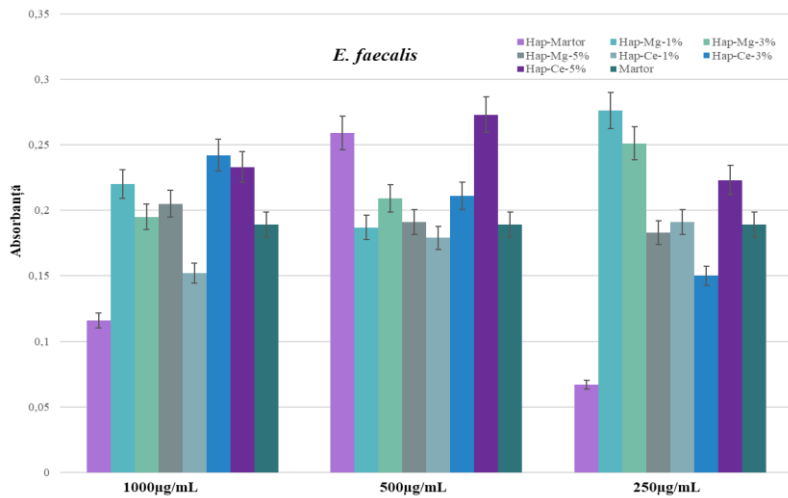


A-Hap-Martor
 B-Hap-Mg-1%
 C-Hap-Mg-3%
 D-Hap-Mg-5%
 C1-1000μg/mL

E-Hap-Ce-1%
 F-Hap-Ce-3%
 G-Hap-Ce-5%
 C2- 250μg/mL

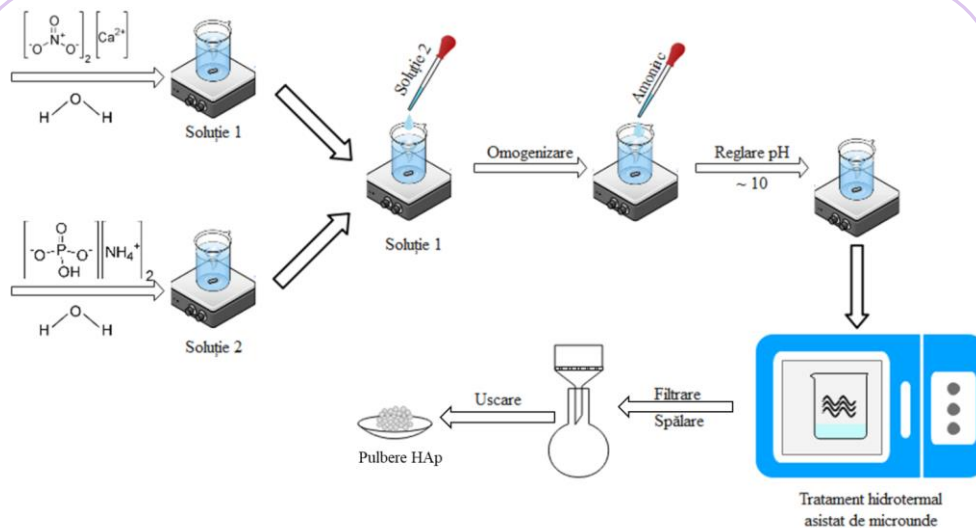
Evaluarea efectului biomaterialelor obținute asupra producerii de biofilme monospecifice

Evaluarea *in-vitro* a caracterului antimicrobian a HAp_M substituită cu Ce și Mg

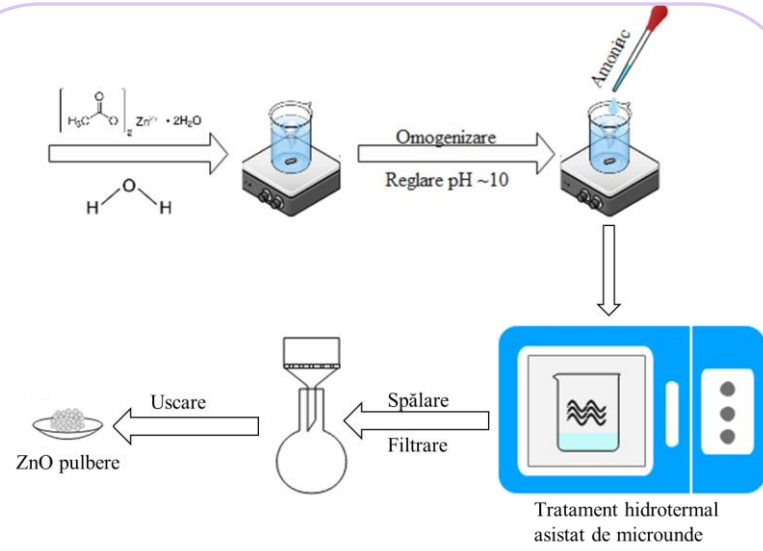


Evaluarea efectului biomaterialelor obținute asupra producerii de biofilme monospecifice

Sinteza HAp/ZnO cu adaos de ulei esențial (EO)



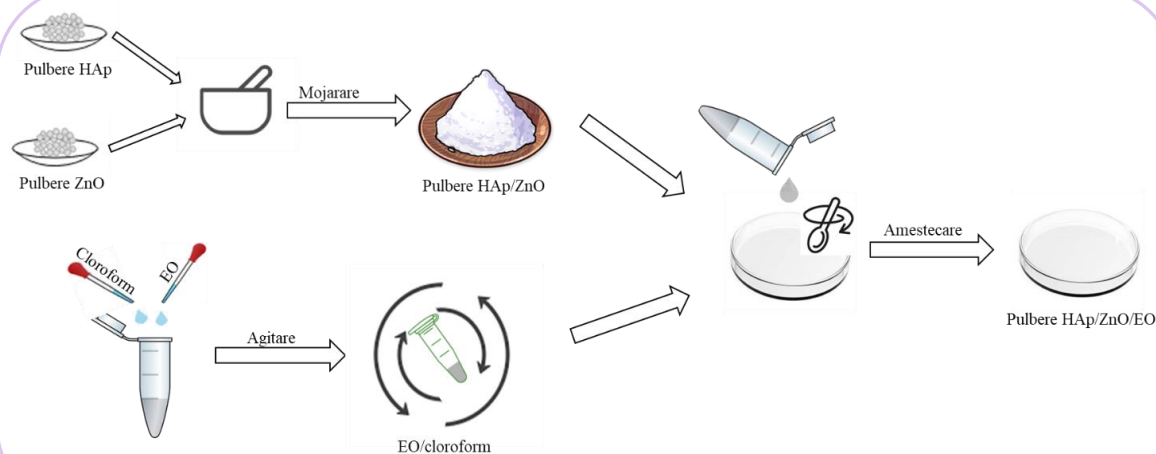
Procesul de obținere a pulberii de hidroxiapatită



Procesul de obținere a pulberii de ZnO

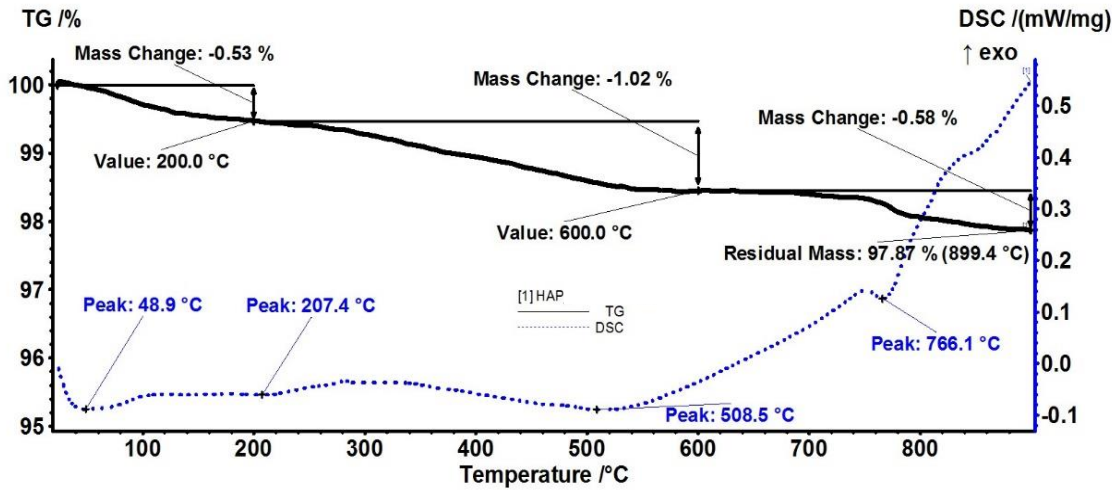
HAp
 HAp ZnO
 HAp Zn U1 C1
 HAp Zn U1 C2
 HAp Zn U2 C1
 HAp Zn U2 C2

U1 – ulei esențial de rozmarin
 U2 – ulei esențial de cimbru
 C1 – 2.5% masic adaos EO
 C2 – 5% masic adaos EO

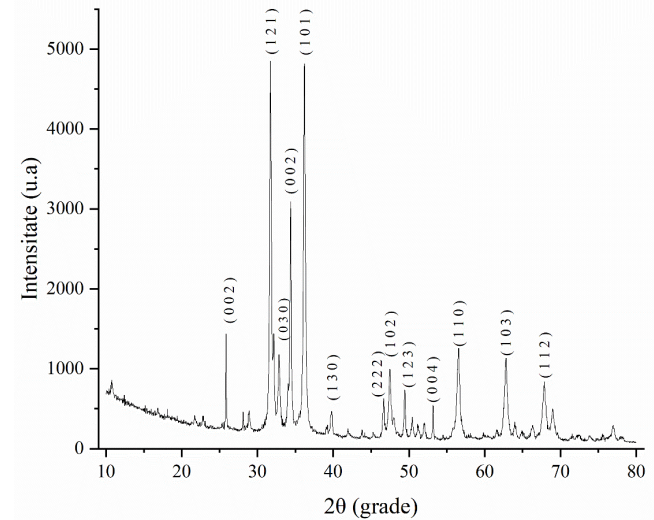


Schemă reprezentativă pentru obținerea probelor HAp/ZnO/EO

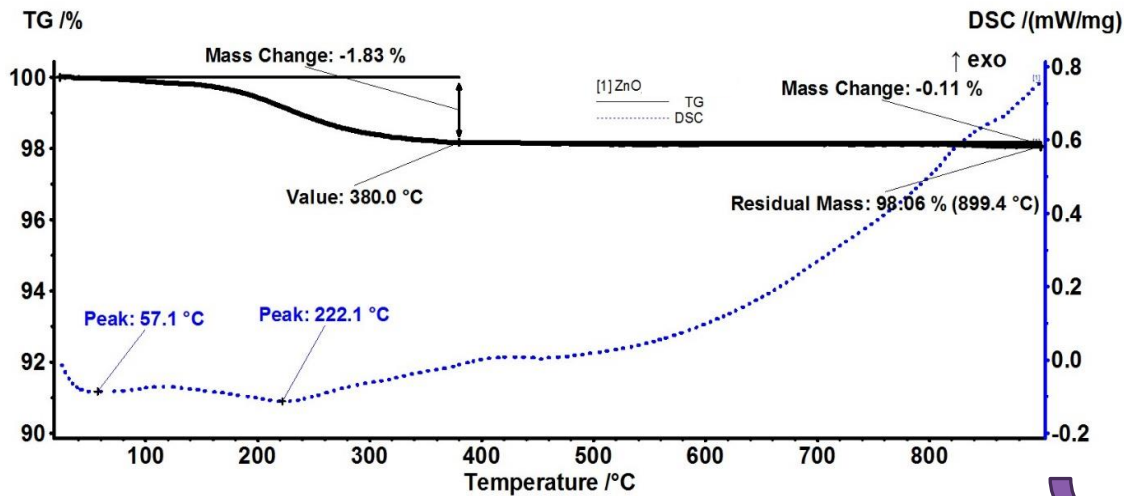
Rezultate și discuții



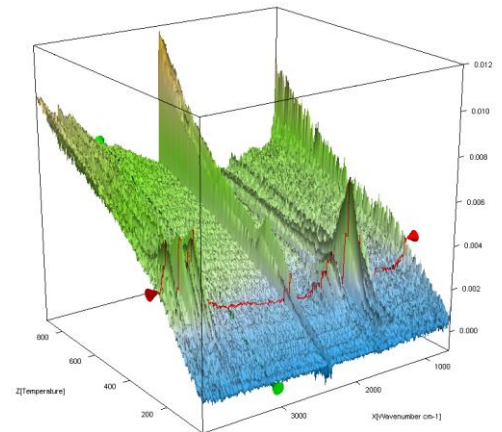
Analiză termică complexă (TG/DSC) pentru pulberea de hidroxiapatită



Difractogramă de raze X pentru pulberea HAp ZnO

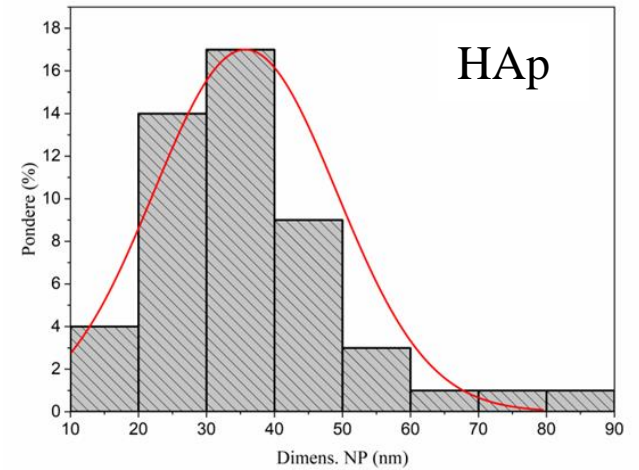
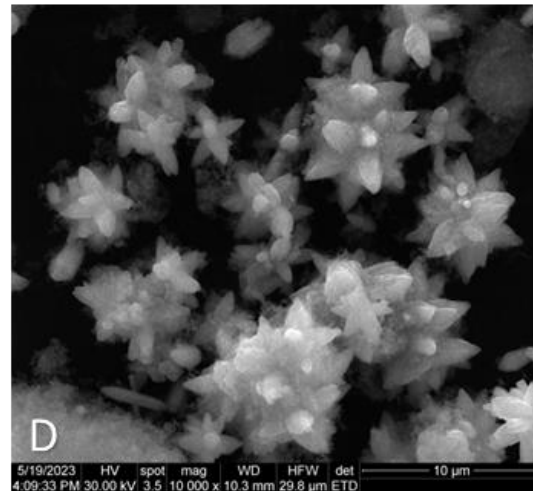
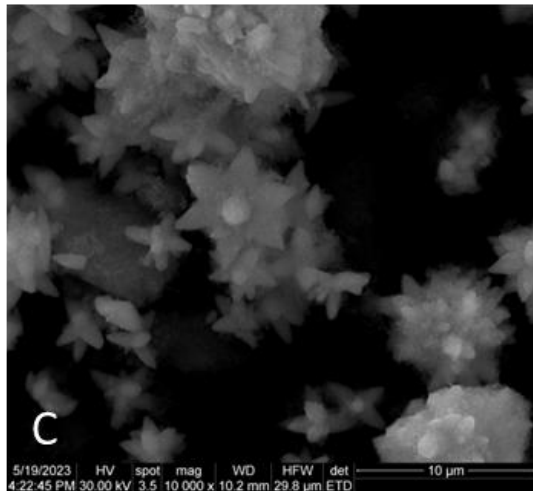
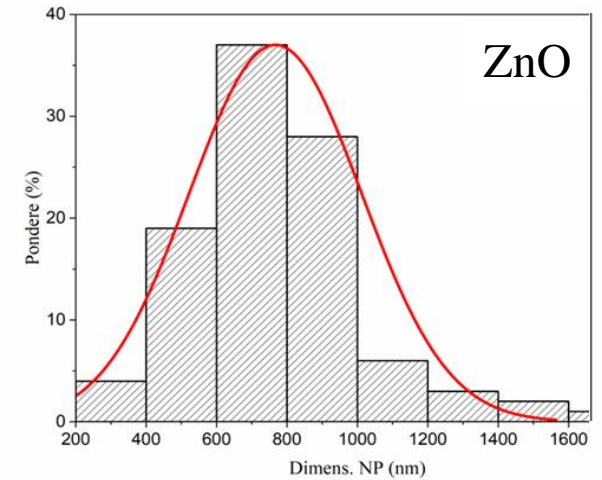
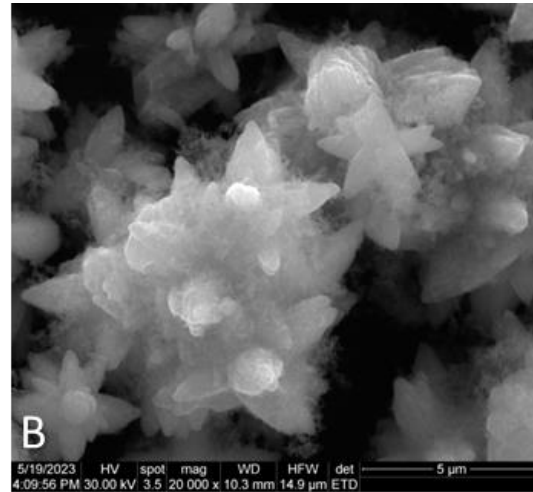
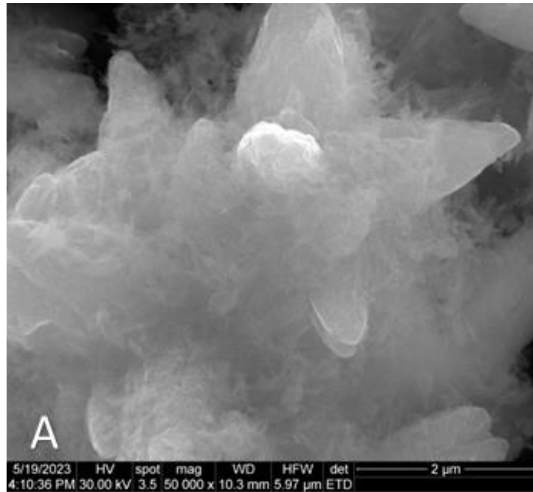


Analiză termică complexă (TG/DSC) pentru pulberea de oxid de zinc



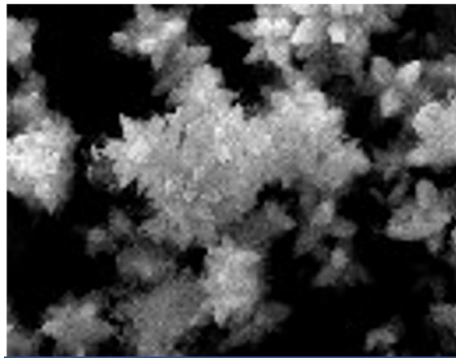
Spectrul FT-IR pentru gazele emise la 235°C

Rezultate și discuții

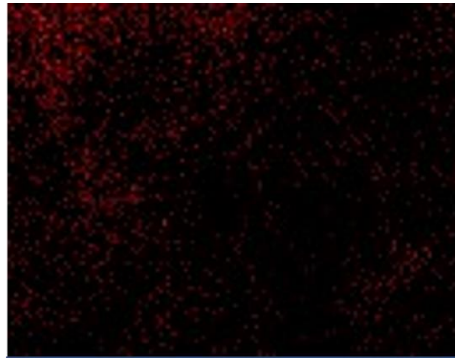


Micrografiile SEM și distribuțiile dimensionale înregistrate pentru hidroxiapatită și oxid de zinc (A – x50 000; B – x20 000; C, D – x10 000)

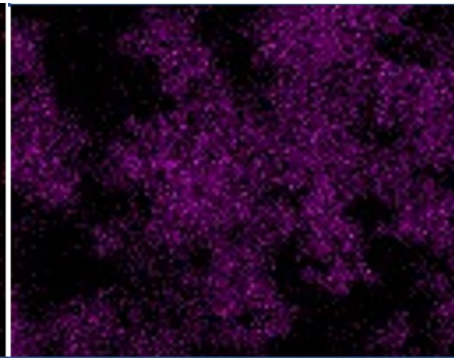
Rezultate și discuții



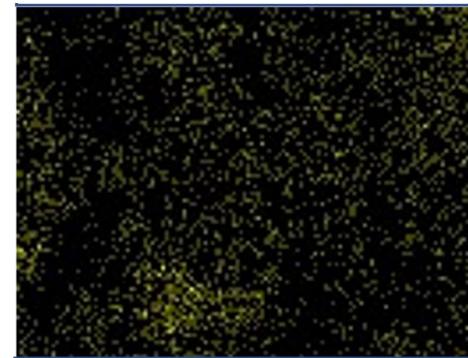
SE1



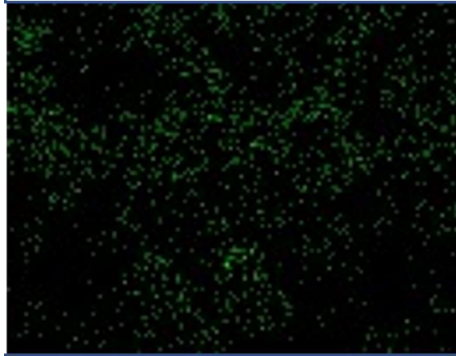
C



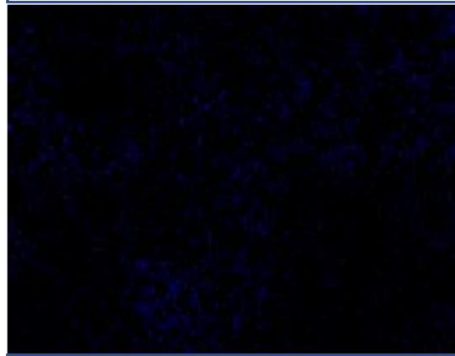
Zn



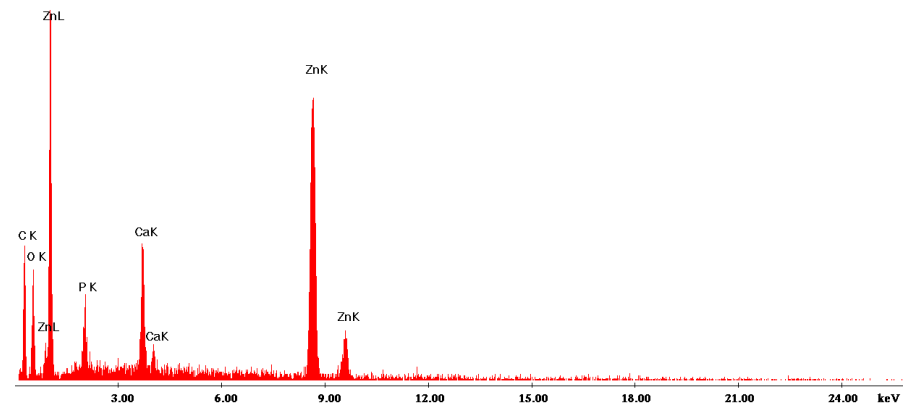
Ca



O

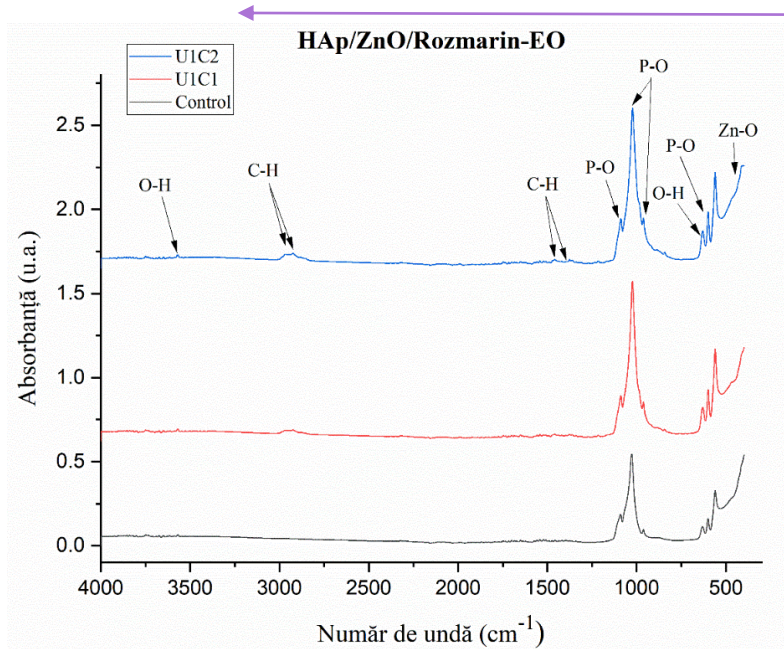


P

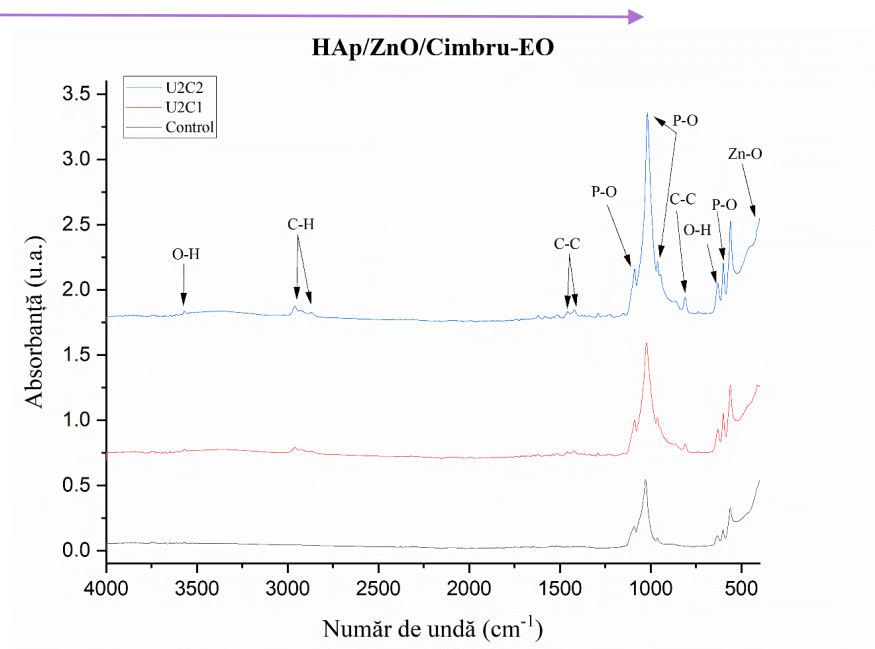


Micrografie SEM, spectru EDS și cartografiere elementală înregistrate pentru Hap ZnO

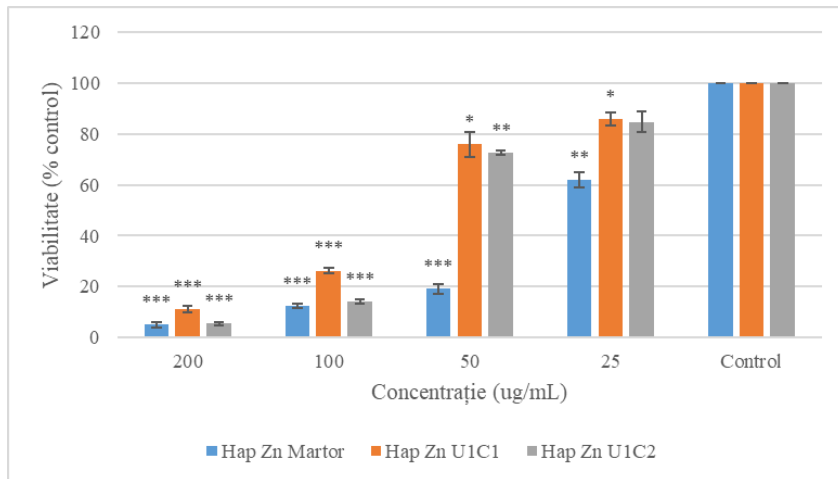
Rezultate și discuții



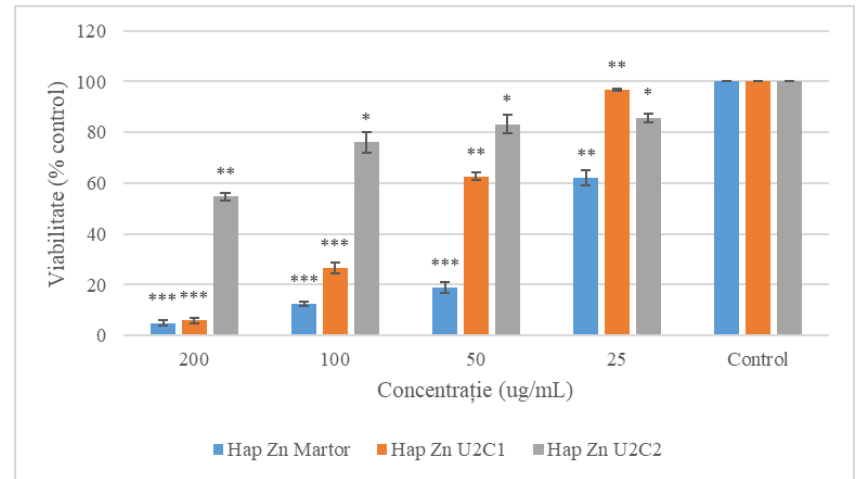
Spectrul FT-IR pentru proba ce conține ulei esențial de rozmarin



Spectrul FT-IR pentru proba ce conține ulei esențial de cimbru



Rezultatele testului MTT pentru proba ce conține ulei esențial de rozmarin



Rezultatele testului MTT pentru proba ce conține ulei esențial de cimbru

Diseminarea rezultatelor



Lucrări ISI cu afilierea AOSR

1. Cristina Rodica Dumitrescu, Ionela Andreea Neacsu, Roxana Trusca, Roxana Cristina Popescu, Iuliana Raut, Mariana Constantin, Ecaterina Andronescu. "Piezoelectric Biocomposites for Bone Grafting in Dentistry." *Polymers* 15, no. 11 (2023): 2446. (Q1, FI=5)
2. Alexandra-Cristina Burdusel, Ionela Andreea Neacsu, Alexandra Catalina Birca, Cristina Chircov, Alexandru-Mihai Grumezescu, Alina Maria Holban, Carmen Curutiu, Lia Mara Ditu, Miruna Stan, Ecaterina Andronescu. "Microwave-assisted hydrothermal treatment of multifunctional substituted hydroxyapatite with prospective applications in bone regeneration" *Journal of Functional Biomaterials* (Q2, FI=4.8) – în evaluare.