

434e Fluidization of Osmotically Dehydrated Small Fruits

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Fluidized bed drying is commonly used for small particulate materials like powders. However, manufacturers are reluctant to apply it for small fruits or small pieces of fruits and vegetables. One of the problems is the capacity of the fan required to achieve complete fluidization. Alternative technologies are to be used either to combine fluidization with a mechanical vibration (vibro-fluidization) or to pulse the air flow periodically with certain zones of the drying bed. In this study, the technical feasibility of using either vibro-fluidization or pulse-fluidization to osmotically dehydrated lowbush blueberries and cranberries was assessed. The kinetic of drying was studied at five different drying temperature of 50, 60, 70, 80 and 90°C in a batch system with an air flow rate of 130-140 m³/h, the flow rate necessary to maintain the osmotically dehydrated berries in a state of fluidization (between the terminal and the entrainment velocity). Using the Fick's diffusion model, the effective moisture diffusivity (D_{eff}) ranged from 0.7532×10^{-10} to 3.6737×10^{-10} m²/s. D_{eff} showed increasing trend with temperature. Tests were performed on batch, vibro-fluidization and pulse-fluidization compared for their thermal efficiency and effect on quality parameters (e.g. firmness, sensory of berries). Results from these studies will be presented as well as recommendations for process design.