

Polymer Materials and Textile Chemistry (POLQUITEX)



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BARCELONATECH

POLQUITEX Research Group

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Web site of scientific production <https://futur.upc.edu/polquitez>

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POLQUITEX research group is a consolidated SGR group constituted by researchers and professors of Chemical Engineering from *Terrassa School of Industrial, Aerospace and Audiovisual Engineering (ESEIAAT)*. The main topics of study include the micro- and macro-characterization of polymer materials and chemical systems related to the textile, chemical, automation and building industries. Currently the three main research areas are:

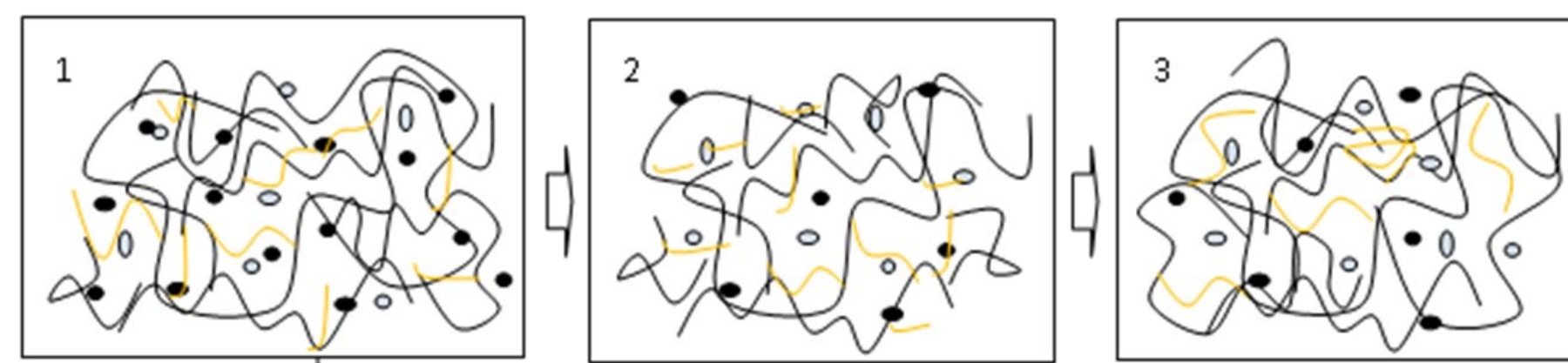
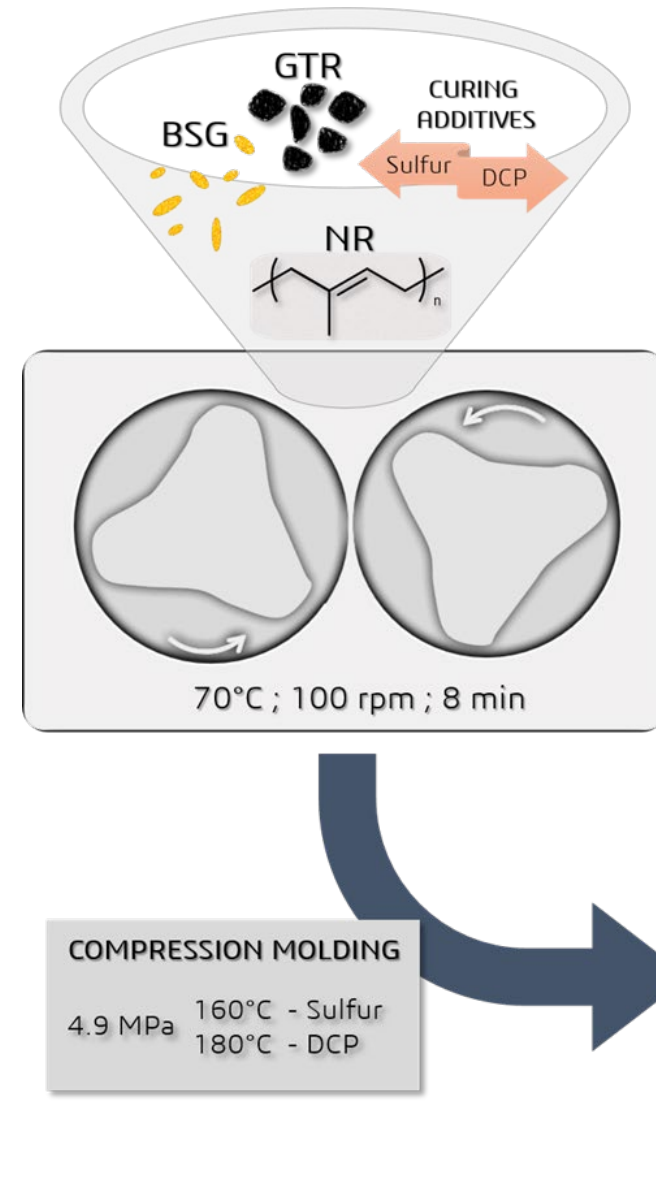
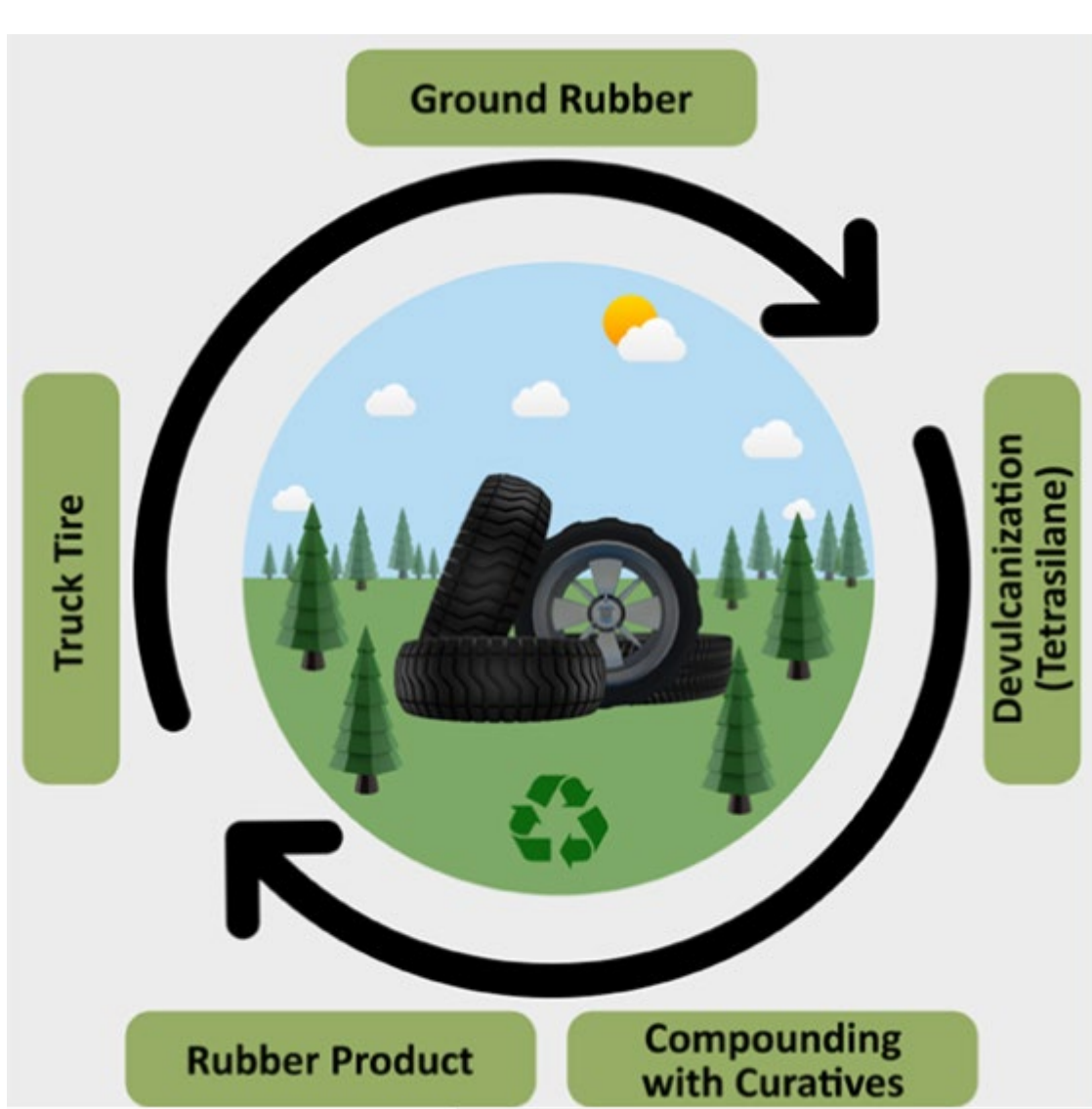
Reusing of industrial elastomeric waste

Valorization of Biogenic Waste

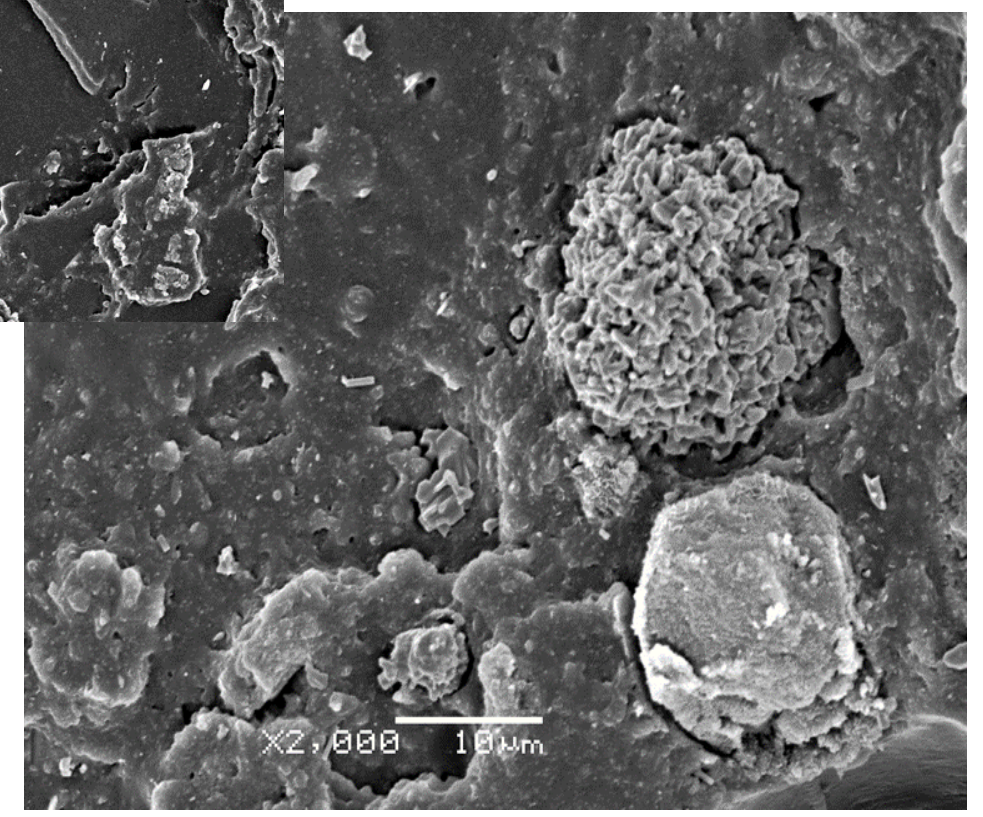
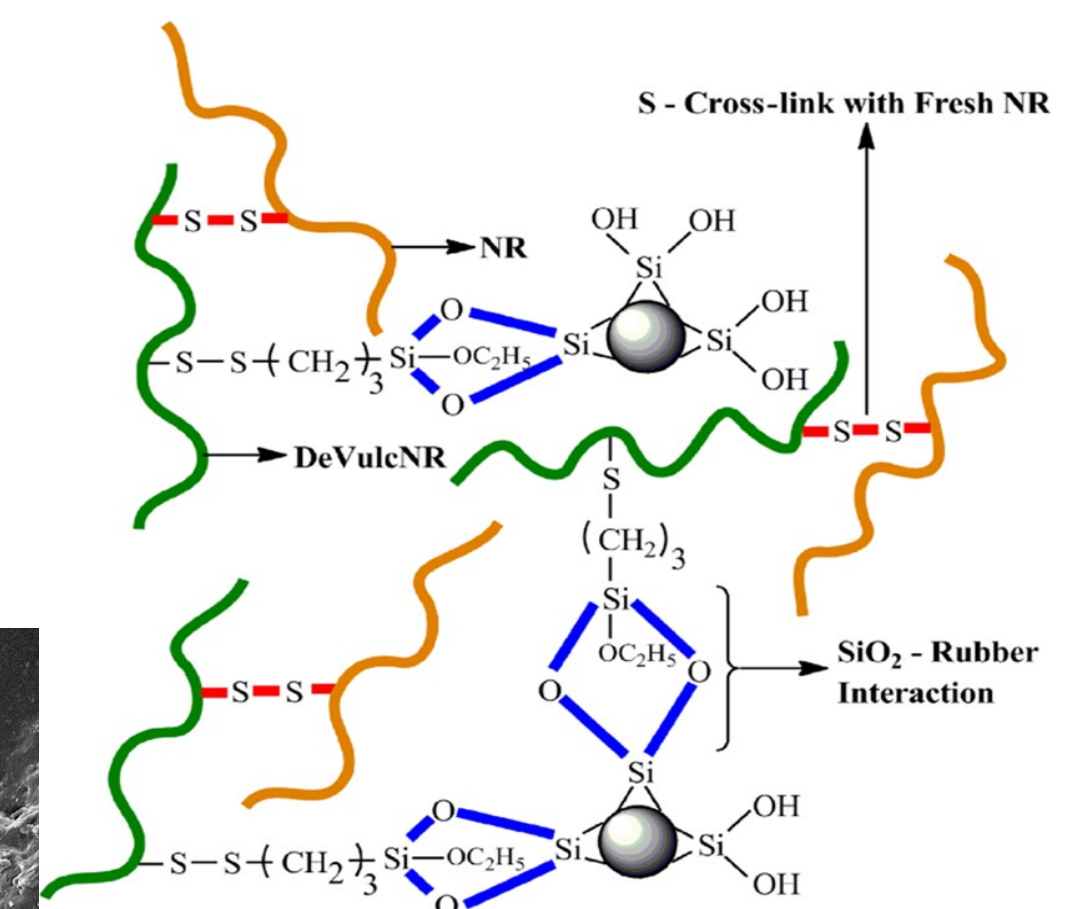
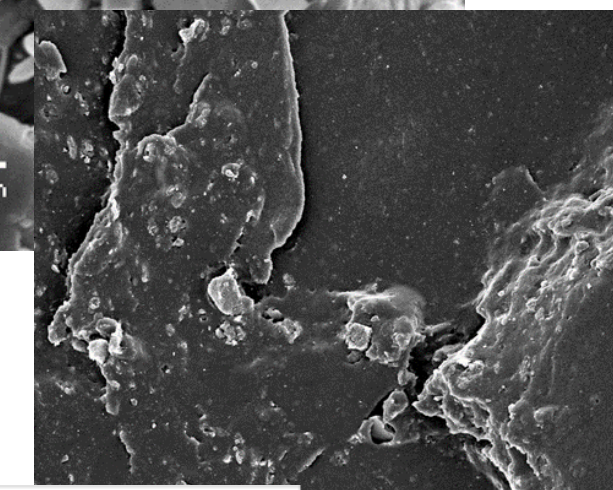
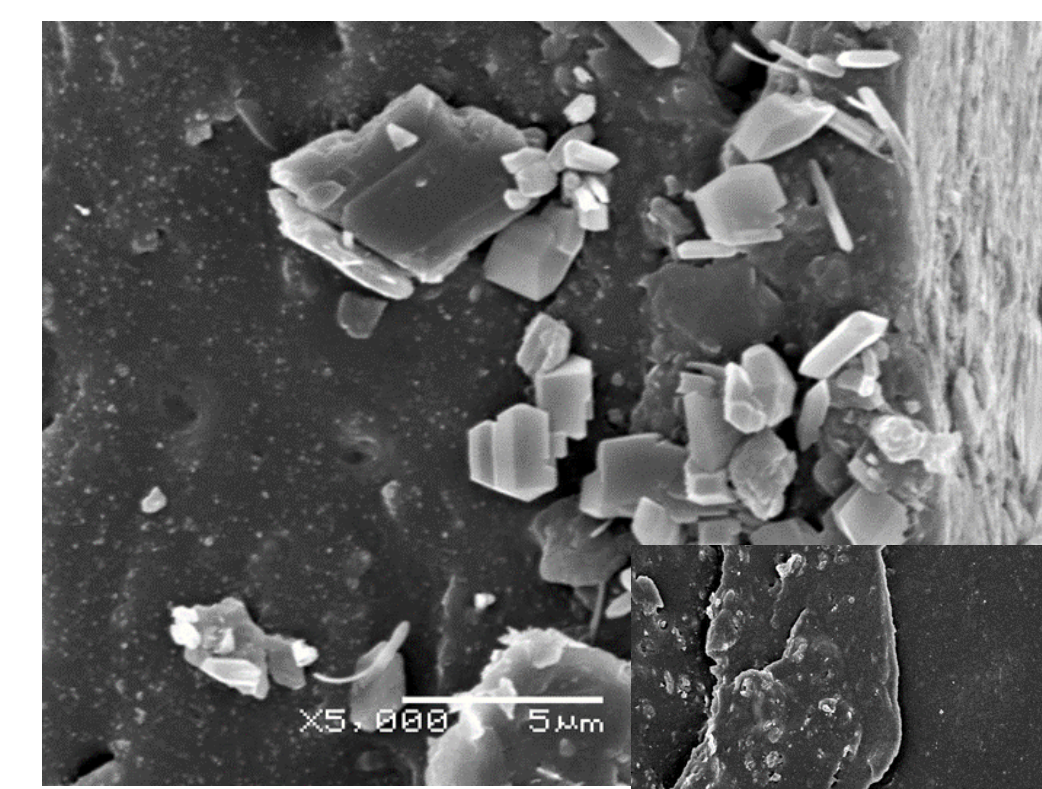
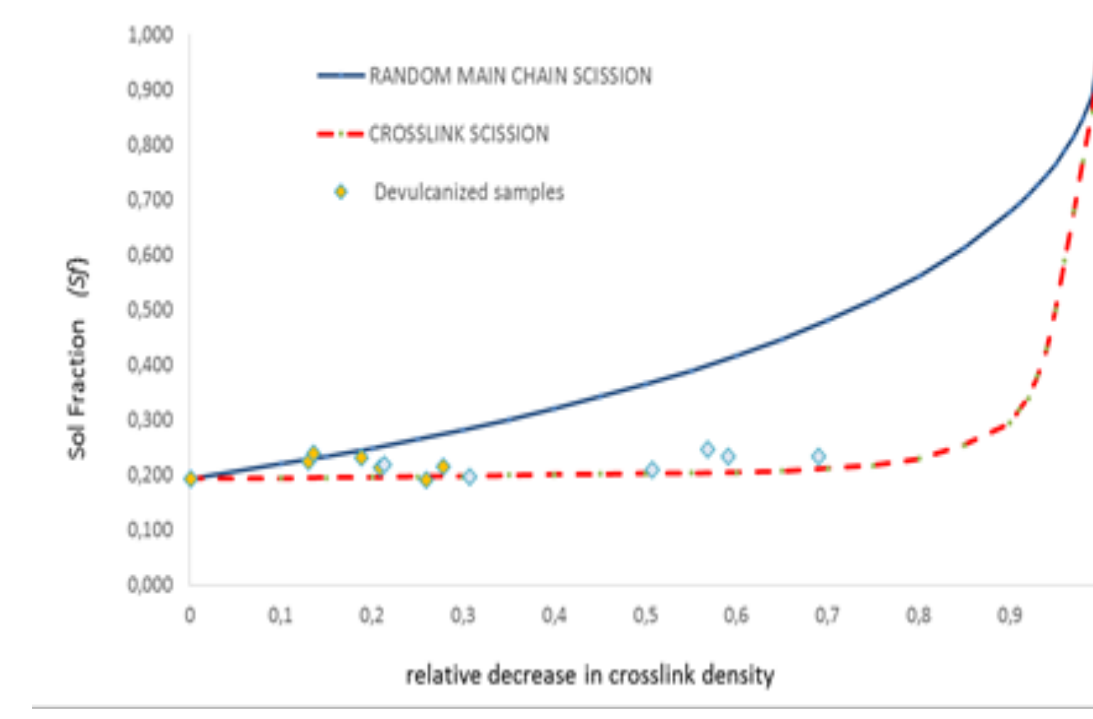
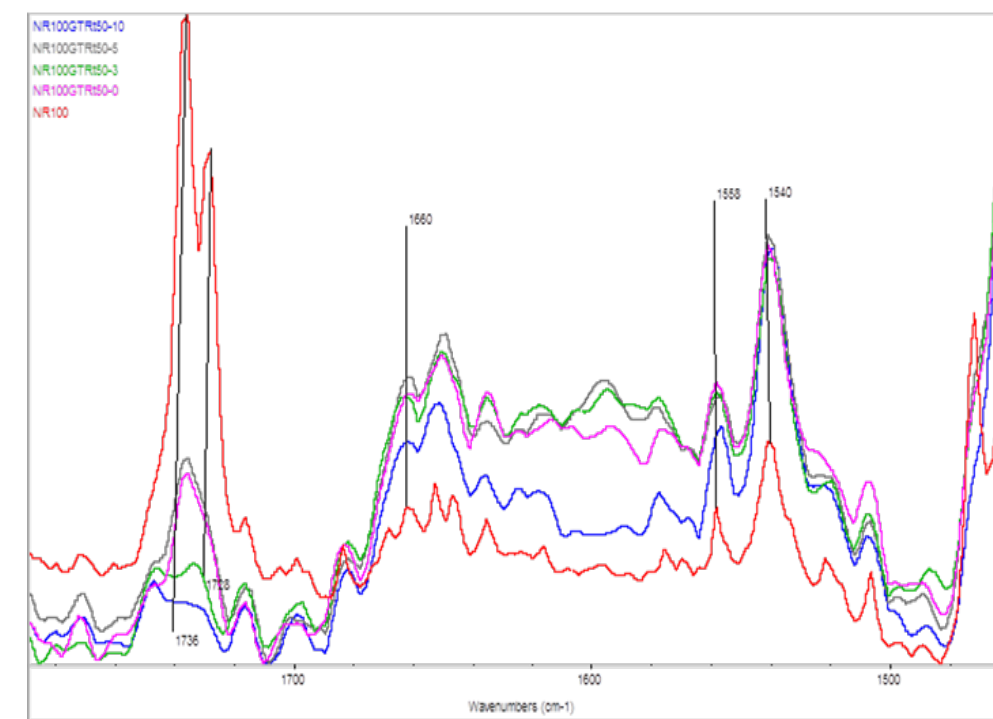
Modification and optimization of processes

Structural and mechanical characterization of Reclaimed waste elastomers for new GREEN Composites

This research area focuses on the reuse and recovery of industrial elastomeric waste (tires, roofs and buildings, gaskets, etc.) and investigates the process to devulcanize wastes to reuse for the same application.



The devulcanization process takes place through a thermomechanical system combined with microwave irradiation. The aim is to optimize the breakage of sulfur bridges and reduce the degree of crosslinking.



The analysis of the progress of the devulcanization process is made by FTIR, Horikx plot, TGA and XRD

Valorization of biogenic wastes

≈ 100,000,000 tons of chicken meat are annually produced worldwide. Since feathers are about 6 wt. % of the animal weight, 8,000,000 tons of feathers are generated yearly!



70-80% meat

5-7% feathers

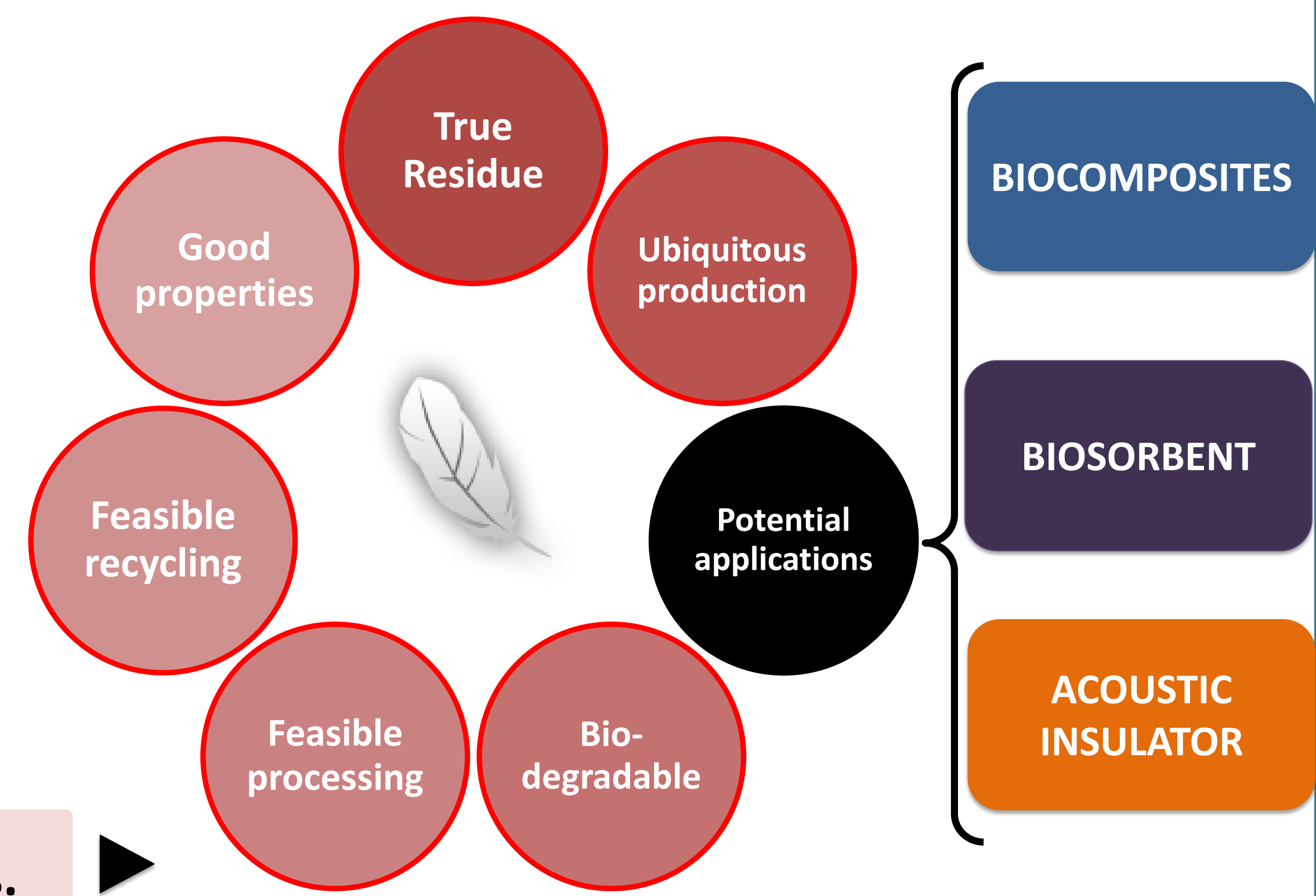
20-25% others

Feathers are:

- Made of 95% keratin (protein)
- Highly stable
- Very light
- Thermally stable up to 200°C

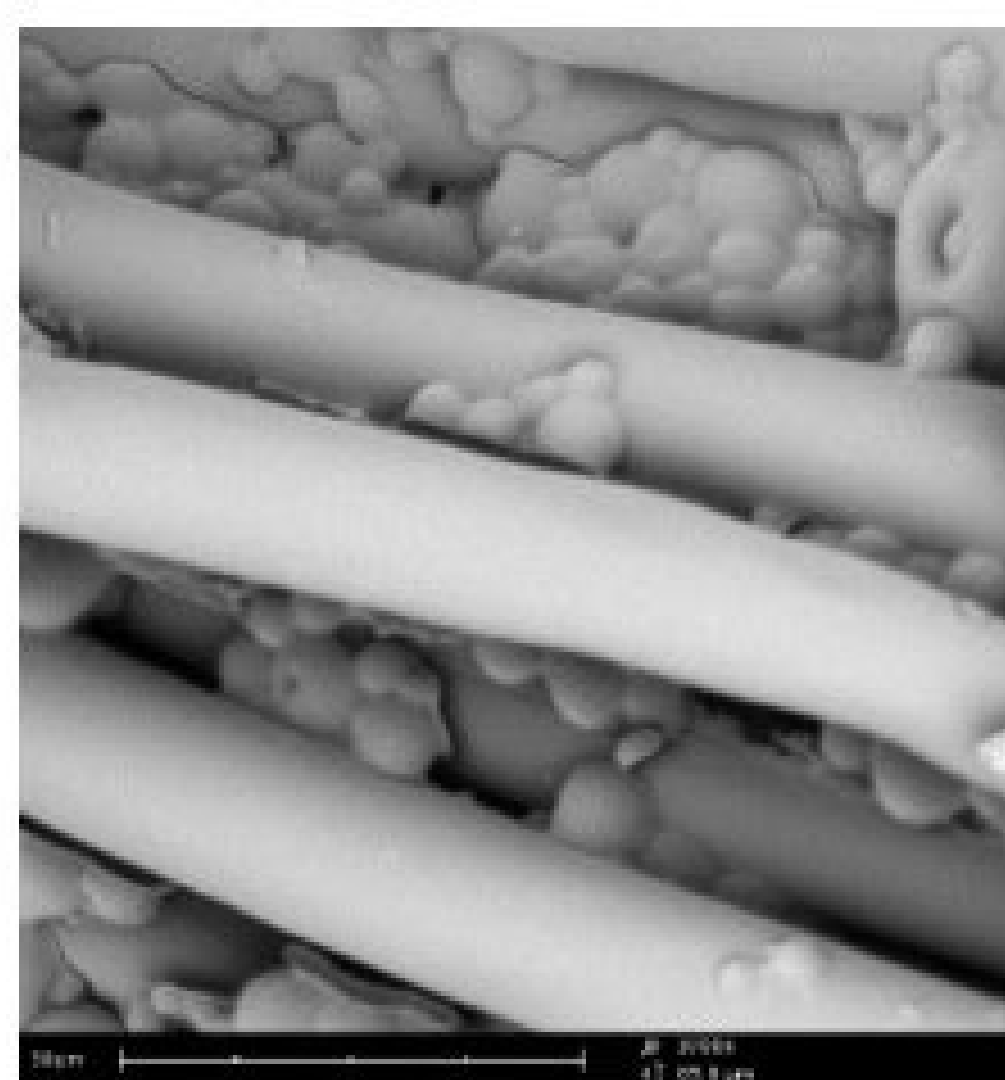
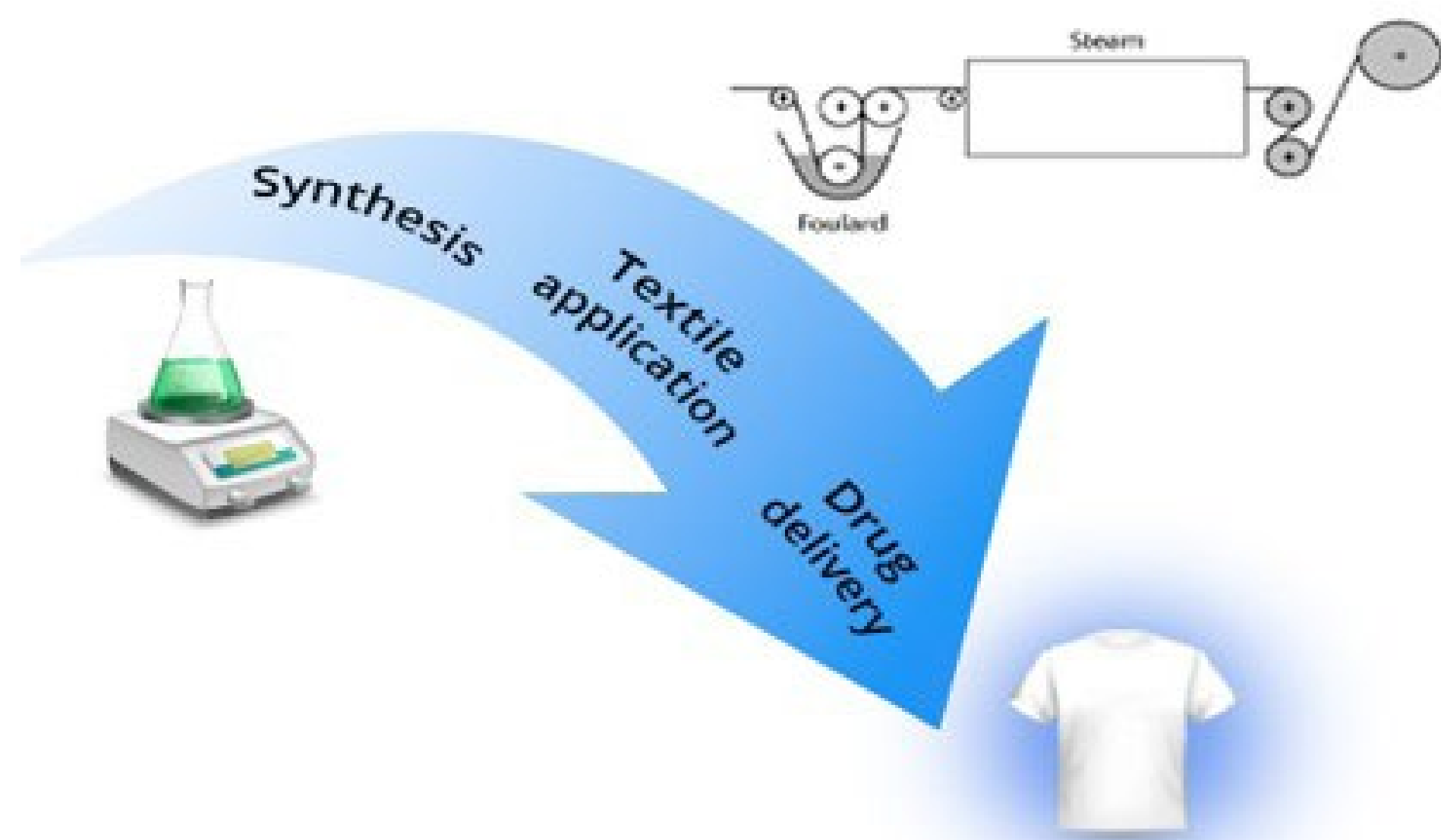
Why not reusing feathers to produce new materials with industrial application and environmental benefits?

Interesting properties for industrial purposes.

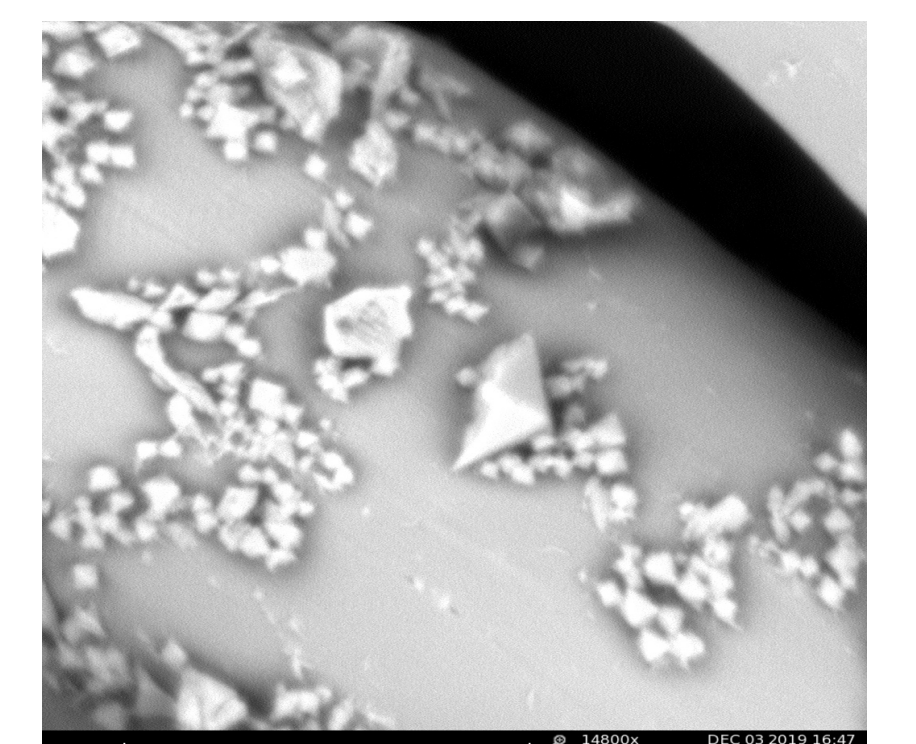
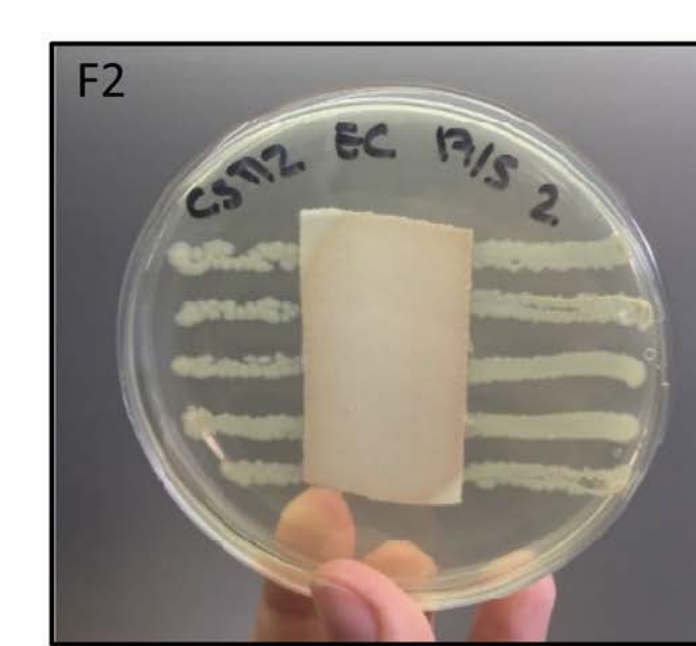
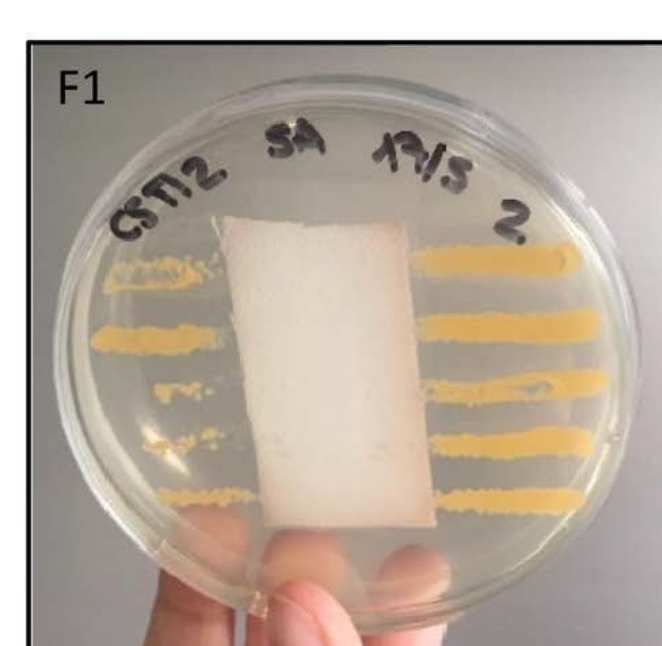
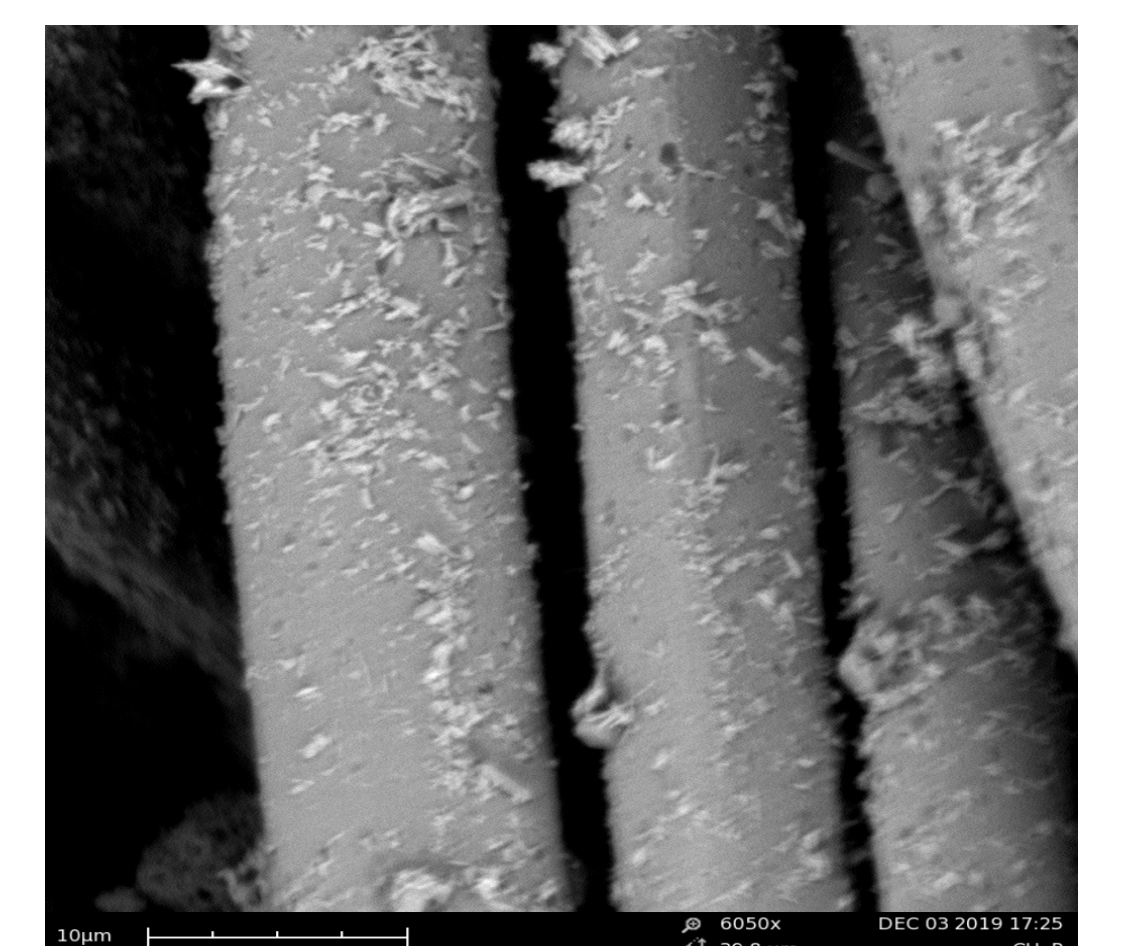


Microencapsulation of active principles and Drug delivery

Design of the mechanisms involved on the retention potential (RP) improvement of biomedical active principles within micro/nao carriers



- Micro and nanocapsules
- MOF's as carriers and antimicrobial agents
- Hybrid microcapsules
- Biobased antimicrobial micro-nano carriers
- Biofunctional polymers



Main Indicators in last 5 years (FUTUR. Portal de la Producció Científica dels Investigadors de la UPC):

- Papers in Indexed Journals: 45
- Technical and Scientific documents: 197
- Doctoral Thesis: 4
- Competitive Projects: 6