

# Effect of dispersed phase (oil) volume fraction, WPC concentration and pressure

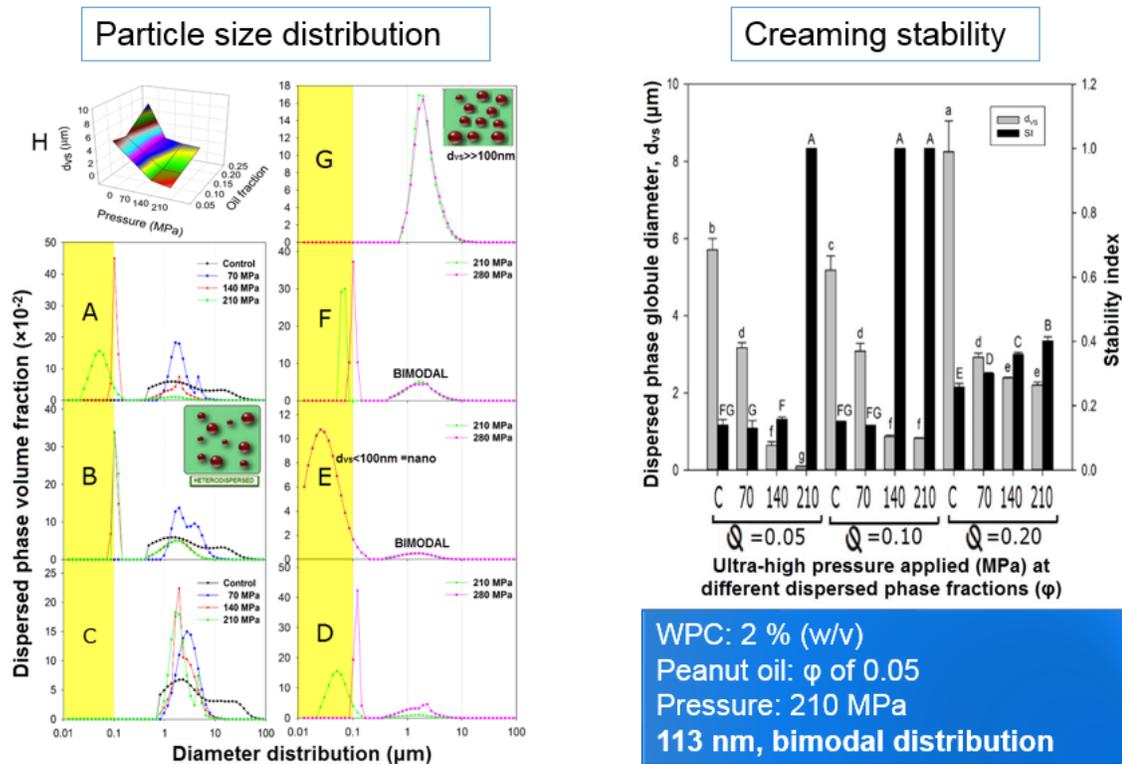


Figure 1 (Left). Grouped frequency distribution of nano-globular volume fractions on single-pass ultra-high pressure homogenization (UHPH) at 70, 140 and 210 MPa. A constant whey protein concentrate (WPC) concentration of 3% (w/v) while altering the dispersed phase fraction (A; 0.05; B; 0.1; C; 0.2), and altering WPC concentrations (D; 3%; E; 2%; F; 1%; G; 0.5%) (w/v) while dispersed phase fraction was kept constant at 0.05, as well as the mean globule size change as affected by different dispersed phase fractions and UHPH pressures (H). The Control was the premixed colloidal dispersion containing 3% (w/v) WPC without UHPH. Highlighted area represents the desired nano-range (Haque and Zhang, 2015, 2014).

Figure 1 (Right). Effect of dispersed phase fraction (0.05-0.2) and ultra-high homogenization pressure (0-210 MPa) on the mean globule size ( $d_{vs}$ ) and stability index (SI) of nano-emulsions containing 3% (w/v) whey protein concentrate. The SI values were determined as described in materials and methods. The left and right Y-axis respectively represent mean globule size ( $d_{vs}$ ) and stability index (SI). C stands for control with no pressure applied (Haque and Zhang, 2015, 2014).

## References:

Haque, Z and Zhang, X. 2015. Effects of Surfactants on Particle Size Distribution and Antioxidative Potential of Peanut Oil-in-Water Nanoemulsions Stabilized by Whey Protein Concentrates. The 79<sup>th</sup> Annual Meeting of the Mississippi Academy of Sciences, February 27,

2015, Hattiesburg, MS.

Haque, ZZ and Zhang, X. 2014. Generation and Stabilization of a Whey Based Nano-Globular Dispersion. The 2014 Annual Meeting of the Institute of Food Technologists, June 21, 2014, New Orleans, LA.

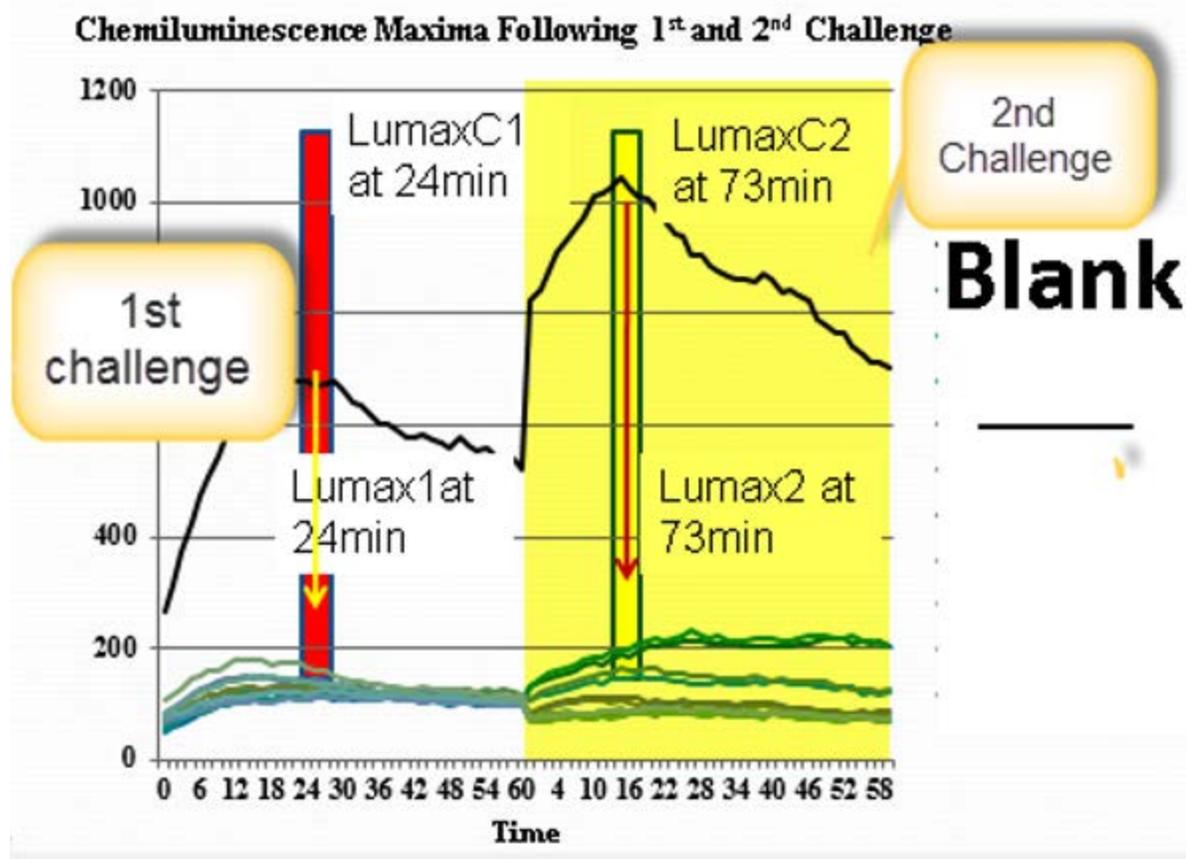


Figure 2: Chemiluminescence maxima (in relative light unit, RLU) exhibited by the blank (the buffer without test antioxidants) and test antioxidants evident by luminol induced chemiluminescence at the points of maximal proliferation of peroxy and alkoxy radicals, generated by pyrolysis of 2,2'-Azobis(2-amidinopropane) dihydrochloride (ABAP). The first chemiluminescence maximum exhibited by the blank (obtained by averaging the five highest chemiluminescence values recorded 1.5 min intervals) following the initiation of ABAP pyrolysis (1<sup>st</sup> challenge), was termed as the LuMaxC1. After one hour, when radical generation apparently ceased, another chemiluminescence curve was re-initiated by introducing equal volume of ABAP in the reaction system (2<sup>nd</sup> challenge). Chemiluminescence maxima of the blank at the second chemiluminescence curve was termed as the LuMaxC2. LuMax1 and LuMax2 indicate chemiluminescence maxima for individual test samples at the points of LuMaxC1 and LuMaxC2 – and reflect antioxidant activity (AA) and persistence (AP) of the test antioxidants (Haque and Mukherjee, 2015; Haque et al., 2013a, b).

**References:**

Haque ZZ and Mukherjee D. 2015. Maillard reaction enhanced short and long-term persistence of peroxy and alkoxy radical quenching ability of casein hydrolysate enriched sweet whey. In preparation for submission to the J. Agric. Food Chem.

Haque ZZ, Mukherjee D, Mukherjee S and Chang S. 2013a. Antioxidative Activity and Resilience of Cheddar and Edam Whey as Determined from Total Radical Trapping Potentials (TRAP). The 2013 Joint Annual Meeting (JAM) of the American Dairy Science Association (ADSA®) – American Society of Animal Science ASAS, July 11, 2013 Indianapolis, IN.

Haque ZZ, Mukherjee D and Chang S. 2013b. Effect of Detergents on the Antioxidative Efficacy of Sweet Whey. The 2013 Joint Annual Meeting (JAM) of the ADSA®-ASAS, July 11, 2013 Indianapolis, IN.