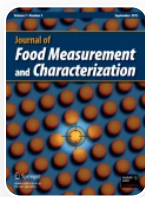


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Optimization of whey protein concentrate and psyllium husk for the development of protein-fiber rich orange fleshed sweet potato (*Ipomoea batatas* L.) bread by using response surface methodology

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Abstract

The present study was concerned with to optimize the formulation of whey protein concentrate (WPC) and psyllium husk for development of protein-fiber rich orange fleshed sweet potato (OFSP) bread using response surface methodology. The variables considered for the study were WPC (03–09%) and psyllium husk (02–06%) while the responses were protein content (%), fiber content (%), overall acceptability, loaf weight (g), loaf volume (cm³), specific volume (cm³/g) and oven spring (cm). Bread was prepared

using 30% OFSP flour and 70% wheat flour. WPC and psyllium husk were used as source of protein and fiber respectively. The level of alone WPC significantly affects ($p < 0.05$) on protein content whereas psyllium husk on fiber content of OFSP bread. There was significant effect of psyllium husk and non significant effect of WPC on overall acceptability. Moreover, the loaf volume and specific volume of bread was significantly affected by both the factors. The WPC was significantly and psyllium fiber non significantly affects on oven spring of OFSP bread. The optimization was carried out on WPC and psyllium husk in order to know which of the combination will give best protein-fiber content and overall acceptability with quality physical properties. The optimized bread sample was also evaluated for biofunctional (total carotenoids, total phenols, total flavonoids and antioxidant activity) components, and estimated glycemic index (EGI). The optimized OFSP bread containing 09% WPC and 06% psyllium husk was found most acceptable by consumers and it provides 17.72% protein and 8.02% fiber. The estimated glycemic index was found lower 52.58. The total carotenoid, total phenols, total flavonoids and DPPH inhibition of OFSP bread was found as 3.78 (mg/100 g), 51.32 (mg GAE/100 g), 26.80 (mg QE/100 g) and 43.53% respectively. The optimized sample of bread was found superior in carotene, protein and fiber content.

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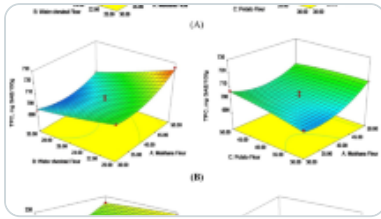
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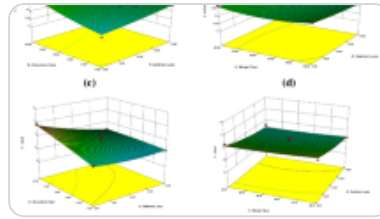
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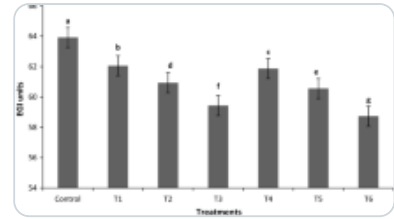
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Ethics declarations

Conflict of interest

Authors declare that there is no conflict of interest.

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