

Title Mass transfer in the osmotic dehydration of coated apple cubes by using maltodextrin as the coating material and their textural properties

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Abstract

Apple cubes of 1 cm^3 were coated by using 20% and 50% (w/v) maltodextrin solutions, respectively. They were subsequently dried in an oven at $70\text{ }^\circ\text{C}$ for 10 and 40 min, respectively, to solidify the coating. Osmotic dehydration was then conducted to both coated and non-coated samples under the process temperature of $30\text{ }^\circ\text{C}$ and osmotic solution concentration of 61.5% (w/v) sucrose. The food to solution ratio was kept constant at 1:20 throughout the osmotic dehydration process. Results showed that the coated samples using 20% (w/v) maltodextrin solution and oven-dried for 40 min yielded negative dry matter gain and sugar gain during the osmotic dehydration process. Furthermore, the coated samples using 50% (w/v) maltodextrin solution and oven-dried for 10 and 40 min also yielded negative dry matter gain and sugar gain during the osmotic dehydration process. Possible reasons for these unusual negative gains were investigated, including dissolution of the coating material during the osmotic dehydration process and strong correlation between the drying time and shrinkage of the cells within the apple cubes. In addition, moisture loss of the coated samples was much smaller than that of non-coated samples. Instrumental texture profile analysis (TPA) of the non-coated and coated samples was performed, measuring the quality attributes such as hardness, brittleness, springiness and cohesiveness. Results showed that the structure of most samples was altered after the osmotic dehydration except those coated using 50% or 20% (w/v) maltodextrin solutions and oven-dried for 10 min.