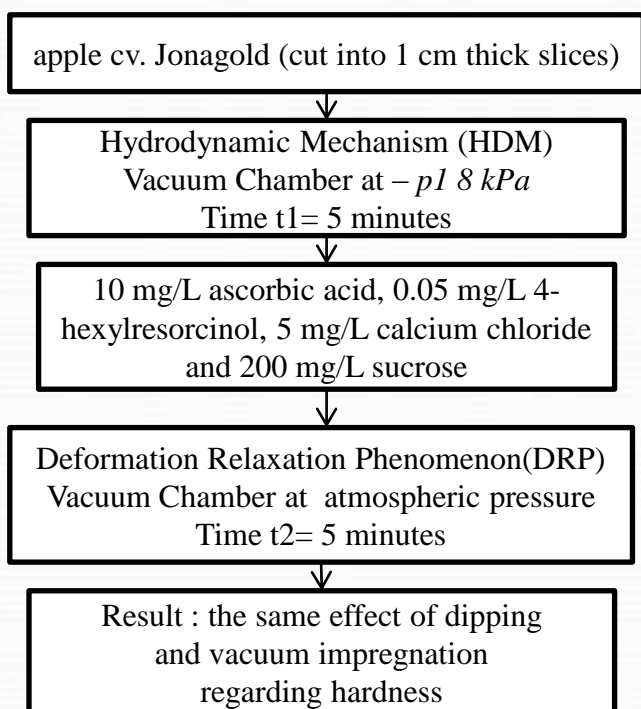


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Vacuum Impregnation to modify physico chemical properties and sensory attributes of apple cv. Jonagold (cut into 1 cm thick slices)

Raw Material	Composition of Vacuum Impregnation Solutions	Process Parameters	Effect
apple cv. Jonagold (cut into 1 cm thick slices)	10 mg/L ascorbic acid, 0.05 mg/L 4-hexylresorcinol, 5 mg/L calcium chloride and 200 mg/L sucrose	$p1\ 8\ kPa$ $t1\ 5\ min$ $t2\ 5\ min$	the same effect of dipping and vacuum impregnation regarding hardness

Flow Chart



Vacuum Impregnation Setup



Result:

The same effect of dipping and vacuum impregnation regarding hardness. The authors applied, e.g., pretreatment of raw material by vacuum impregnation with a calcium chloride solution and impregnation preceded by blanching in the high temperature short time. They stated that a decrease of pressure during impregnation from 59.9 to 9.3 kPa caused cell damage. However, when comparing the sample impregnated with water with that impregnated with a calcium chloride solution, they observed improved mechanical properties of the tissue connected with an addition of calcium ions to the solution. Application of vacuum impregnation after blanching did not provide the expected effect of texture improvement in apples, irrespective of the volume of the applied pressure and concentration of calcium ions in the solution (0.2%–4.0% w/w). This may be connected with the removal of gases and partial filling of the intracellular space by the liquid during thermal treatment. As a result, a lower amount of calcium ions may penetrate to the tissue during vacuum impregnation. Those authors also investigated the texture of apples, which were subjected e.g., to blanching (60 min at 40 °C, 15 min at 55 °C and 15 min at 65 °C) in 0.6% calcium chloride solution or vacuum impregnation with a 2% calcium chloride solution followed by osmotic dehydration. An improved texture of apples in comparison to the control (with no pretreatment) was observed in the sample impregnated and blanched for 15 min at 55 °C. This was connected with a better preservation of tissue microstructure. However, the results of studies concerning the effect of vacuum impregnation with calcium ions on the structure of plant tissue are not conclusive. Attempts to apply calcium chloride in combination with ascorbic acid, 4-hexylresorcinol and sucrose in order to improve the texture in minimally processed apples were also made by Biegańska-Marecik and Czapski (2007).