Formulation, characterisation, and biocompatibility assessment of Rifampicin-loaded Poly(d,l-lactide-co-glycolide) composites for local treatment of orthopaedic and wound infections

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Keywords: Composites, biodegradable, polymer, antimicrobial, cytocompatibility, rifampicin, PLGA

Supplementary material

Samples of PLGA and RIF-PLGA after 21 days of immersion used for FTIR

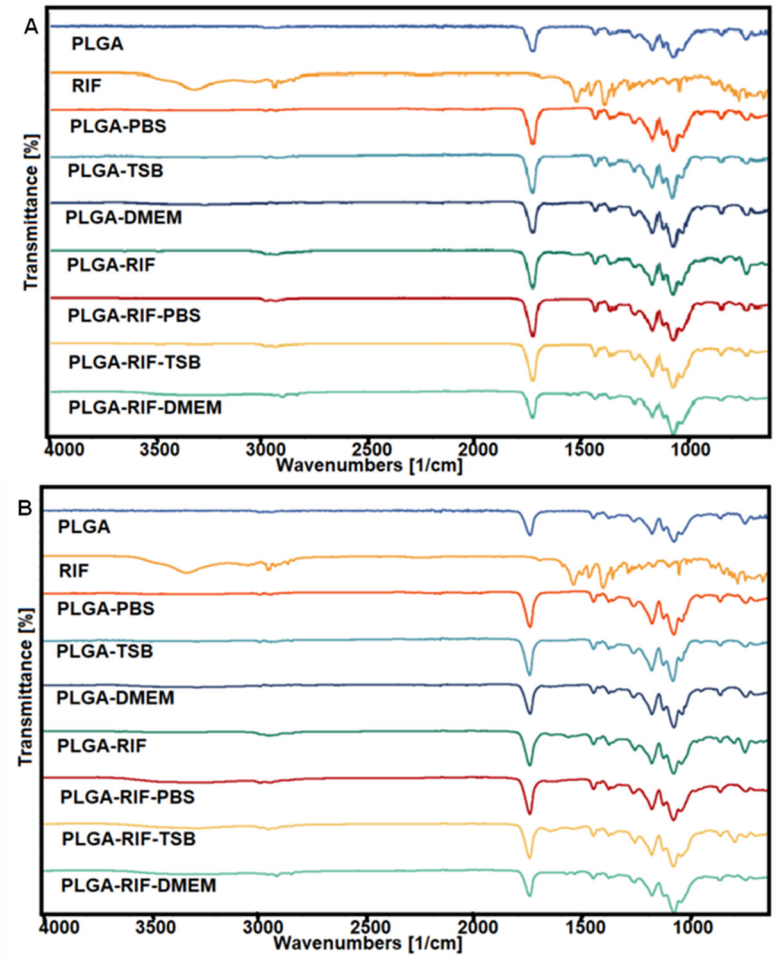


Figure S1. FTIR spectra for (A) PLGA:RIF (2:1) (B) PLGA:RIF (8:1), including pure PLGA, RIF. Additionally, it presents FTIR spectra of PLGA and PLGA-RIF composite immersed in different media, namely PBS, TSB, and DMEM, for 21 days. PLGA (PLGA alone), RIF (RIF alone), PLGA-PBS (PLGA immersed in PBS), PLGA-TSB (PLGA immersed in TSB), PLGA-DMEM (PLGA immersed in DMEM), PLGA-RIF (composite), PLGA-RIF-PBS (PLGA-RIF immersed in PBS), PLGA-RIF-TSB (PLGA-RIF immersed in TSB), PLGA-RIF-DMEM (PLGA-RIF immersed in DMEM).

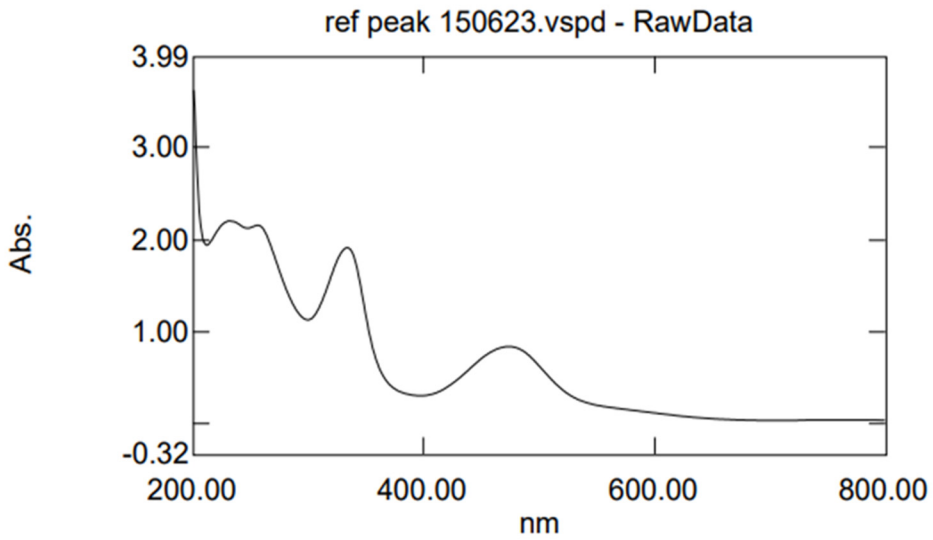


Figure S2: RIF peaks by UV-Vis spectroscopy

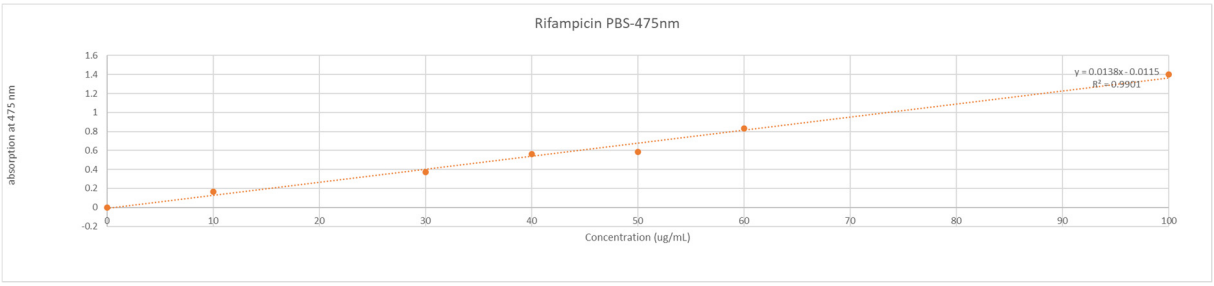


Figure S3: A. RIF calibration curve in PBS

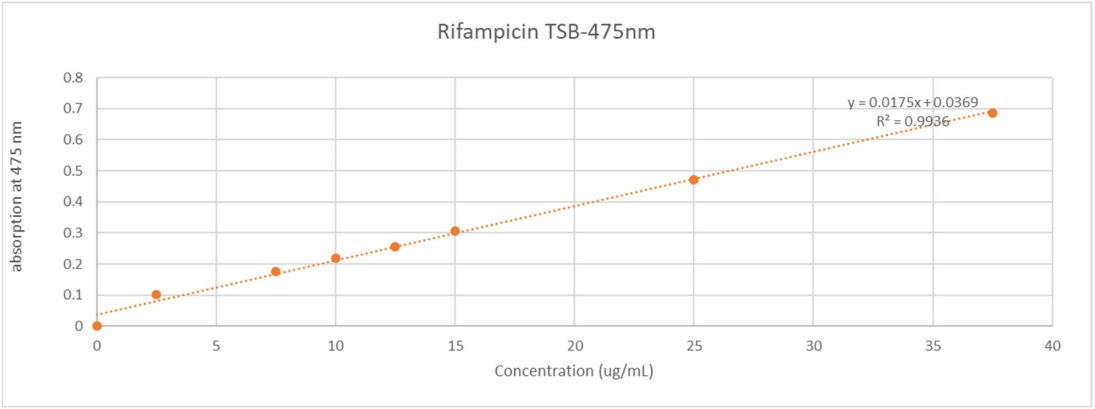


Figure S3: B. RIF calibration curve in TSB

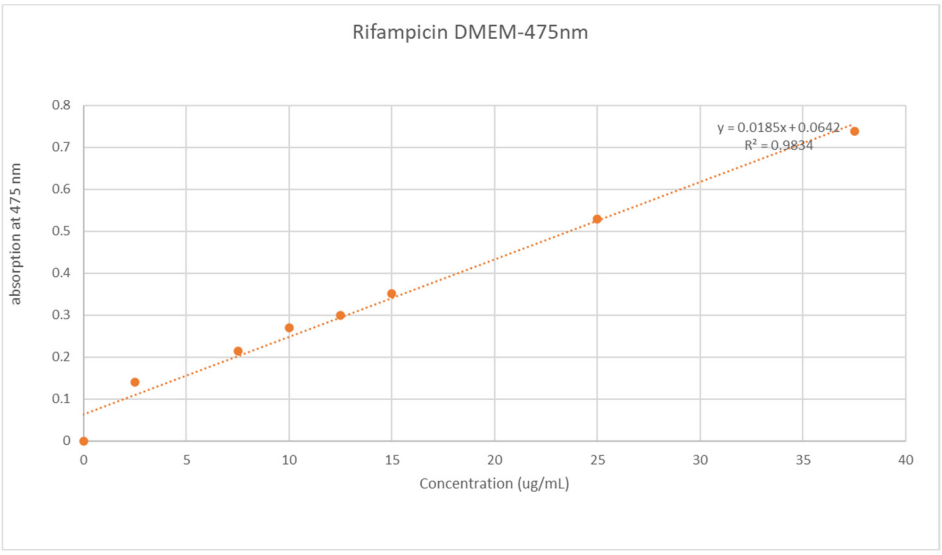
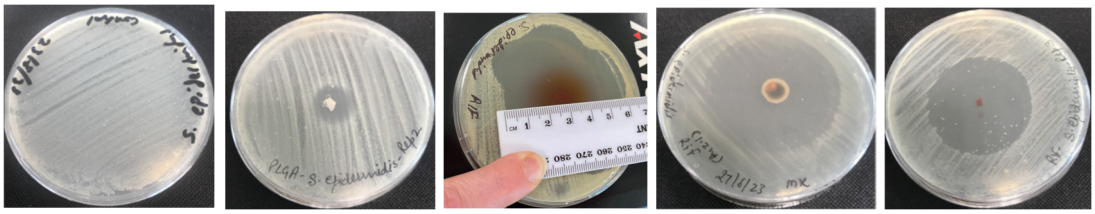
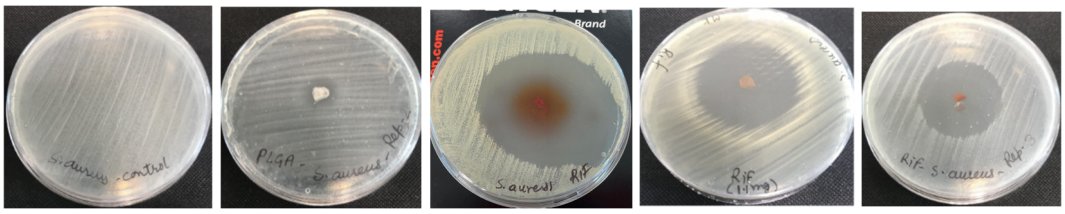


Figure S3: C. RIF calibration curve in DMEM



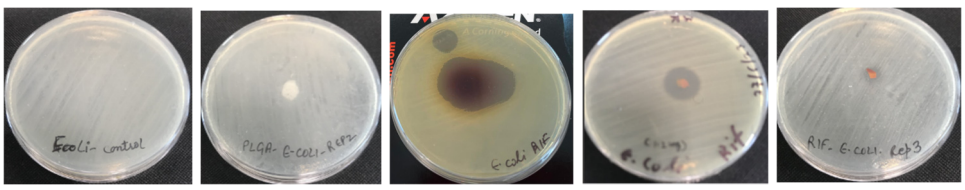
Control **PLGA** **RIF** **PLGA:RIF (2:1)** **PLGA:RIF (8:1)**

S. epidermidis



Control **PLGA** **RIF** **PLGA:RIF (2:1)** **PLGA:RIF (8:1)**

S. aureus



Control **PLGA** **RIF** **PLGA:RIF (2:1)** **PLGA:RIF (8:1)**

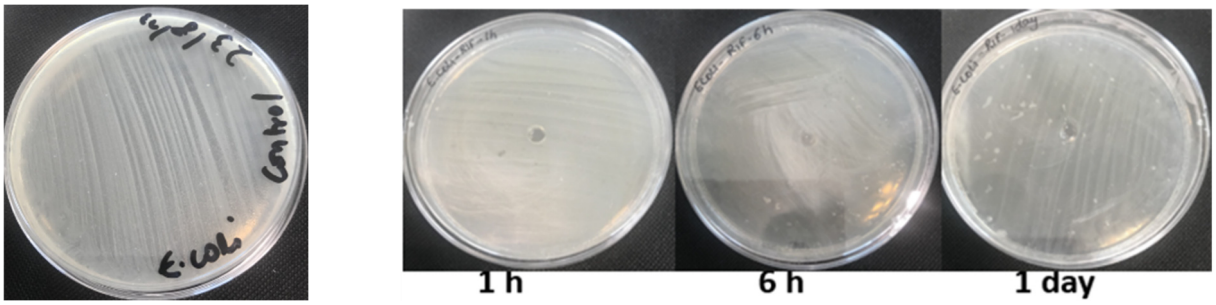
E. coli



Control PLGA RIF PLGA:RIF (2:1) PLGA:RIF (8:1)

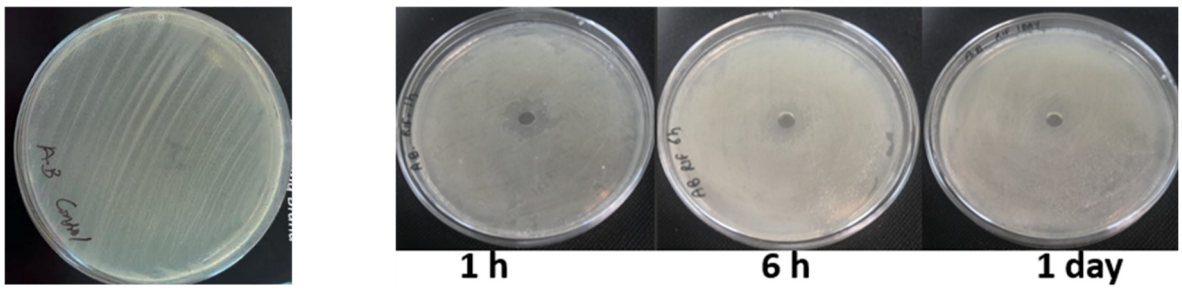
A. baumannii

Figure S4: The direct antimicrobial activity of PLGA, RIF, and PLGA composites against bacterial strains after 24 h.



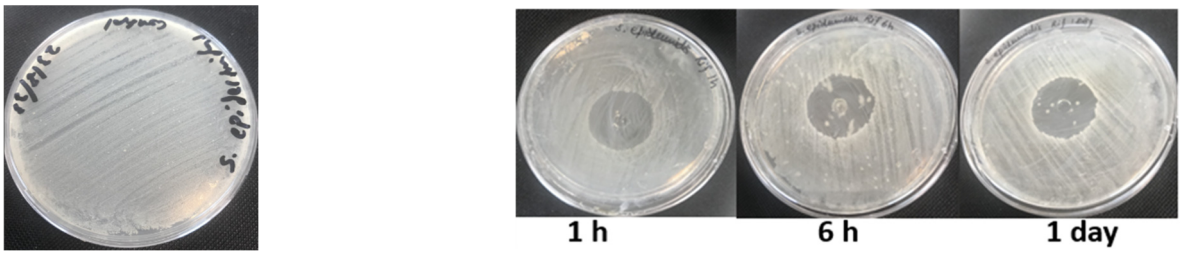
Control PLGA:RIF (8:1)

***E. coli*- Non-direct TSB punch agar**



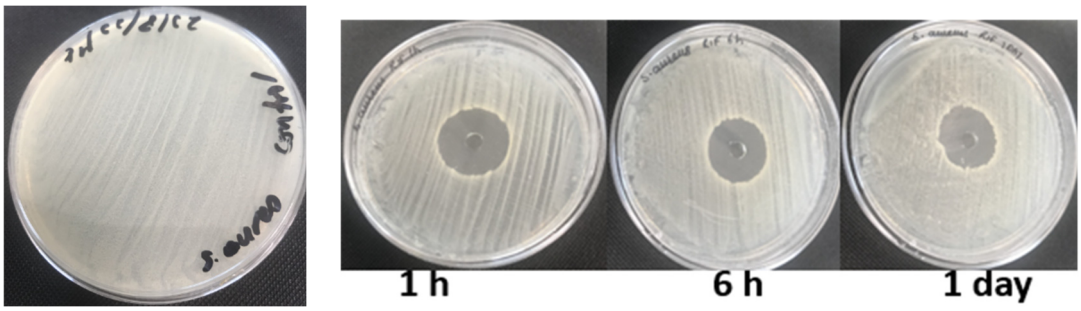
Control PLGA:RIF (8:1)

***A. baumannii*-non-direct TSB punch agar**



Control **PLGA:RIF (8:1)**

***S. epidermidis*-non-direct TSB punch agar**

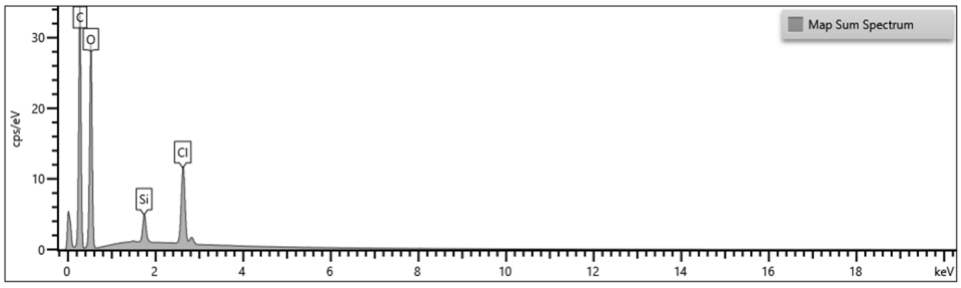


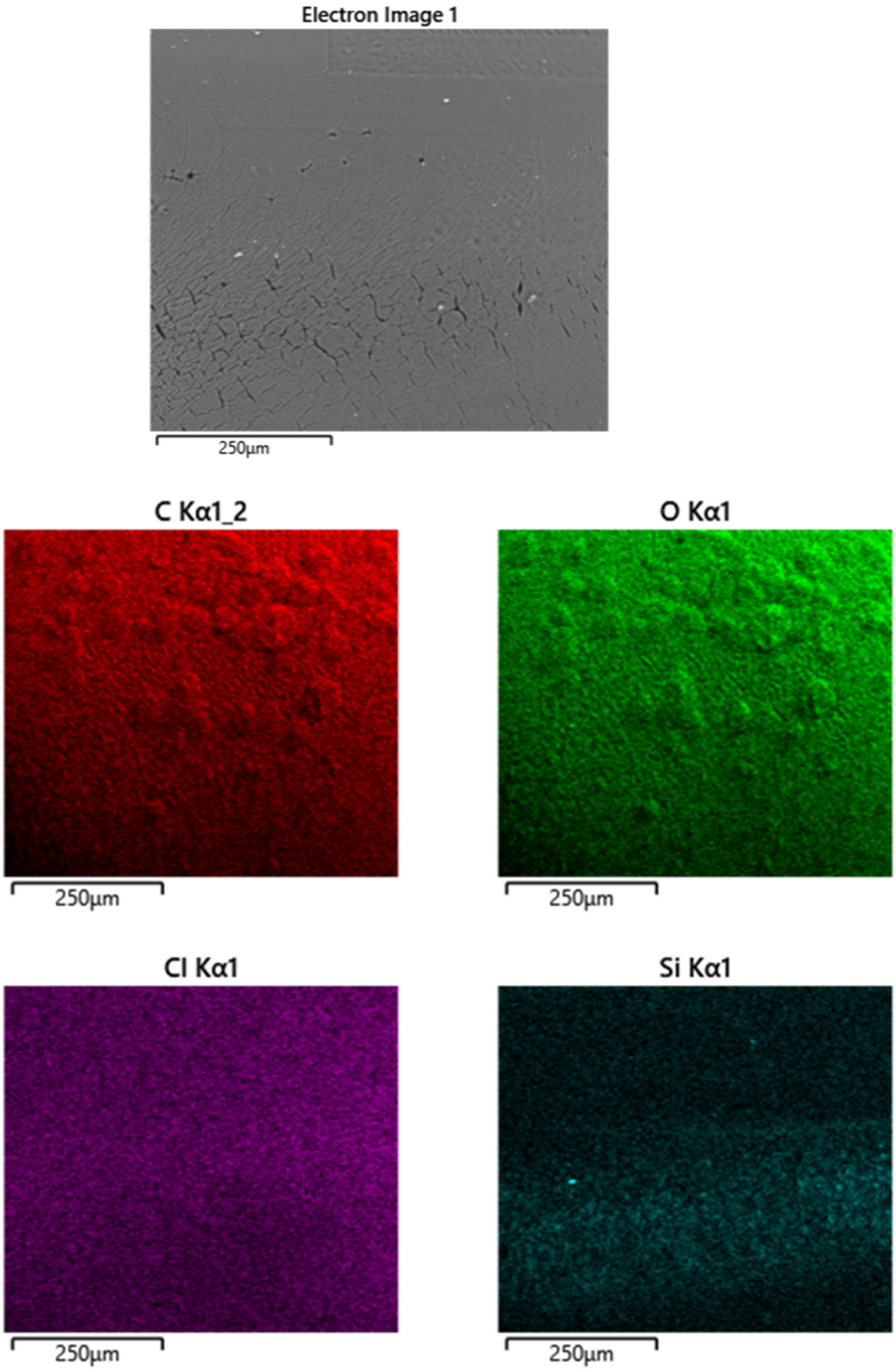
Control **PLGA:RIF (8:1)**

***S. aureus*-non-direct TSB punch agar**

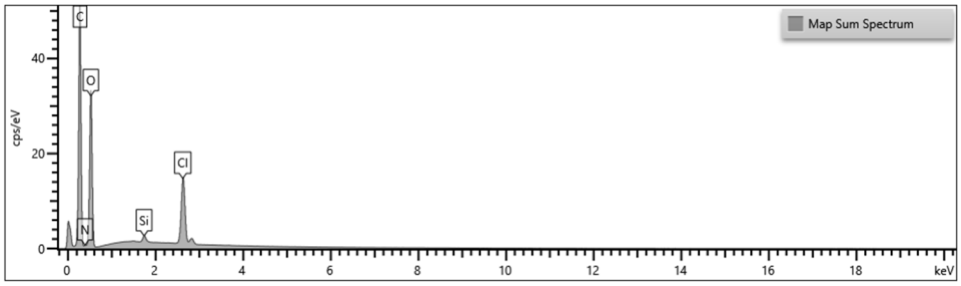
Figure S5: Non-direct antimicrobial activity of the PLGA and PLGA-RIF composites after 1 h, 6 h, and 1 day of immersion in TSB and 50 µm of the supernatant against bacteria.

A

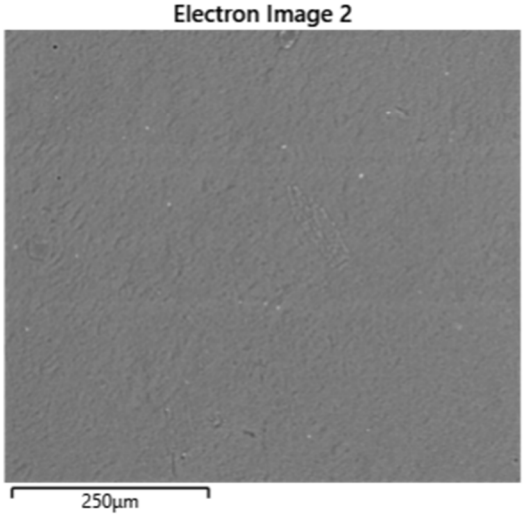


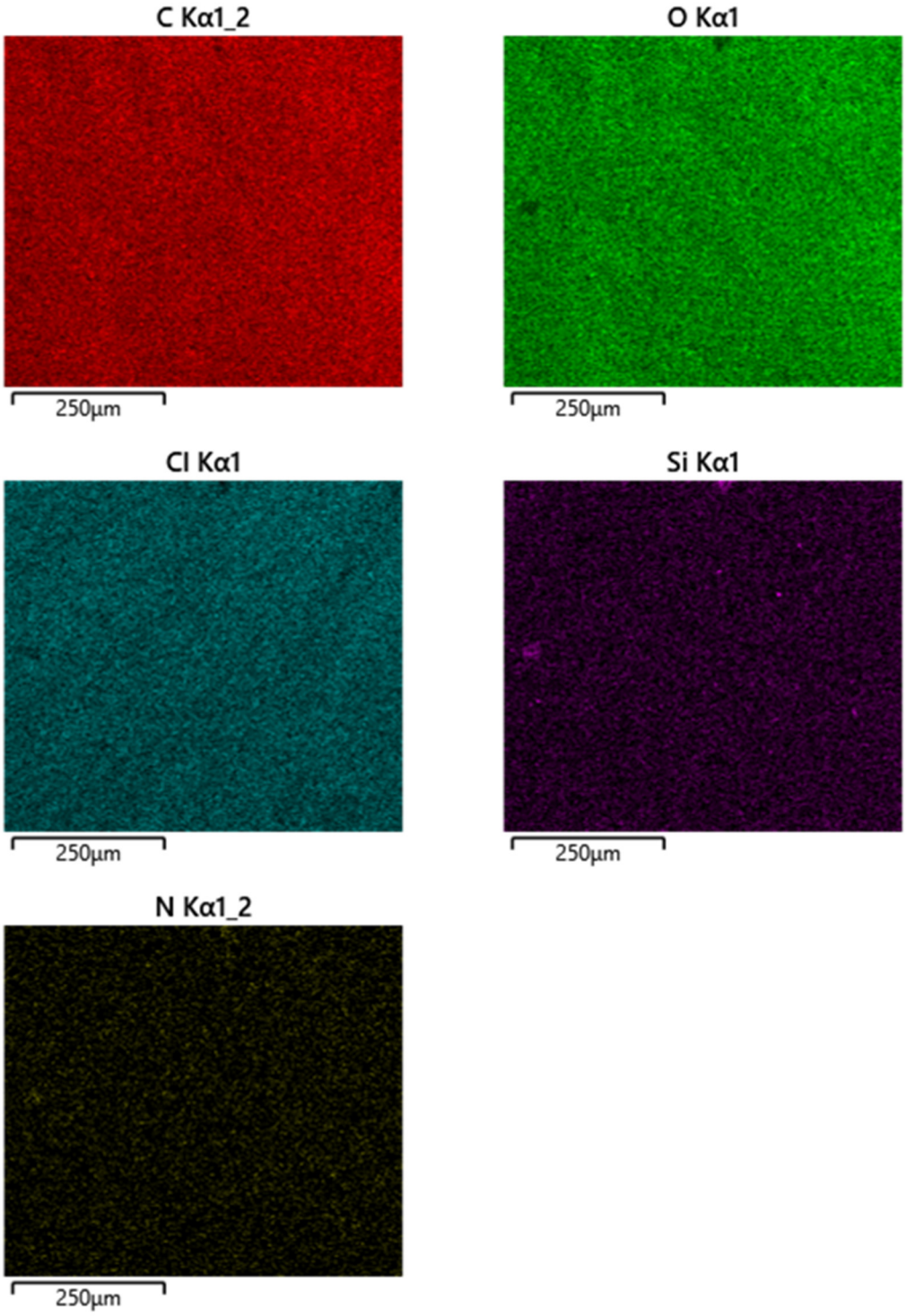

Electron Image 1
250µm
C Kα1_2
250µm
O Kα1
250µm
Cl Kα1
250µm
Si Kα1
250µm

B

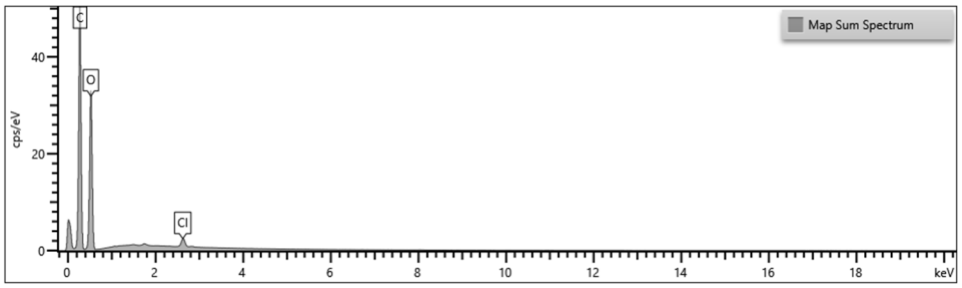


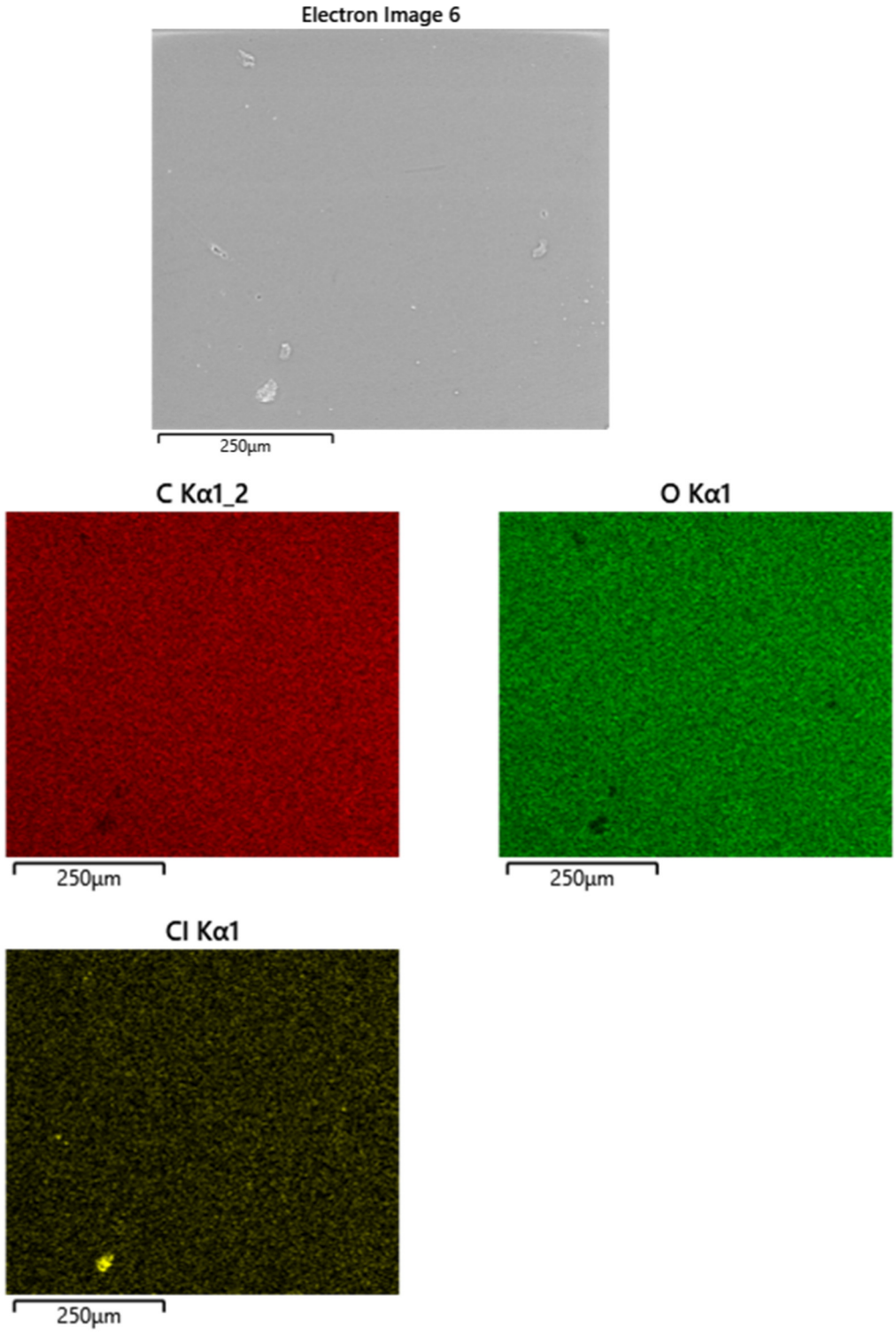
Electron Image 2



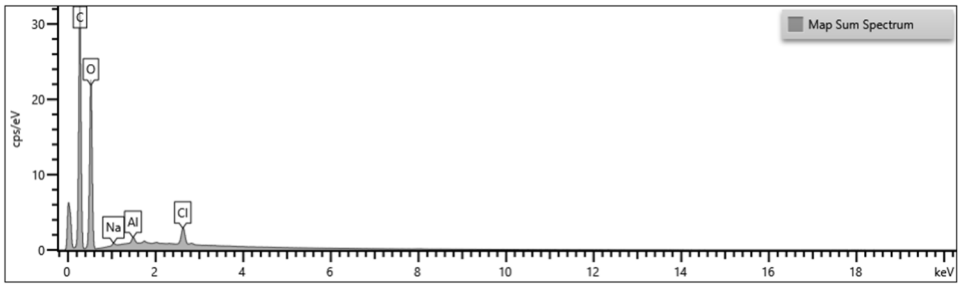

C Kα1_2
250µm
O Kα1
250µm
Cl Kα1
250µm
Si Kα1
250µm
N Kα1_2
250µm

C

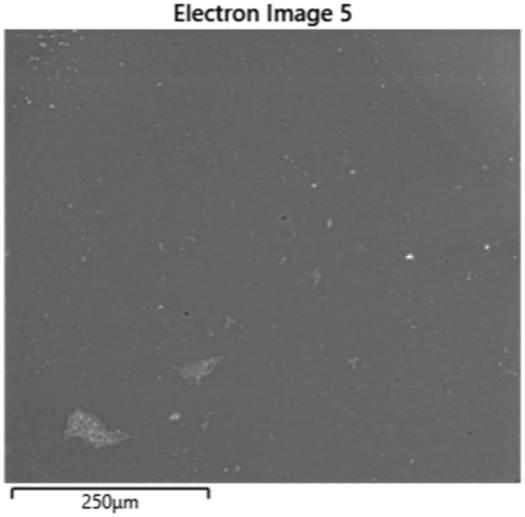

Map Sum Spectrum
C
O
Cl
cps/eV
0
20
40
0
2
4
6
8
10
12
14
16
18
keV


Electron Image 6
250µm
C Kα1_2
250µm
O Kα1
250µm
Cl Kα1
250µm

D


Map Sum Spectrum
C
O
Na
Al
Cl
cps/eV
keV

Electron Image 5



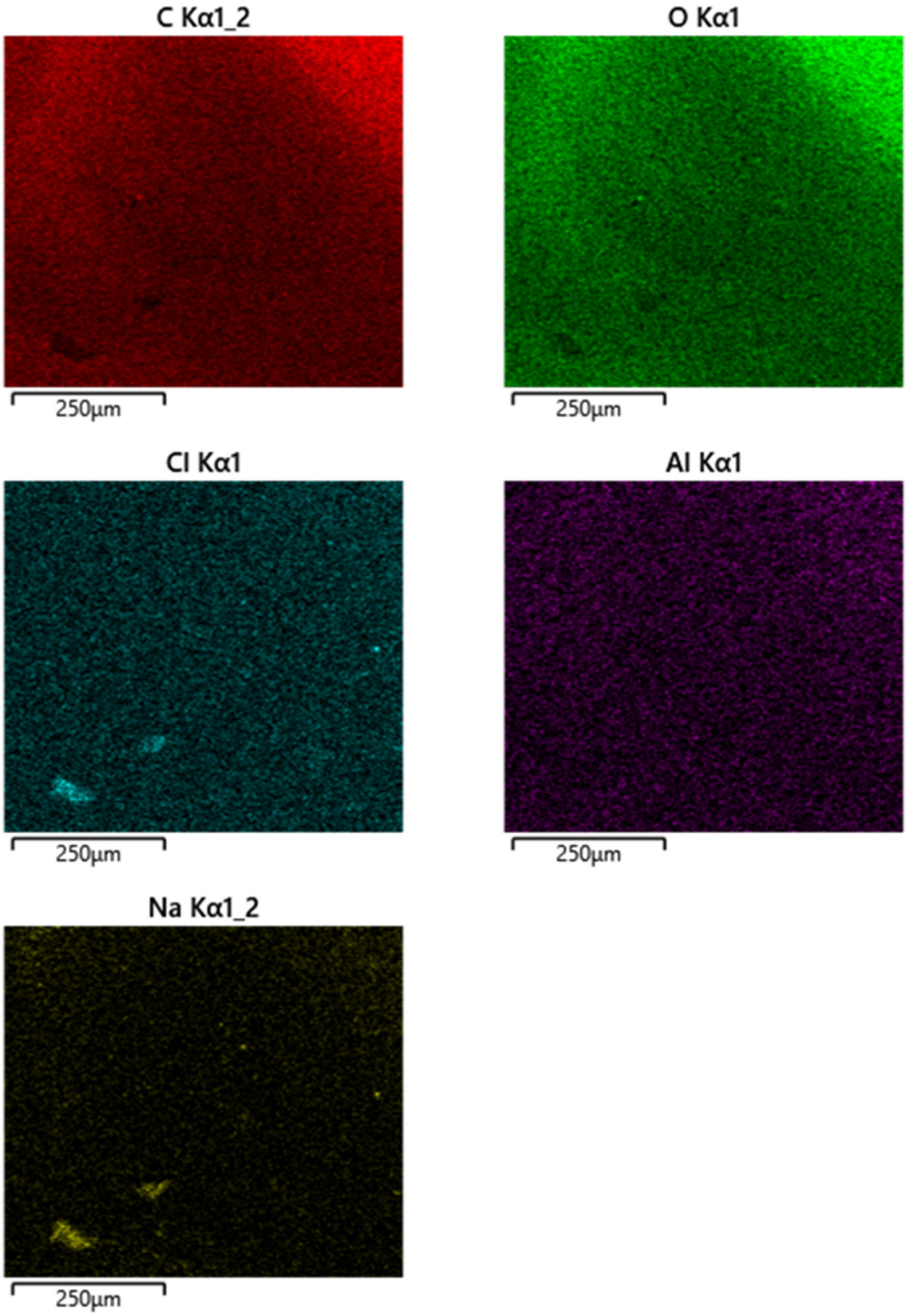


Figure S6: EDS- A) PLGA B) PLGA-RIF C) PLGA Immersed in DMEM D) PLGA-RIF Immersed in DMEM