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[P005] Poster

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[P03-439] Rapid, green extraction of chitin from *hermetia illucens* and fabrication of functional chitosan-based aerogel for application demonstrations

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Keywords : *Hermetia illucens* chitosan, Chitosan-based hydrogel, Chitosan-based aerogel, Characterizations, Applications

[Purpose] This research proposes the rapid and non-destructive extraction of the chitin based on the *Hermetia illucens* larvae by environmentally friendly methods and its conversion into chitosan by controlling deacetylation. The extracted biopolymer will then be used to prepare functional chitosan-based hydrogel and aerogel using drying method by incorporating functional monomers 2-Acrylamido-2-methylpropane sulfonic acid (AMPH), Acrylic acid, and nanoparticles (Fe₃O₄ or graphene oxide or biochar) by in-situ modification. The resulting aerogel will be characterized by FTIR, Raman spectroscopy, XRD, SEM, TGA/DSC, EDX, and BET.

[Method] Chitin will be extracted using a green, non-destructive approach employing mild and eco-friendly processing conditions to reduce chemical usage and environmental impact while preserving its molecular structure. The obtained chitin will be suitable for sustainable conversion into functional chitosan-based materials.

[Results] This will be an integrated approach to develop multifunctional different kinds of hydrogel and aerogel platforms that have enhanced adsorption, biomedical, biosensors, and magnetic properties. This work addresses an urgent need for the valorization of the chitinous material we produce as insects for the development of high-performance materials and helps to achieve the circular bioeconomy by using BSF as a sustainable and high-performance source of biopolymers.

[Consideration] This study emphasizes green, rapid, and non-destructive chitin extraction from *Hermetia illucens* with controlled conversion to chitosan for functional hydrogel and aerogel fabrication. The proposed approach is expected to produce multifunctional materials with enhanced adsorption, biomedical, biosensing, and magnetic properties.

[Conclusion] This work aims to valorize insect-derived chitin as a sustainable biopolymer source, supporting circular bioeconomy and environmentally friendly material development.