

## Summary

Identifying niche markets for products that use native tapioca starch is essential to promote the development of this agro-industry in Colombia and in other producing countries. Native starches are perceived by consumers as “natural” or “less risky” than other ingredients/ additives; this perception and the market trend towards natural foods and clean labels make the use of native starches look promising. However, native starches have limitations in some applications in the food industry because of their instability at high temperatures, high shear forces, low pH values and its tendency to retrogradation at low temperatures, leading to lower end-product quality.

The main objective of this thesis is to evaluate the performance of native tapioca starch in fruit fillings and to develop a starch plus low-methoxyl pectin mixed system able to support pH, high temperature and process conditions, adding value to the starch alone because of its improved properties.

First, the addition of pectin to the starch, as the main mixed system, was developed. It was compared to a control of modified starch commonly used in industrially prepared fruit fillings. Starch pasting and viscoelastic properties, instrumental texture parameters (extrusion) and syneresis of the different systems were studied. A number of factors inherent to the conditions of the preparation processes of fruit fillings, such as addition of fruit and stability at different temperature conditions (baking and freezing), were also studied. The effect of cooking in two bakery applications (open and closed systems) was evaluated. The addition of pectin caused a significant increase in the firmness and consistency of the gels analyzed and the fillings without fruit prepared with the proposed system were more resistant to heat treatment than those prepared with tapioca starch alone, showing stable rheological and textural properties during the different processes and similar to those of the modified corn starch, used as control.

Given that at present, the food market is increasingly segmented and consumers seek products not only of good quality but also healthier, satisfying needs, and personal tastes, reduced-sugar fruit fillings were also formulated. Instrumental (rheological and texture) and sensory techniques (quantitative descriptive analysis, QDA) and untrained consumer hedonic studies were performed. Liking and adequacy of some sensory attributes were also evaluated using just-about-right (JAR) scales.

The instrumental and sensory results were highly correlated, and a segmentation into three consumer groups was found in fruit fillings' perception and consumer liking. One group did not like intense sweeteners at all. Another, remarkably, preferred the characteristics of the tapioca starch samples. The third group (the most numerous) did not show these marked tendencies, suggesting that formulations should be adapted to each scenario.

Finally, knowing that a number of textural features are assessed during the consumption of the fillings, which in turn can modulate their flavour perception, two relatively new sensory techniques were applied: Temporal Dominance of Sensations (TDS) with trained assessors (with texture and flavour modalities separately performed) and a check-all-that-apply (CATA) questionnaire with consumers, including the evaluation of an “ideal fruit filling”. The results were

then correlated with consumers' liking. These sensory techniques allowed the consumer to drive and suggest what aspects of the formulation should be redesigned.