ABSTRACT

Fruits and vegetables are the major sources of daily intake of vitamins and minerals, but these nutrients are susceptible to oxidation due to high temperature during conventional drying. Aam papad is Indian fruit leather, conventionally made out of mango pulp mixed with concentrated sugar solution and is sun dried. Optimization of mango pulping using adapted pulper using RSM FCCD design was done for independent variables such as motor speed (350 to 450 rpm), peel + seed weight (1.0 to 1.50 kg) and screen size (1 to 2 mm). Pulp output and pulping time were significantly affected by pulping at different independent variables ($p<0.05$). Pulp output increased significantly (2.97 to 3.17 kg) with the increase in motor speed from 350 to 450 rpm. RW drying of single layer mango pulp was done at 95 °C to study of drying kinetics, colour and texture of dried mango leather and comparison with tray drying at 60 °C. It was observed that RW drying took 15 to 18 min to reach moisture content 18 to 22 (%) wb whereas tray drying took 10 to 12 hours to reach similar moisture content. Quality characteristics and nutrients were more retained in RW drying as compared to tray drying process. The optimization of RW drying process parameters viz., drying temperature (85 to 95 °C) and thickness of pulp (2 to 4 mm) was done using RSM FCCD. It was observed that drying time was increased with the increase in thickness of pulp from 2 mm to 4 mm as 20 min to 65 min, respectively The best optimized solution for RW drying of mango pulp was drying temperature as 95°C and pulp thickness as 2.7 mm. Mango leather had 4 months shelf life under RH less than 50% and less than 2 months above RH 74% under 30-40 °C ambient temperature. At higher RH storage conditions, the leathers absorbed moisture and had increased water activity which increases microbial activity in them and thus causes mold growth at leathers surface. Mango leather had shelf life 3, 7 and 11 months in ambient, vacuum and refrigerated storage, respectively. Semi-continuous Refractance Window (RW) dryer was developed and its cost was calculated as Rs. 50,000 average. Similarity value comparison for the ranking of samples was done using Fuzzy logic sensory analysis and it was found that RW dried mango leather samples was preferred by judges compared to other sample. Similarity values comparison for mango leather quality attribute in general concluded Mouthfeel and Taste as "highly important".

Keywords: Mango leather, mango pulp, Refractance Window drying, colour, texture, ascorbic acid, total phenolics content, storage, controlled relative humidity, sensory evaluation