* Please note if you do not find a set of abstracts for a Concurrent Session, this is because we did not receive a set of abstracts for that session.
Use of Microbial Cells as a Novel Approach for Food Emulsion Formation and Stabilization

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Food emulsion stabilization is primarily achieved using small-molecule surfactants (e.g., polysorbates, phospholipids), proteins (e.g., milk or soy) and/or thickening agents (gums, gelatin) to lower interfacial tension or increase emulsion viscosity. Colloidal particles represent a lesser-known class of emulsion stabilizers. In so-called Pickering emulsions, interfacially-adsorbed micron-scale particles act as a steric barrier that retards and ideally prevents emulsion coalescence and phase separation by hindering the direct contact between neighbouring dispersed droplets. Growing evidence has shown that many Pickering species can perform 'double-duty' by aiding in both emulsion formation and stability. In regards to their potential use in processed foods, robust and readily-available food-grade micron-sized colloidal particles are either scarce, difficult to produce or restricted by legislative regulations. To circumvent these limitations, in this study we employed thermally-inactivated microbial cells, either yeast (Saccharomyces cerevisiae) or bacteria (Lactobacillus acidophilus or Streptococcus thermophilus), to generate and stabilize model oil-in-water emulsions containing up to 80 wt% dispersed oil.

Emulsions containing 4-8 wt% added microbial cells were highly stable and did not demonstrate visible phase separation upwards of one month. Microstructurally, in the emulsions at high oil weight fractions, the droplets were in a hexagonal-like close-packed arrangement and were fully covered by cells. From a textural perspective, these emulsions were self-supporting and exhibited a mayonnaise-like consistency. Mechanistically, the microbial cells acted as Pickering-type stabilizers by preferentially residing at the oil/water interface. Using confocal microscopy to directly visualize the interfacially-bound cells, three-phase contact angles of 30-50° were measured, demonstrating their propensity to stabilize oil-in-water emulsions. This study has demonstrated that microbial cells have the ability to generate and stabilize oil-in-water emulsions at low and high dispersed oil volume fractions. The ability of these emulsions to be self-supporting implies their possible use as solid fat replacers, e.g., in margarines. The use of such microbial cells is sure to provide another arrow in the growing food structuring quiver of food scientists and processors.

Effect of Structure and Concentration of Gelator on Organogels Properties: A Rheological and Small-Angle X-ray Spectroscopy Study (YOUNG SCIENTIST AWARD WINNER)

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Organogels are solid-like systems structured in an organic solvent due to molecular interactions of the gelator; their structure network will depend on the concentration and structure of the gelator. Aiming at evaluating the influence of gelator structure and concentration in organogels' properties, rheological analyses, polarized microscopy and Small-Angle X-ray spectroscopy (SAXS)
were performed. Four different gelators (glyceryl tristearate--GT; sorbitan tristearate--ST; sorbitan monostearate--SM; glyceryl monostearate--GM) were tested in medium-chain-triglycerides (MCT) oil phase. Organogels were prepared by mixing the oil phase and gelator at different concentrations (5, 10, 15, 20 and 25% (w/w)) at 80 °C during 30 min. Flow curves were obtained using shear rate values ranging from 0 to 300 s⁻¹ and frequency sweeps were done from 0.01 to 10 Hz with 1% deformation. Micrographs were obtained under a polarized light microscope equipped with a digital camera, being samples pre-prepared directly in the support. Small angle X-ray scattering (SAXS) measurements were performed using a synchrotron beamline. All organogels presented birefringence confirming the formation of a crystalline structure that changes with the increase of gelator concentration. Organogels produced with GT, ST and GM as gelators presented a pattern characteristic of a lamellar structure, while organogels using SM as gelator showed a rod-like structure. Microscopic observations were confirmed by SAXS analyses through log-log SAXS curves at low angles, where the three-dimensional structure of the organogels was confirmed (i.e. rods for SM organogels and flat disks to GT, ST and GM). Through the evaluation of SAXS peaks following Braggs Law it has been shown that all structures were organized as lamellas but with different d-spacings. These particularities at micro- and nanoscale level lead to differences in rheological properties of organogels. As example for ST and SM organogels all the rheological analyses show a gel-like behaviour (i.e. G' > G''), however for GT and GM organogels this behaviour is not always observed. Organogels produced with GM gelator showed the strongest structure, with high values of G' and G'' (around 60 MPa for 25% of gelator). Results also showed that the hydrophobic chain (stearic acid) and hydrophilic head of gelators influence the three-dimensional network of the organogels, indicating the possibility of tailoring the functionality of organogels.

Strategies for Improving the Flavour of Low-fat and Recombined Milk Cheese: A Colloid Structural Approach
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The fat phase in cheese is important for the development of cheese flavour as can clearly be shown by the poor flavour of low-fat cheese. Fat globules may harbour lipophilic flavour precursors as well as provide a fat-water interface for enzymes such as lipases to function. The milk fat globule membrane (MFGM) contains more than 37 enzymes, some of which are capable of generating flavour reactions in cheese. The MFGM may also contain flavour precursors, as well as providing an environment for the growth of lactic acid bacteria in fermented dairy products. Despite the important functional role of the fat phase, consumers are demanding fat-reduced products. Common dairy processes such as heating, cooling, churning, recombination, homogenisation and washing, as well as the more novel application of pulsed electric field processing will alter the arrangement of MFGM surface components thus potentially exposing MFGM integral enzymes to the aqueous phase surrounding fat globules and increasing enzymatic activities. This has the potential to improve the flavour of cheese made from low-fat and/or recombined milk. This review will critically assess the impact of common dairy processes on flavour development in cheese made from low-fat and recombined milk. Processes such as heating, cooling, agitation, and recombination alter the structural arrangement of MFGM components on the colloidal fat surface. Enzymatic activities, such as xanthine oxidase and glutamyl transferase increase, thus changing the flavour profile in cheese. Structural changes on the