**Evaluation of Hydrocolloids for their Application in the Formulation of Carotenoids**

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In addition to their remarkable health benefits1, carotenoids are used to colour foodstuffs, e.g., cheese, dairy products, and beverages, e.g., soft drinks, juices, instant drinks. The global market for these applications is estimated with 240m € [Mintel]. Since carotenoids are crystalline, in water insoluble compounds, they must be transformed into water dispersible product forms to enable application in an aqueous environment and guarantee stable performance. For this purpose, hydrocolloids have a key role in stabilizing interfaces of carotenoid product forms. Controlling the particle size of emulsions and dispersions containing carotenoids is the key to stir colouration and in parallel ensure bioavailability. Emulsions are per definition thermodynamically unstable systems and need to be stabilized by a surfactant. Using a small molecular surfactant e.g. sodium lauryl sulphate, polysorbate 80, etc. is one solution but comes with disadvantages as for example being perceived as unnatural. Another and clearly preferred solution is to use naturally derived hydrocolloids to form and stabilize emulsions and dispersions. Several varieties of octenyl succinic anhydride modified food starches (E 1450) can be found on the market, each of them tailormade for specific application areas. The method used to transform the starch leads to products with different functionalities and with that also varying performance in emulsion forming and stability2.

Especially for formulation of carotenoids for colouration, not only emulsion quality and stability are of importance but also the performance in the targeted application. Whereas soft drinks come with the challenge of a low pH, application such as cheese come with the challenge that the colourant should become incorporated in the cheese matrix and not the whey during cheese making process. Thus, for formulations of carotenoids for soft drinks octenyl succinic anhydride modified food starch are a good choice as emulsifier, for cheese application it is not. Here, caseinates were found to be a suitable emulsifier and stabilizer for this application to incorporate the carotenoid in the cheese matrix and not lose it in the whey3.

Overall, hydrocolloids are great emulsifiers to form and stabilize emulsions and dispersions with carotenoids and certainly further fat-soluble compounds, such as vitamins. However, the hydrocolloids must be chosen with care to meet the targeted emulsions quality, stability, and application performance.

Our presentation will highlight the selection criteria for choosing the right hydrocolloid for specific applications and their mode of operation in stabilizing β-carotene as colorant. We will illustrate the implementation of two hydrocolloids, OSA modified food starch and sodium caseinate and their function in colouring beverages and cheese, respectively.

This abstract is the submission for an oral presentation.

*References:*

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