

Dehydrofreezing : Conventional versus Intensified Processes towards better quality attributes of strawberry fruits

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Freezing and Thawing processes result in severe damage of the integrity of product's cell structure due to the formation of ice crystals, especially for fruits with high initial water content, such as strawberry fruit. Dehydrofreezing, a process which involves water partial removal before freezing has been proposed in order to reduce the negative impacts of conventional or even accelerated freezing. For this purpose, strawberries fruits were subjected to convective air drying of 40 °C and 3m/s to reach different water content levels of 1, and 0.3 g H₂O/g db. Freezing profiles obtained at various freezing rates (V1, V2, and V3) for different water contents allowed the main freezing characteristics such as the Initial Freezing Temperature (IFT), the Practical Freezing time (PFt), and the Specific Freezing time (SFt) to be assessed. On the other hand, quality attributes were estimated through the assessment of thawed water exudate (TWE g H₂O/100 g db), color, texture (maximum puncture force as index of firmness) and some phenolic compounds: water content had great impacts on thawed water exudate (TWE). Hence, the lower the water content, the weaker the TWE. Moreover, the partial removal of water by air drying before freezing remarkably reduced the negative impact of freezing/thawing processes on final strawberry color. Decisively, the firmness of strawberry fruit increased with the decrease of water content level. Finally, the obtained results showed an improvement of phenolic compounds retention with the increase of drying intensity, to obtain the highest levels of phenols, flavonoid, and anthocyanines