Supplementary materials

Raman technology for process control: waste shells demineralization to produce transparent polymer foils reinforced with natural antioxidant, and calcium acetate by-product

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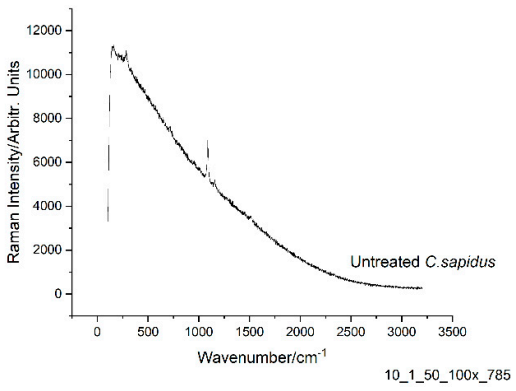
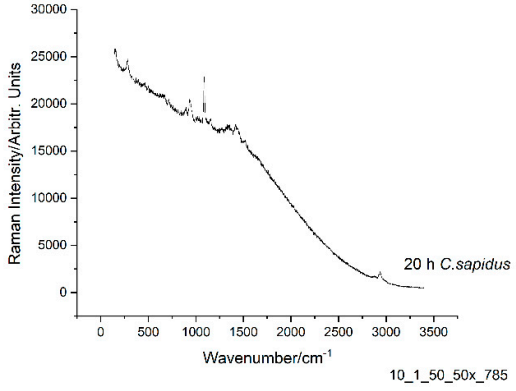
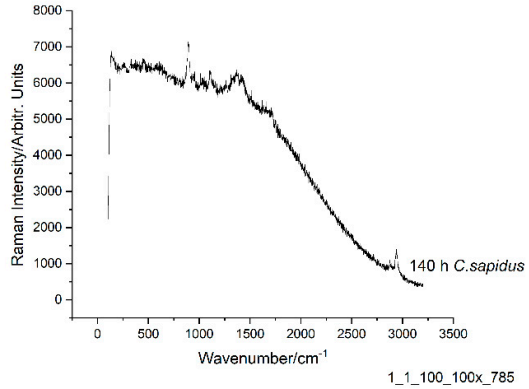
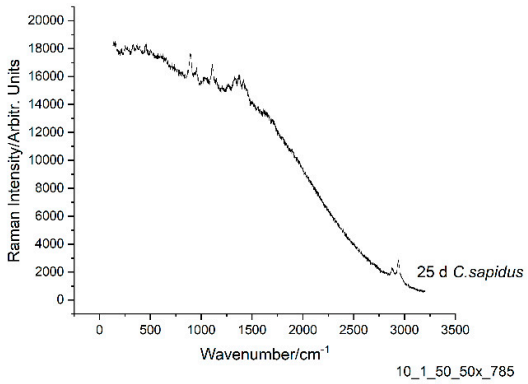





Raman Intensity/Arbitr. Units
Wavenumber/cm-1
140 h C.sapidus
1_1_100_100x_785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Wavenumber/cm-1
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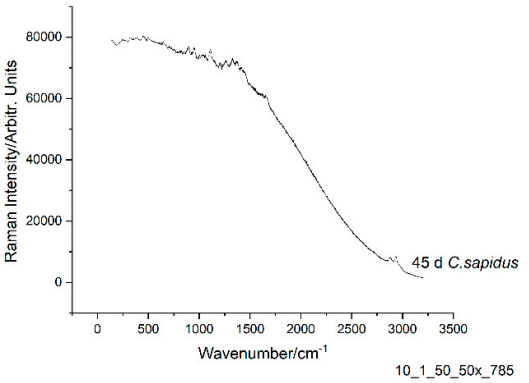
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Wavenumber/cm-1
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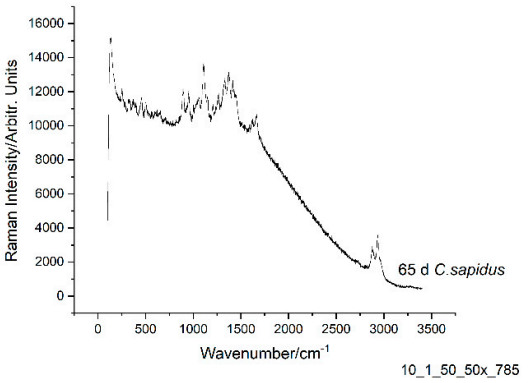
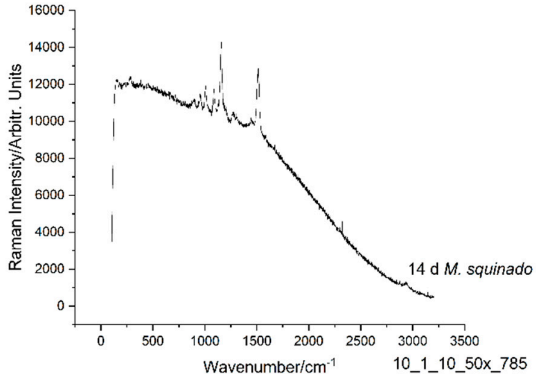
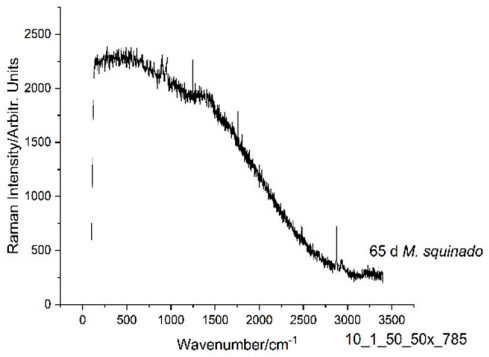
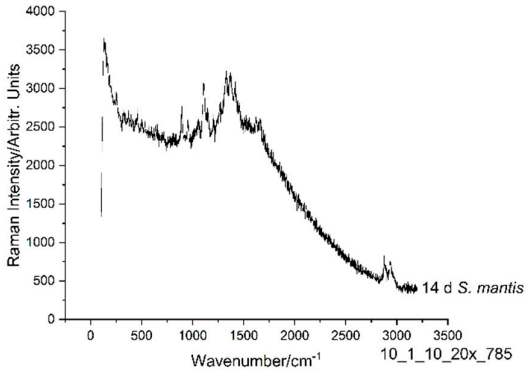
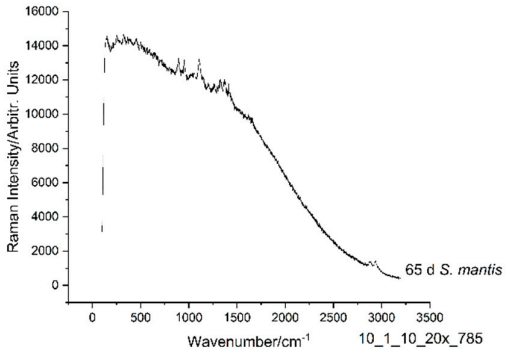
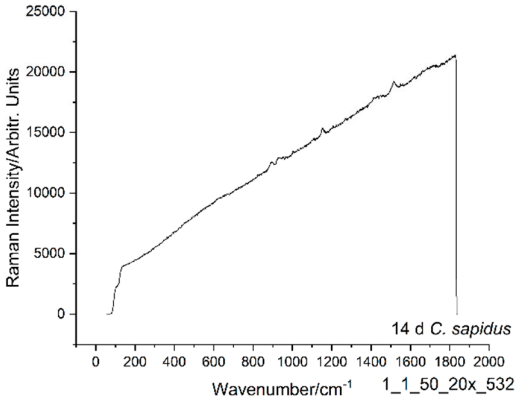

Raman Intensity/Arbitr. Units
Wavenumber/cm-1
65 d C.sapidus
10_1_50_50x_785

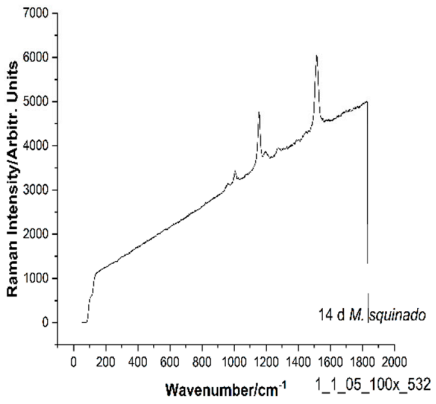

Raman Intensity/Arbitr. Units
Wavenumber/cm-1
14 d M. squinado
10_1_10_50x_785

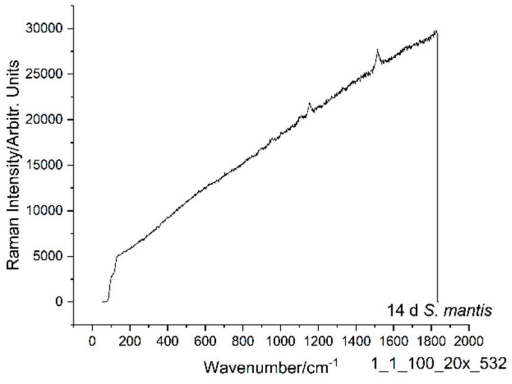

Raman Intensity/Arbitr. Units
Wavenumber/cm-1
65 d M. squinado
10_1_50_50x_785

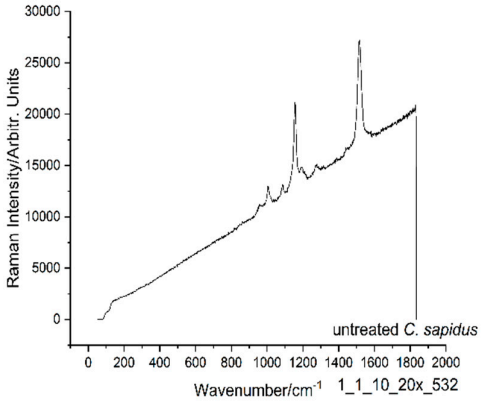

Raman Intensity/Arbitr. Units
Wavenumber/cm-1
14 d S. mantis
10_1_10_20x_785

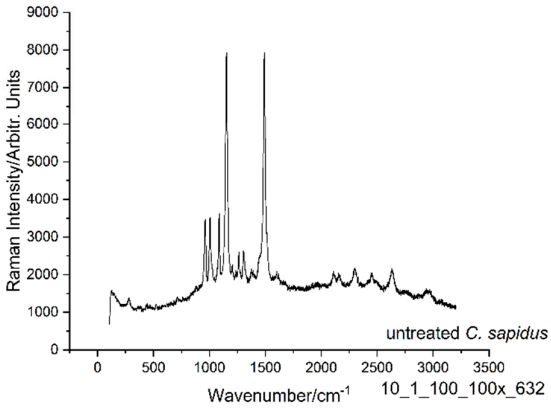

Raman Intensity/Arbitr. Units
Wavenumber/cm-1
65 d S. mantis
10_1_10_20x_785

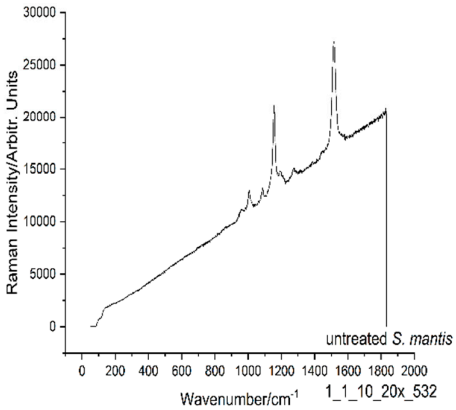

Raman Intensity/Arbitr. Units
Wavenumber/cm-1
14 d C. sapidus
1_1_50_20x_532


Raman Intensity/Arbitr. Units
Wavenumber/cm-1
14 d M. squinado
1_1_05_100x_532


Raman Intensity/Arbitr. Units
Wavenumber/cm-1
14 d S. mantis
1_1_100_20x_532


Raman Intensity/Arbitr. Units
Wavenumber/cm-1
untreated C. sapidus
1_1_10_20x_532


Raman Intensity/Arbitr. Units
Wavenumber/cm-1
untreated C. sapidus
10_1_100_100x_632


Raman Intensity/Arbitr. Units
Wavenumber/cm-1
untreated S. mantis
1_1_10_20x_532

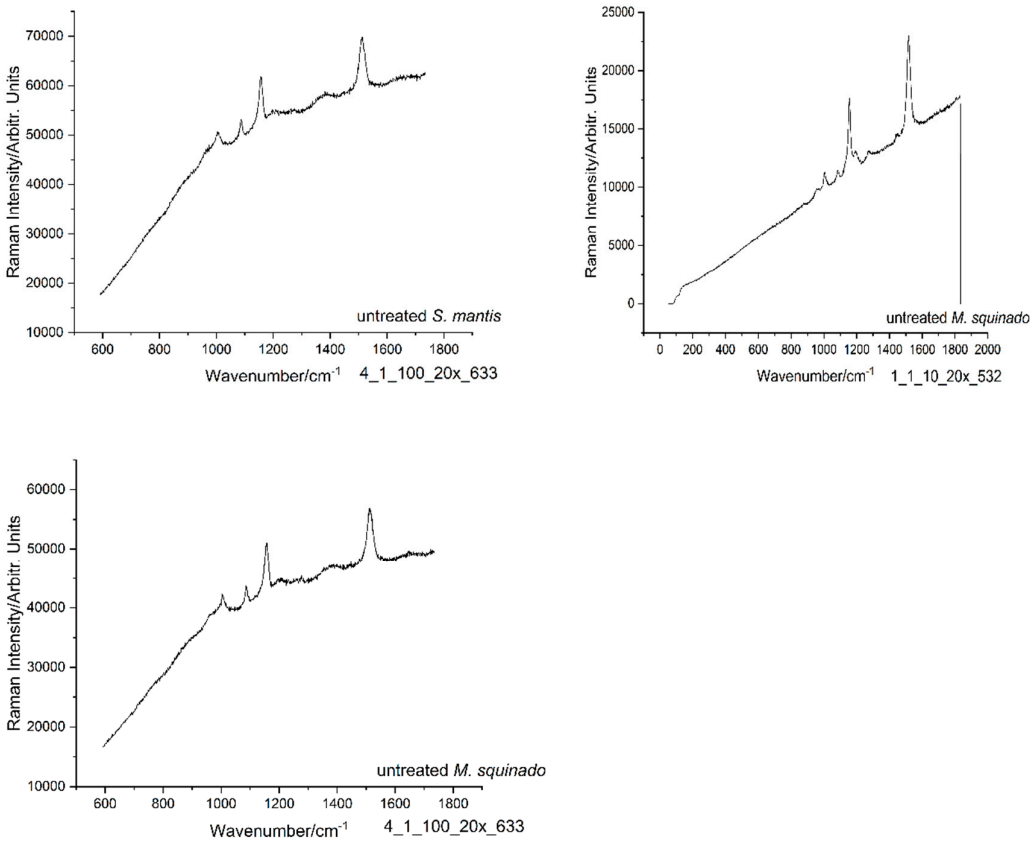


Figure S1. A series of 19 typical raw Raman spectra (without any processing), acquired during process of demineralization from crustacean species (as indicated on each spectrum, with specificied spectral acquisition parameters in this manner: "time_nr-acq_power_XObj_laser", meaning time of exposure, number of acquisitions, laser power %,_objeective magnification,_laser line /nm, respectively.

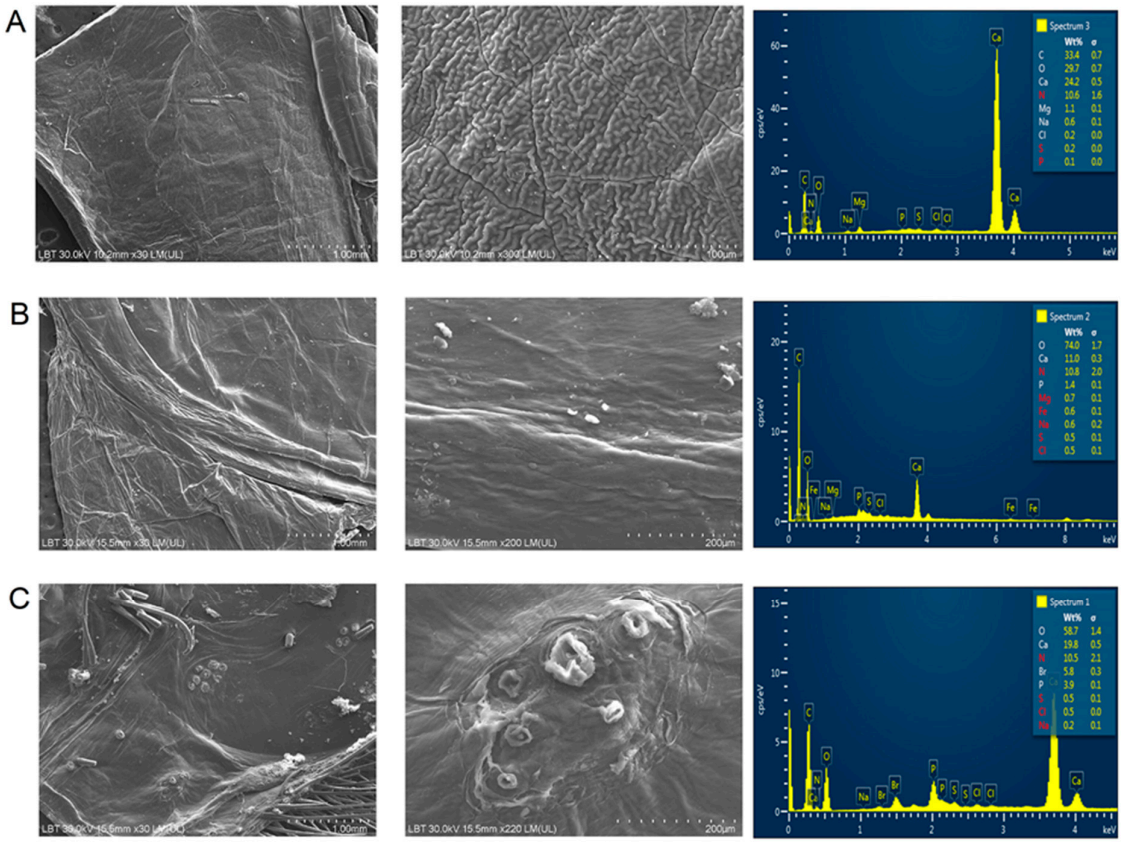


Figure S2. SEM images of the surface morphology of the acetic acid bath treated cuticle of three species with corresponding EDX graphs; *C. sapidus* (A), *S. mantis* (B) and *M. squinado* (C).