Properties of Dried Plum Supplemented Peanut Muffins Fortified with Calcium.

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Products that contribute positively to bone health are in demand because of the steady increase in percent of 50-year old plus consumers. Dried plums contain boron and selenium which modulate bone and calcium metabolism, and preserve bone mineral density. Dried plum consumption has also been observed to increase rate of bone formation in postmenopausal women. However, current utilization level of dried plum as an ingredient in bakery products is 3-5%. From previous studies, muffins containing peanut flour and peanut butter had good texture when up to 60% wheat flour was replaced by peanut (12% fat) flour. The objective of this study was to ascertain the highest levels of 12%-fat peanut flour and dried plum powder that could be used to develop muffins with good quality. Response surface methodology and a three-level Box-Behnken Balanced Incomplete Block Design were used to evaluate the effects of peanut flour (PF: 50, 75, 100% wheat flour replacement), dried plum puree powder containing 97% dried plum and 3% calcium stearate (DPP: 6, 15, 24% wt of dried ingredients), calcium stearoyl lactylate (CSL: 1.5, 2.0, 2.5% wt of dried ingredients), and glycerol monostearate (GMS: 0.5, 1.0, 1.5% wt dried ingredients) on muffin properties. Texture profile (TA XT2*i* Texture Analyzer fitted with TA-25 probe at test speed of 2 mm/sec), color (Minolta Chomameter), water activity (Rotronic meter) and sensory screening were used to evaluate experimental and commercial muffins and set limits for acceptability. Muffins became a darker brown (decreased hue angle and L value) as PF and DPP were increased. Hardness of the muffin treatments increased as PF and DPP increased, and peaked at 100% PF and 24% DPP. When CSL was 1.5%, muffin crumb had highest cohesiveness with PF=100% or DPP=24%, and least cohesiveness for combined highest levels of PF (100%) and DPP (24%). When CSL was 2.0-2.5%, cohesiveness generally increased with increased PF, but decreased with increased DPP. Muffin springiness peaked when DPP was 8-11%, whereas muffin resilience generally decreased with increased GMS. Optimization studies based on RSM predictions and sensory evaluation indicated that good quality high-peanut-plum muffins could be obtained when formulations containing either 75%PF + 24%DPP or 84.4%PF + 18.2%DPP are used.