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Impact of food formulation and processing on saltiness perception

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One of the salt reduction strategies in liquid food products can potentially be a programmable salt delivery using water-in-oil-in-water (wow) emulsions stabilised by chemical modified octenyl succinic anhydride (OSA)-starch (Chiu et al. 2015). The objective of the current study was to investigate the effect of formulation and processing conditions of wow emulsions stabilised by non-chemical modified starch on the droplet size stability and salt release using an in vitro oral cavity model.

The emulsions were produced with high and low (0.27 and 0.57%) contents of internal lipophilic emulsifier polyglycerol polyricinoleate (PGPR 90Kosher, Dupont, DK) and 2, 3 or 4% of external hydrophilic emulsifier, either OSA-starch (Univar, UK) or native waxy rice starch (Ulrick & Short, UK). The formulations were processed in a high shear overhead mixer (Silverson, UK) operating at 8000rpm, leading to a production of emulsions at low (75±3°C) and high (88±5°C) temperature.

The results showed that all emulsions were stable against coalescence for at least three months. The droplet size was smaller in OSA-starch emulsions compared to waxy rice starch based emulsions. The salt encapsulation of all emulsions remained stable for at least 3 months with the exception of OSA-starch emulsions and Low Temp Low PGPR waxy rice emulsions. Reducing PGPR content led to an increase of salt detection in emulsions processed at low and high temperature. High temperature processing increased the salt detection at high PGPR emulsions stabilised by 3 and 4% waxy rice and, at low PGPR emulsions stabilised by 2, 3, 4% waxy rice starch, resulting up to 90% salt detection.

The chemical modified starch can be replaced by native waxy rice starch for the controlled release of salt. The salt release varies depending on formulation and processing condition of emulsions. The future work will focus on the salt reduction in wow emulsion based foods.