Fruit purees are considered as concentrated suspensions where solid insoluble particles are dispersed into an aqueous solution of sugars, organic acids and pectic substances. The properties (structure, rheology) of apple puree depend on many factors, particularly those related to raw material properties (variety, maturity, cell-wall composition) and processing conditions (heating, mechanical treatments). Nevertheless, these properties remain poorly understood and difficult to master.

The aim of this study is to better understand the relationship between the structural and rheological properties of apple puree, taking into account the impact of different apple varieties and manufacturing process on these parameters. Three varieties were studied: Golden Delicious, Granny Smith and Royal Gala. In order to vary the pulp content and size particle of the puree, a separation-reconstitution strategy joined to a grinding step was established. Rheological (shear thinning behaviour, yield stress) and structural (pulp content, particle size distribution and viscosity of the serum) properties of the purees were studied for each variety. Cell wall structures of raw materials were observed using an ESEM. A confocal microscope was used to observe the structural differences of purees.

For each apple variety, pulp concentration and particle size may be identified as the key structural parameters having a large effect on the rheological properties of apple puree. The apparent viscosity increases with the increase of pulp content. These results are corroborated by microscopic observation. Finally, results here obtained enables to pilot textural properties of fruit-based products allowing the creation of new products with different structure and innovative controlled textures.

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