

# In Situ Synchrotron FTIR Microspectroscopy in Hydration Studies

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Presented work was focused on odd-even effects in polysaccharide polyelectrolyte multilayers, that may influence their hydration content and the chemical environment of the water within them. Experiments were performed using polysaccharide polyelectrolyte multilayers (PEMs) composed of pharmaceutical grade fucoidan and chitosan. PEMs were studied under confinement using synchrotron FTIR microspectroscopy at increasing pressure, in order to isolate and measure infrared spectra of water within the PEM, without interference from bulk water. Complementary studies of the PEMs were carried out using lab-based in situ attenuated total reflectance Fourier transform spectroscopy (ATR FTIR) and quartz crystal microbalance with dissipation monitoring (QCM-D), as well as zeta potential measurements, to determine the quantity of adsorbed polymer, hydration content, film thickness, viscoelastic properties and surface charge during layer-by-layer deposition. Results revealed that the hydration of the PEM followed a saw-tooth profile, known as the odd-even effect, where the film increased hydration with fucoidan adsorption and dehydrated/densified with chitosan adsorption. The water structure within the film showed a lower degree of hydrogen bonding than water in the bulk electrolyte. However, the water structure/environment was independent of the terminating layer of the PEM, in spite of the alteration in percentage hydration water, indicating only a partial proof of the initial hypothesis for this multilayer system (hydration amount changes, hydration water environment does not).

## Speakers Gender

Male

## Travel Funding

Yes

## Level of Expertise

Student

## Do you wish to take part in the poster slam

No

**Primary author(s)** : Ms BENBOW, Natalie (University of South Australia)

**Co-author(s)** : Mr PAWLISZAK, Piotr (University of South Australia); Mr WEBBER, Jessie (University of South Australia); Dr SEBBEN, Damien (University of South Australia); Dr KRASOWSKA, Marta (University of South Australia); Prof. BEATTIE, David (University of South Australia); Mr KARPINIEC, Sam (Marinova Pty Ltd); Mr STRINGER, Damien (Marinova Pty Ltd); Dr TOBIN, Mark (Infrared Microspectroscopy Beamline, ANSTO Australian Synchrotron); Dr VONGSVIVUT, Jitraporn (Infrared Microspectroscopy Beamline, ANSTO Australian Synchrotron)

**Presenter(s)** : Mr PAWLISZAK, Piotr (University of South Australia)

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