

B.11. OPTIMIZATION OF PEACH DEHYDRATION THROUGH FORCED CONVECTION METHODS

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Abstract. This paper presents an optimized dehydration process for peaches using forced convection, designed for versatile applications ranging from industrial food processing to laboratory research and domestic use. The study focuses on balancing product quality with energy efficiency by maintaining rigorous control over thermodynamic parameters and raw material preparation. The proposed method follows a structured four-stage protocol. Stage I involves the selection of specific peach cultivars with low stone-to-pulp adherence, characterized by a fruit firmness of 1.0 kgf/cm² and an initial moisture content of approximately 87-90%. The fruit is sliced with high precision into 3-4 mm spherical segments to ensure uniform heat distribution. Stage II details the precise arrangement of slices in a single, non-overlapping layer on perforated supports. Stage III defines the optimal drying environment, utilizing ambient air (20 - 25°C, 60-65% relative humidity) as the thermal agent, with the drying chamber maintained at 50 - 65°C and an airflow velocity of 1,5 – 2,0 m/s. Finally, Stage IV concludes the process within a timeframe of 350-420 minutes, achieving a final moisture content of maximum 20%. The results demonstrate that this method significantly reduces energy consumption to 8 - 10 kWh while preserving the natural color and organoleptic properties of the fruit. Furthermore, the dehydrated peaches exhibit a shelf life of 25 - 30 days without the immediate requirement for vacuum packaging, proving the effectiveness of the method in stabilizing the product for short-to-medium term storage.

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