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Abstract Formulary

Presentation type: **Oral** ✔ **Poster** ✔

Title: Polyphenolic loaded gelatine-based aerogel: Processing-structure-property relationship

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ABSTRACT (Space limited to 2200 characters)

The development of biopolymer aerogels brings together two strands of modern materials development. Plant and animal derived polymers (biopolymers) are biodegradable and sustainable alternatives to petroleum-derived polymers. The unique qualities of aerogels, such as their high porosity and low density, attract great interest in applications as diverse as aerospace and medicine.
There have been investigations into the ability of various biopolymers to form aerogels, including polysaccharides (cellulose, starch, alginate, chitin, pectin, etc.) and proteins from milk, eggs, and silk. The aerogels are highly adsorbent, nano-structured materials, making them a potential matrices for controlled release of materials. As a result, biopolymer aerogels have tremendous potential as biocompatible matrices for the controlled release of pharmaceuticals, antivirals, antibacterial, antifungals, skin moisturisers and UV absorbers.
The present study examines the preparation of gelatine-based protein aerogels, their impregnation with a bioactive polyphenolic extract using various green chemistry techniques, and the controlled release of this bioactive extract. Bio-aerogels have been characterised using scanning electron microscopy, N2 adsorption-desorption analysis, FTIR spectroscopy, as well as in-vitro release profiles. The results showed that novel bio-aerogels could be synthesised with tunable pore sizes resulting in high surface areas. The bioactive was observed to have a sustained release that was consistent with the Kors-Peppas model despite having an initial burst release of 10-20%. These results and the underlying science extend our knowledge, not only in terms of aerogels but also of proteins, which may be used to develop sustainable materials that can be used to help us achieve a more sustainable future.