**Supplementary material**

**Gels**

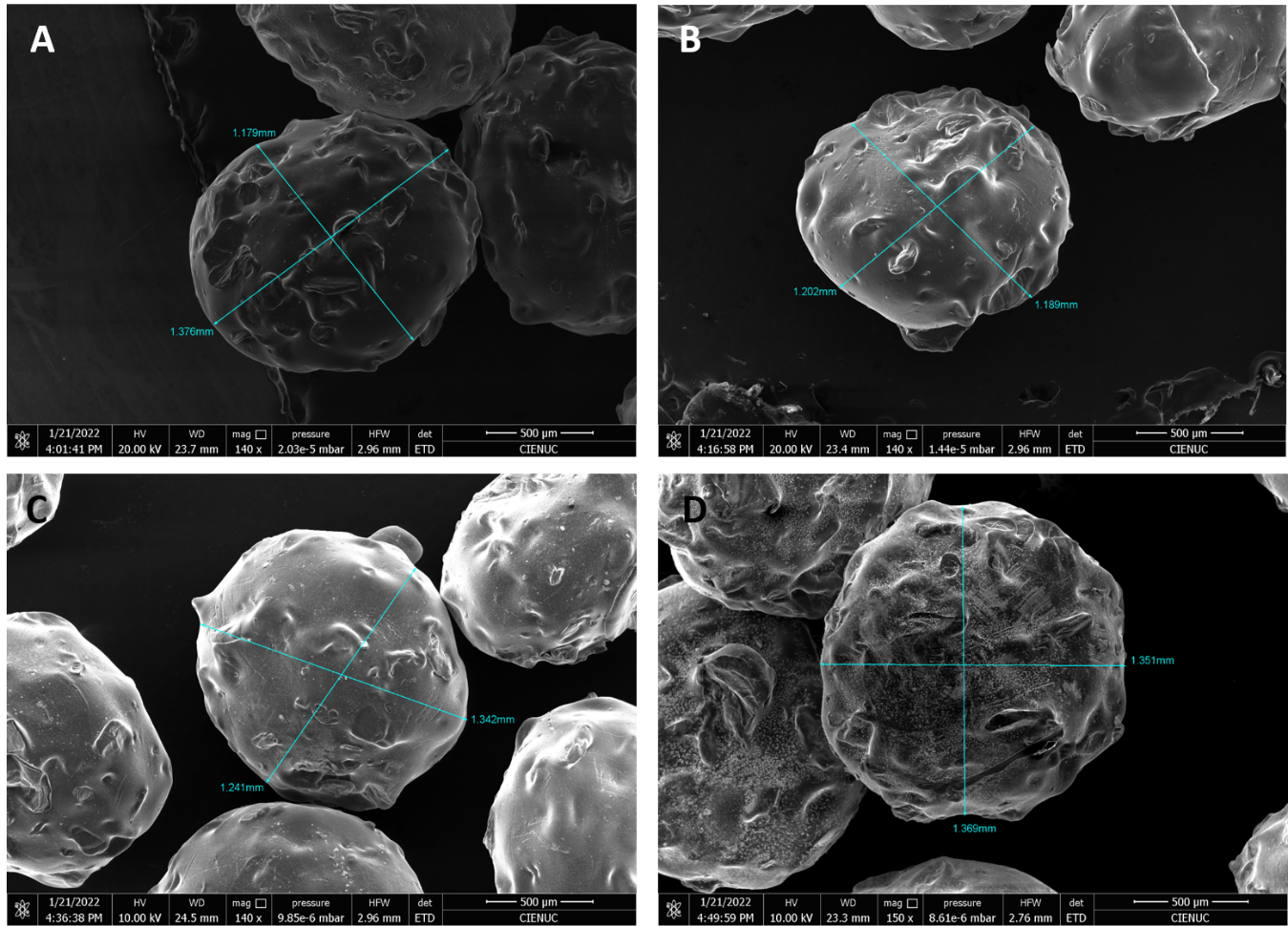
**Gemcitabine Delivery System Based on Chitosan Capsules with Magnetite and Natural Zeolite (Clinoptilolite). Synthesis, Characterization and Evaluation of its Anticancer and Bactericidal Properties**

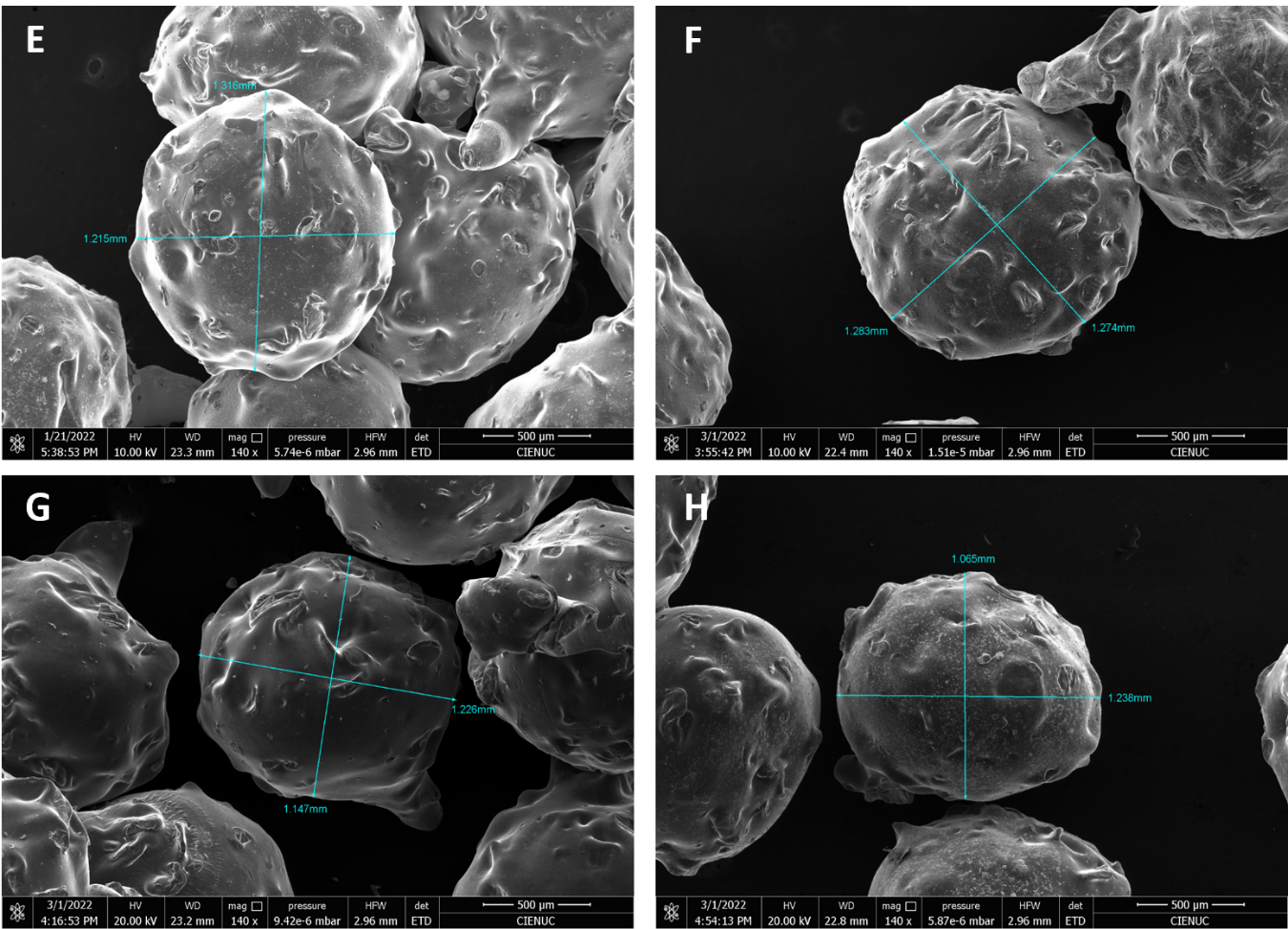
Yuly Andrea Guarín-González 1,\*, Gerardo Cabello-Guzmán 2, José Reyes-Gasga 3, Yanko Moreno-Navarro 4, Luis Vergara-González 5, Antonia Martin-Martín 6, Rodrigo López-Muñoz 6, Galo Cárdenas-Triviño 1,Ϯ and Luis Felipe Barraza 7,\*

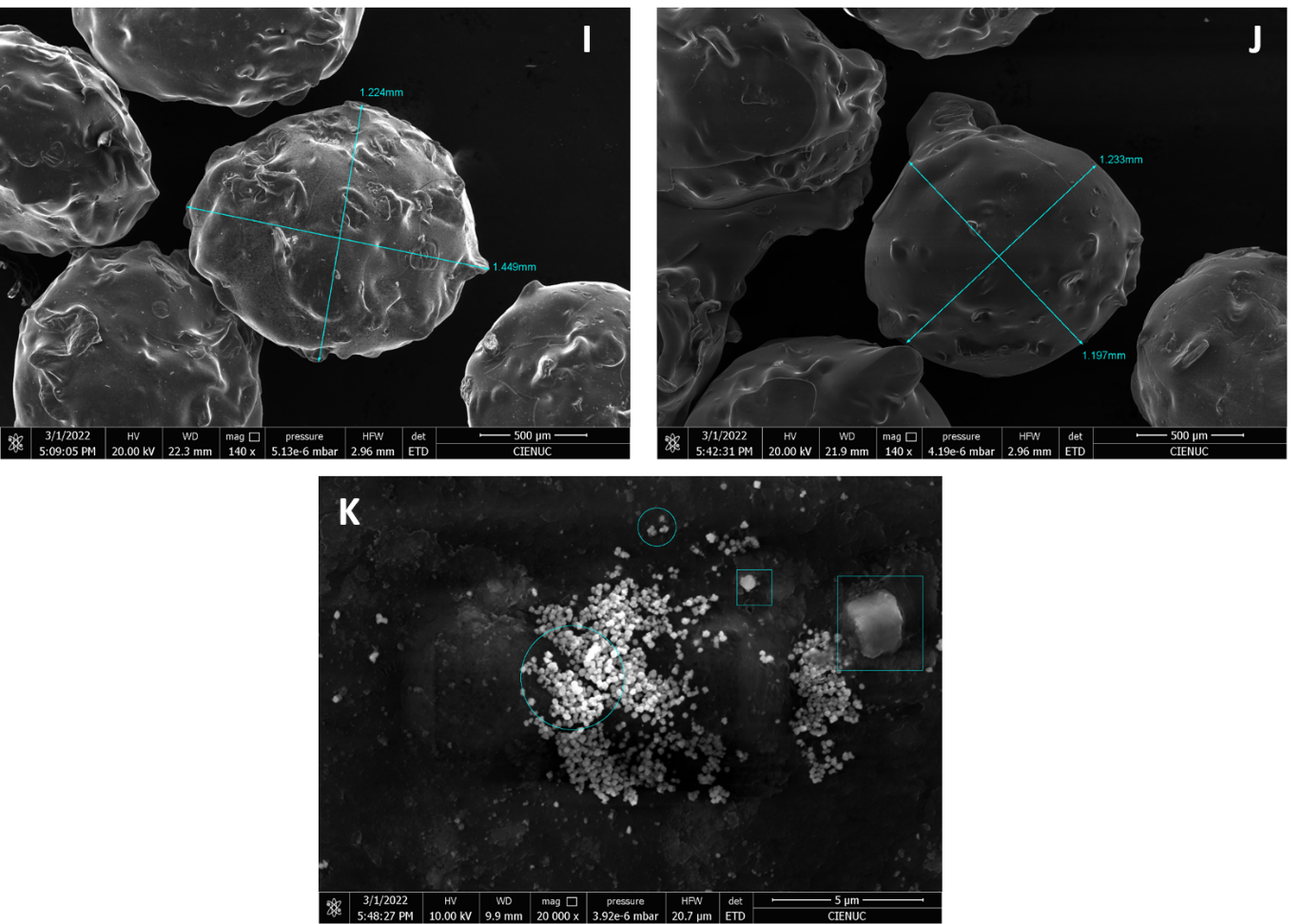
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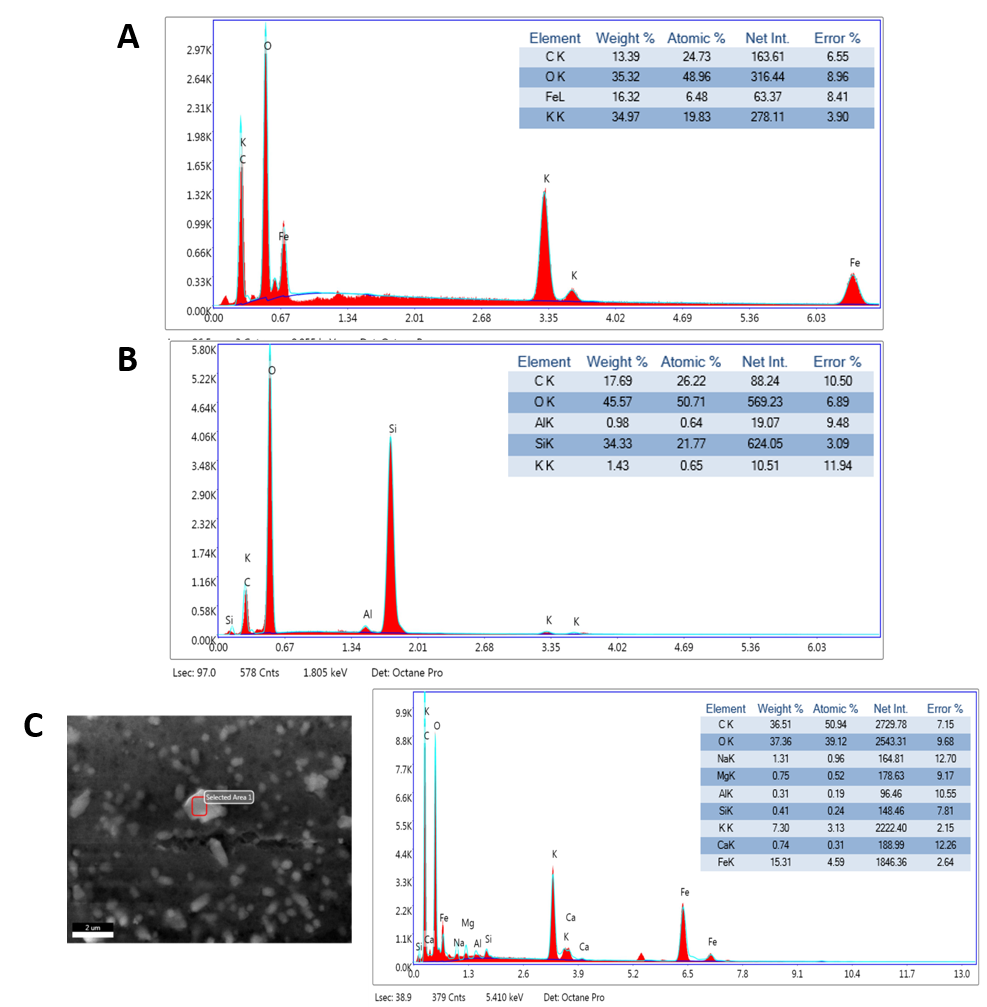
Ϯ Deceased author







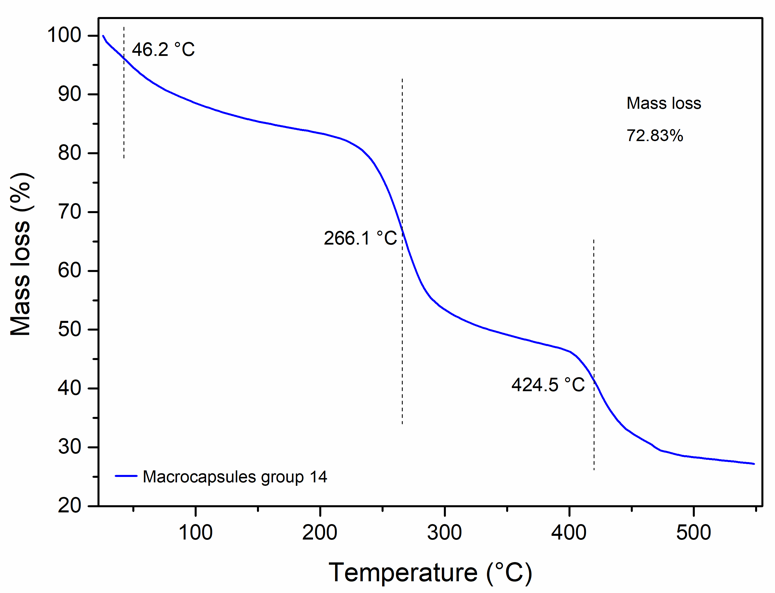
**Fig. S1.** FESEM micrographs of macrocapsules; (A) group 3, (B) group 4, (C) group 5, (D) group 6, (E) group 8, (F) group 9, (G) group 10, (H) group 11, (I) group 12, (K) group 14 and (K) minerals in the surface focus of group 14.



**Fig. S2** EDS analysis of the group 5 (A), group 7 (B) and group 14 (C)

**Table. S3** Characteristic bands of macrocapsule groups 3, 5 and 7, for identification of components interaction.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Group** | **Sample** | **IR- absorption band (cm-1)** | **Movement description** | **Bond** |
| 3 | Chitosan 4% + **Gemcitabine 0.0025%** | 3294 | Stretch vibration | -OH |
| 1669 | Amide I Axial deformation | -C=O |
| 1428 | Deformation | CH3 |
| 1157 | Antisymmetrical stretch vibration | C-O-H |
| 1091 | Symmetrical vibration | C-O-C |
| **3541** | **Primary amine stretching** | **NH2** |
| **1386** | **Stretch vibration** | **C-F** |
| 5 | Chitosan 4% + **Magnetite 0.1%** | 3152 | Stretch vibration | -OH |
| 1675 | Amide I Axial deformation | -C=O |
| 1584 | Torsion | NH2 |
| 1426 | Deformation | CH3 |
| 1158 | Antisymmetrical stretch vibration | C-O-H |
| **561** | **Stretch vibration** | **Fe-O** |
| 7 | Chitosan 4% + **Zeolite 0.1%** | 1665 | Amide I Axial deformation | -C=O |
| 1596 | Torsion | NH2 |
| 1425 | Deformation | CH3 |
| 1259 | Symmetrical stretch vibration | C-O-H |
| 1157 | Antisymmetrical stretch vibration | C-O-H |
| 1077 | Symmetrical vibration | C-O-C |
| **3511** | **Stretching vibration acid hydroxyls** | **Si-O(H)-Al** |
| **3291** | **Tensile vibration** | **-OH (zeolite) and –NH2 (chitosan)** |
| **1035** | **Asymmetric valence of the tetrahedron** | **SiO4** |
| **487** | **Bending vibration** | **Si-O-Si** |



**Fig. S4** Thermogram, macrocapsules group 14

**Table. S5** Estimated GEM concentrations (mg/mL) from extracts.

|  |  |  |
| --- | --- | --- |
| **Group** | **Extract (%)** | **[GEM mg/mL]** |
| G3 | 100 | 0.0225 |
| 80 | 0.0180 |
| 60 | 0.0135 |
| 40 | 9.00x10-3 |
| 20 | 4.50x10-3 |
| G10 | 100 | 0.0202 |
| 80 | 0.0161 |
| 60 | 0.0121 |
| 40 | 8.06x10-3 |
| 20 | 4.03x10-3 |
| G11 | 100 | 0.0211 |
| 80 | 0.0168 |
| 60 | 0.0126 |
| 40 | 8.42x10-3 |
| 20 | 4.21x10-3 |
| G14 | 100 | 0.0208 |
| 80 | 0.0166 |
| 60 | 0.0125 |
| 40 | 8.00x10-3 |
| 20 | 4.00 x10-3 |