159 Rheological, texture, structural, and functional properties of Greek-style yogurt fortified with cheese whey-spend coffee ground powder. J. Osorio-Arias, A. Párez-Martínez, O. Vega-Castro, and S. Martínez-Monteagudo. Faculty of Pharmaceutical and Food Science, Medellín, Colombia, Aoxlab S.A.A. Medellín, Colombia, Dairy and Food Science Department, South Dakota State University, South Dakota, Brookings, SD.

The present study evaluated the feasibility of the fortification of Greek-style yogurt with a newly developed ingredient consisting of cheese whey-spend coffee ground (CW-SCG) powder. The yogurts were analyzed using a battery of tests, including whey production, water holding capacity, firmness, rheological properties, protein content, available lysine, and antioxidant activity. The milk base was fortified to 15% dry matter with different skim milk powder to CW-SCG ratios (100/0, 75/25, 25/75, and 0/100 wt/wt). The addition of CW-SCG up to 75% did not significantly change the acidification curve when comparing with the control sample (P > 0.05), reaching the target pH 4.7 after 270–300 min. The available lysine decreased with the addition of CW-SCG, yielding values of 78.55 ± 1.56, 28.89 ± 2.45, 23.61 ± 4.42, 20.03 ± 2.71 mg per 100 g for 0-, 25-, 75-, and 100-CW-SCG, respectively. The highest value of whey production was obtained in those samples fortified with 100-CW-SCG (6.33 ± 0.35%), followed by 75- and 25-CW-SCG (5.17 ± 0.99 and 3.01 ± 0.81%, respectively). The antioxidant capacity increased proportionally to the added CW-SCG powder, yielding values of 68.41 ± 2.78, 80.71 ± 2.54, 100.51 ± 3.44, and 120.21 ± 3.18 μmol TE per 100 g for 0-, 25-, 75-, and 100-CW-SCG, respectively. Fortification of the yogurt with CW-SCG decreased the water holding capacity by 13 to 25%, depending on the level of fortification. Similarly, the addition of CW-SCG significantly decreased the hardness of the yogurts from 76.57 ± 1.18 to 30.27 ± 1.73 N s (P < 0.05). Additionally, fortified yogurts with CW-SCG yielded a product with less shear-thinning behavior as compared with control. The scanning electron images of the fortified yogurts revealed the incorporation of spent coffee ground particles within the protein network. Polyphenol-Protein associations may explain the texture and rheological behavior of the yogurts. The fortification of the yogurt up to 25% of CW-SCG yielded comparable properties than the control. The industrial development of fortification of yogurt with small amounts of CW-SCG will require further studies to evaluate consumer acceptance and storage stability.

Key Words: rheological properties, texture, fortification

161 Effect of nanopowdered eggshell on the characteristics of probiotic yogurt. D. G. Kamel, Dairy Science Department, Assiut University, Assiut, Egypt.

Eggshell (ES) is a waste product of the food industry that could increase environmental pollution. ES is an alternative, cheap, and bioavailable source of dietary calcium (Ca) that can be utilized to fortify the Ca content of probiotic yogurt using nanotechnology. The calcium content of commercial yogurt is limited to 190.0 mg 100g\(^{-1}\). The objective of this study was to produce probiotic yogurt (5.0–7.0 log cfu g\(^{-1}\)) with high Ca content by fortification with nano-sized (0.02, 0.04, and 0.06 mg mL\(^{-1}\)) ES powder (ESP). Nano-sized ESP was prepared by milling pre-boiled dried ES using mortar grinder Fritsch Pulverisette 2. The size of the milled powder was measured using PW 1700 X-ray diffractometer to ensure that the diameter of the nano-sized was 25 ± 1.7 nm. Yogurt was manufactured by dividing the pasteurized milk into 4 aliquots portions to make the yogurt. The first portion (T1), second (T2), third (T3), and fourth (T4) portions were inoculated with 1% Lactobacillus delbrueckii subsp. bulgaricus (Lb), 1% Streptococcus thermophilus (St), and 15% Bifidobacterium bifidum (Bb). T1 was considered as control while 0.02, 0.04, and 0.06 mg mL\(^{-1}\) of nano-sized ESP were added to T2, T3, and T4, respectively. All treatments were inoculated at 40°C until a pH of 4.6 was reached. Subsequently, the yogurt was cooled and stored at 4°C for 16 d. The acidity, Ca, sensory properties, Bb count, total bacterial count (TBC), yeast and mold counts were examined. This experiment was repeated 3 times using 3 different batches of raw milk. The addition of nano-sized ESP decreased acid development significantly (P < 0.05). The TBC significantly decreased (P < 0.05) to 6.1 log cfu g\(^{-1}\) as the concentration of nano-sized ESP increased to 0.06 mg mL\(^{-1}\). The addition of 0.06 mg mL\(^{-1}\) nano-sized ESP produced a high Ca (705.4 mg 100g\(^{-1}\)) yogurt with an acceptable composition and quality as compared with control (197.6 mg 100g\(^{-1}\)). All sensory evaluation showed that the addition of nano-sized ESP improved taste, appearance, body and texture of probiotic yogurt. Moreover, the addition of nano-sized ESP increased the shelf-life of probiotic yogurt as compared with control. The impact of nano-sized ESP in probiotic yogurt during storage on the nutritional benefits will be evaluated in subsequent studies.

Key Words: nanopowdered eggshell, functional yogurt, shelf life