ABSTRACT

This research work aimed at finding a new probiotic starter culture and prebiotic for the preparation of synbiotic soy yoghurt which can give good product characteristics and enhance consumer acceptability for fermented soy milk. Various combinations of probiotics, *St. thermophilus-L.acidophilus*, *St. thermophilus-L.plantarum*, *St. thermophilus-L. rhamnosus*, *St. thermophilus-L.bulgaricus*, *L.acidophilus-L. plantarum*, *L. acidophilus –L. rhamnosus* and *L. plantarum-L. rhamnosus* were studied to find the most suitable starter culture. Prebiotics, fructooligosaccharide (FOS) and inulin were added in an attempt to reduce the after-taste of soymilk, improve acidification rates and growth of probiotics. Addition of prebiotic in soymilk (TS 13.23 %, TSS 12.5 °Bx, Protein 5.15 %, Fat 2.13 % and pH 6.45) significantly accelerated the acidification rate (10.82 to 23.33×10^{-3} pH units/min) and reduced the fermentation time by 4-9 h. FOS supplemented fermented soy milk had showed better acidification and post acidification profile as compared to inulin supplemented samples. Textural profile results showed that ST-LA with FOS gave best texture to the product with firmer gel (350.10), lower adhesiveness (-93.10) and springiness (0.92), higher gumminess (164.50) and average cohesiveness (0.47). FOS supplemented soy milk showed better rheological characteristics as compared to inulin supplemented soy milk. In FOS supplemented soy milk among all the probiotic combinations, ST-LA fermented samples showed good gel characteristics with higher elastic modulus (1672.39 Pa), viscous modulus (416.41Pa), complex modulus (1723.53Pa) and lower tan δ (14) as compared to those of other culture combinations. Sensory analysis reflected that among all studied samples, ST-LA fermented FOS supplemented soy milk got highest overall acceptability scores (7.40) on 9 point hedonic scale. Process optimization was done for the preparation synbiotic soy yoghurt using ST-LA, probiotic culture and FOS, prebiotic. Optimized synbiotic soy yoghurt was prepared using FOS (8.1 % w/v) and culture combination ST-LA with inoculum size 3.6 % v/v, 1:1 ratio and incubated at temperature 41°C for 5.25 h. The developed product showed good nutritional, textual and sensory characteristics. The product was well set (hardness 423.1 g, adhesiveness -111.9 g.s, complex modulus G* 1554.3 Pa) with very less whey separation (1.14 %). Microstructural and rheological study showed that the formation of acidified milk gels completed at pH 4.5 with the aggregation of soy protein particles into a true three-dimensional network of chains and clusters. There was no significant decrease in LA counts (cfu/mL) in soy yoghurt during the 28 day of storage at 4 °C. Developed product remained acceptable among the sensory panel throughout the 28 days of refrigerated storage.

Keywords: Probiotics; Prebiotics; Synbiotic; Fructooligosaccharide; Inulin; Soy Yoghurt; Binary co-culture; Acidification kinetics; Textural and Rheological Characteristics; Microstructural