

Valorisation of Mango Seed: Response Surface Methodology Based Optimization of Starch Extraction from Mango Seeds

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Abstract : Box-Behnken Response surface methodology was used to determine the optimum processing conditions that give maximum extraction yield and whiteness index from mango seed. The steeping time ranges from 2 to 12 hours and slurring of the steeped seed in sodium metabisulphite solution (0.1 to 0.5 w/v) was carried out. Experiments were designed according to Box-Behnken Design with these three factors and a total of 15 runs experimental variables of were analyzed. At linear level, the concentration of sodium metabisulphite had significant positive influence on percentage yield and whiteness index at $p < 0.05$. At quadratic level, sodium metabisulphite concentration and sodium metabisulphite concentration² had a significant negative influence on starch yield; sodium metabisulphite concentration and steeping time*temperature had significant ($p < 0.05$) positive influence on whiteness index. The adjusted R² above 0.8 for starch yield (0.906465) and whiteness index (0.909268) showed a good fit of the model with the experimental data. The optimum sodium metabisulphite concentration, steeping hours, and temperature for starch isolation with maximum starch yield (66.428%) and whiteness index (85%) as set goals for optimization with the desirability of 0.91939 was 0.255w/v concentration, 2hrs and 50 °C respectively. The determined experimental value of each response based on optimal condition was statistically in accordance with predicted levels at $p < 0.05$. The Mango seeds are the by-products obtained during mango processing and possess disposal problem if not handled properly. The substitution of food based sizing agents with mango seed starch can contribute as pertinent resource deployment for value-added product manufacturing and waste utilization which might play significance role of food security in Ethiopia.

Keywords : mango, synthetic sizing agent, starch, extraction, textile, sizing

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