

Title Effect of vacuum-microwave drying on selected mechanical and rheological properties of carrot

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Abstract

Carrots were dried using the vacuum-microwave method and strength tested using an Instron 5566 with measuring heads of class 0.5. The values of the cutting and the compression forces were calculated. The testing was performed on materials that were initially blanched, osmotically dehydrated, and untreated before drying. As a result of the vacuum-microwave drying, dried carrots with a moisture content within the range (3.2–3.8)% were obtained. The blanching operation resulted in an almost two-fold increase in the dry matter resistance to compression compared to that of the dry matter obtained from initially untreated carrot. Osmotic dehydration reduced the product resistance to compression more than two-fold. A five-element Maxwell model adequately described the reduction in stresses with time. The values of the modulus of elasticity and the coefficients of dynamic viscosity for the rheological model were calculated. The highest values of the modulus of elasticity were obtained for the raw material subjected to blanching.