

Elucidation of starch recrystallization-induced quality changes in pre-cooked rice noodles under different storage conditions

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Pre-cooked noodles with long shelf-life and cooking convenience have been recently receiving a lot of attention in the global food market. However, thermal treatments during preparation and their high moisture contents bring about critical quality losses during storage, that have not been systematically evaluated yet. Thus, the quality changes of the pre-cooked noodles made from rice flour were investigated in terms of thermal, tomographical, and water mobile characteristics. In particular, their physicochemical changes were monitored under different storage conditions (room temperature, refrigerated, and frozen) for 4 weeks. The T_2 relaxation time and signal amplitude of the pre-cooked noodles were prominently changed during the refrigerated storage, showing water syneresis from starch recrystallization. In addition, the texture properties were highly correlated with the results of water mobility, presenting higher hardness and lower extensibility. Furthermore, non-destructive tomographical analysis demonstrated higher structural density and thickness of refrigerated noodles, which were correlated with the microstructural images by SEM. In addition, the higher degree of starch recrystallization was thermally observed in the refrigerated noodles during storage, followed by room temperature. This result might provide more fundamental information on the quality changes of pre-cooked noodles during storage, probably contributing to the quality improvement of pre-cooked starchy food products.