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# Rheological behaviour of "sour" guava pulp (*Psidium araca*) variety Coronilla

Andrade R.D., Ortega F.A., Torres R.
University of Cordoba, Colombia

# INTRODUCTION

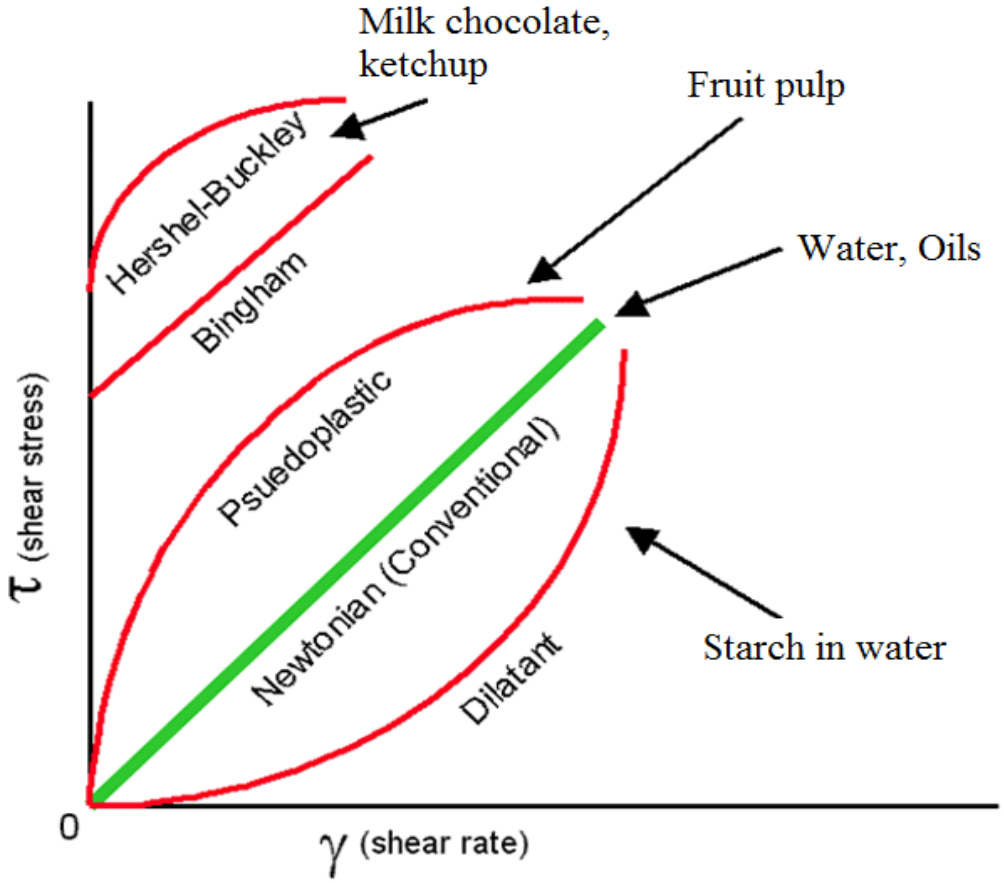
- Guava (*Psidium guajava* L.) is a member of the large Myrtaceae family. The sour guava, a native fruit tree of South America, is one of the fruits more consumption in the department of Córdoba, however, in Colombia it is for many strangers and underemployed; it generally grows in homemade orchards and their consumption is generally given in fresh.

# INTRODUCTION

- Rheological properties are determined by measuring force and deformation as a function of time. Several models have been used to describe the flow behaviour of foods, for example: Newtonian, power law, Herschel–Bulkey and Casson models. Power law model is the most widely employed model for non-Newtonian foods and is used extensively to describe their flow properties in practical engineering applications

# INTRODUCTION

## Rheograms for typical time-independent fluids



# MATERIALS AND METHODS

- *Guava pulp*. Guava fruits were selected keeping in mind that they were free of external damages, with commercial maturity; they were washed and scalded at 90ºC for 5 minutes.
- The samples of guava pulp were homogenized and they were carried out pH, total soluble solids (TSS) and acidity.

# MATERIALS AND METHODS

- *Rheological measurements.*

Rheological properties were measured using Brookfield viscometer (model DV-II+ Pro). A sample of 400 mL of guava pulp was used in a glass beaker of 600 mL size for all the experiments. The measurement range of viscometer between 10% and 100% full scale torque was adjusted by selecting specific spindle and its rotational speed (0.5–100 RPM).

# MATERIALS AND METHODS

- *Data analysis.*
- The power law model (Eq. 1) was used to describe the rheological properties of solutions.

$$\eta_a = K\,\gamma^{n-1} \qquad (1)$$

where $\eta_a$ is apparent viscosity (Pa.s), K is consistency index (Pa.s$^n$), $\gamma$ is shear rate ($s^{-1}$), n is flow behaviour index (dimensionless).

- The equation of Mitschka was used (Eq. 2) to obtain the values of shear rate starting from the data of rotational speed and to carry out the rheogram.

$$\gamma = \left(0.263\left(n\right)^{-0.771}\right)N \qquad (2)$$

where N is the rotational speed, RPM.

# RESULTS AND DISCUSSIONS

- TSS of the sour guava pulp was found to be 10 ºBrix, pH 2.89 and acidity (citric acid) 6.04%. The rheological behaviour of the "sour" guava pulp variety Coronilla was adjusted appropriately to power law model or Ostwald of Waele ($R^2$=0.993), presenting values of flow behaviour index of 0.216 and consistency index of 283.81 Pa.$s^n$. The spindle used was N° 6.

- The value of flow behaviour index was less than 1, indicating a shear thinning behaviour (pseudoplastic) of "sour" guava pulp at concentration and temperature (20°C) tested. It is consistent with earlier findings for other varieties of guava and pulps of fruits.

# RESULTS AND DISCUSSIONS

- In the figure 1 the rheogram of the "sour" guava pulp, in which one observes that the apparent viscosity diminishes when increasing the shear rate.
- When carrying out the ascent curves and descent it is presented a decrease of the apparent viscosity with regard to the time, which denotes the thixotropy presence (2.52%).

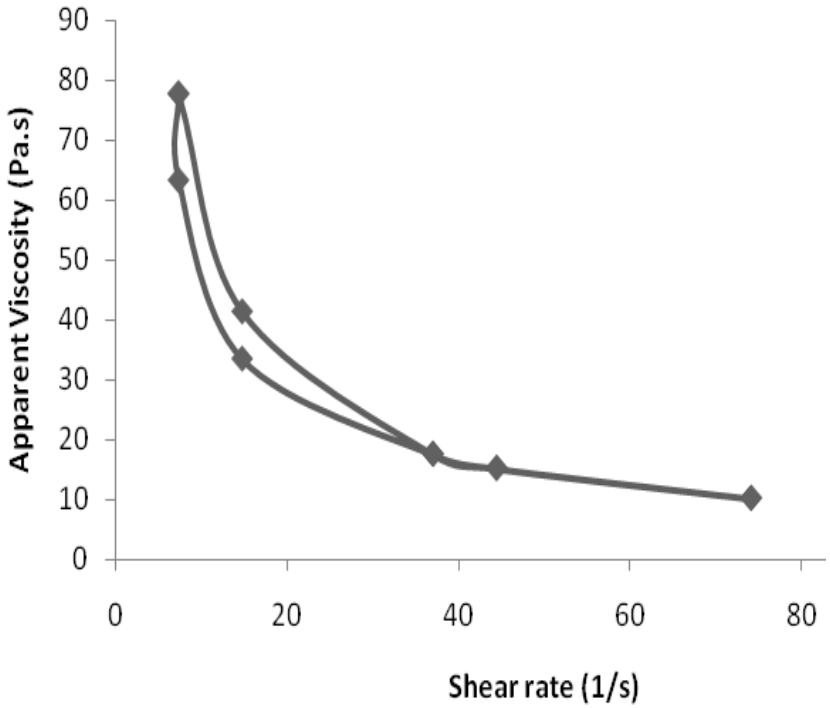



Fig. 1. Rheogram for a "sour" guava pulp at 20ºC.

# CONCLUSIONS

The steady shear flow pattern was well represented by the power law model. Apparent viscosity decreased as a function of ascending shear rate suggesting that sour guava pulp was pseudoplastic and they presented small thixotropy percentages.