14th Food Engineering Conference

November 28-29, 2016 Melbourne, Australia

Rheological properties and stability of beta-carotene incorporated oil-in-water emulsions stabilized with different type of emulsifiers

Nor Hayati Ibrahim Universiti Malaysia Terengganu, Malaysia

Beta-carotene is currently incorporated in nutraceuticals including functional food emulsion to enhance their nutritional value But this ingredient is chemically unstable. Emulsifiers are believed to have antioxidant properties which may help to protect beta-carotene from degradation. This study investigated on the main and interaction effects of beta-carotene (5, 10 and 15%) and emulsifiers (sodium caseinate, whey protein concentrate and isolated soy protein) on rheological properties and stability of oil-inwater emulsions. There were significant interaction effects between both factors on rheological and stability parameters. All emulsions were pseudoplastic fluids (flow index=0.72-0.97) with 5% beta-carotene incorporated emulsions stabilized whey protein concentrate (WPC) showed significant (p<0.05) highest viscosity, yield stress and storage modulus. It was the only emulsion identified as elastic gel where exhibited storage modulus higher than loss modulus (G'>G'') and thus the most stable towards creaming. Significant (p<0.05) highest beta-carotene content was also observed in the emulsion. However, with 10 and 15% beta-carotene in the emulsions, the WPC was found to be less effective in protecting beta-carotene from degradation upon storage as compared to sodium caseinate (NaCa) and isolated soy protein (ISP). Due to stronger antioxidant properties of WPC and NaCa, significant (p<0.05) lower peroxide value was found in the two emulsions compared to ISP emulsions. In addition to its good rheological properties and beta-carotene stability, the emulsion with 5% beta-carotene stabilized with WPC was identified to be stable towards lipid oxidation with low total oxidation value.

yati@umt.edu.my

Food fortification: A panacea to food insecurity in developing countries

H N Mishra

Indian Institute of Technology, Kharagpur, India

Nutritional deficiency is a major health problem in developing countries. Malnutrition is the major cause for the death of 50% of the 10-11 million children under the age of 5. Worldwide, there are about 60 million children with moderate acute malnutrition (MAM) and 13 million with severe acute malnutrition (SAM) and approximately 1.6 billion people with anemia. The only proven way by which nutrition deficiency can be alleviated is increasing the intake of nutrients specially the micronutrients. Fortification can be done either by adding the target nutrients in to the food matrix which has better stability and deliverability or by increasing the nutritive value of food by mixing different food materials which compliments each other with the essential nutrients. Accordingly, 5 ready-to-eat therapeutic food (TF-RTE) formulations from locally available ingredients (3 peanut, 1 Bengal gram and 1 potato based), fortified with necessary vitamins and minerals as per the UNICEF/WHO norms, had been developed using Linear Programming to combat SAM. The developed formulations are soft, crushable, smooth and easily digestible with protein (10-12% of energy), fat (50–60% of energy) and energy value (520–540 kcal). A completely automated, indigenously designed and developed PLC controlled pilot scale unit has been set up according to the GMP/GHP requirements for the production of TF-RTE. Similarly, fortification through extrusion technology using non-traditional ingredients i.e., brokens (rice & dal), which are produced as by-products during milling, for the preparation of fortified rice (FR) analogues containing the embedded vitamins and minerals within rice and health dal (HD) analogues containing the required amount of essential amino acids within a single formulation are developed. Details of the formulation and processing technologies of TF-RTE, FR & HD shall be discussed.

hnm@agfe.iitkgp.ernet.in