



PHYSICAL AND RHEOLOGICAL CHARACTERIZATION OF WAXY CORN GRAIN SAMPLES IN VENEZUELA AND ITS POTENTIAL FOR TRADITIONAL BEVERAGE ELABORATION

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INTRODUCTION

Starch from waxy corn is employed as thickener for different food products. Most of this type of corn is planted in temperate areas, not known for the tropical conditions of Venezuela. The object of the present study was to characterize for physical and rheological properties of kernels waxy corn cultivars adapted to Venezuelan tropical conditions. Additionally, sensory affective profile for “chicha” (unfermented) made from these corn cultivars. Chicha is a traditional beverage made from corn or rice grains.

METHODS

Maize cultivars coded Wx127 and LMD/Wx, homozygous and heterozygous for the waxy gene, respectively. Test weight, grit yields, size grits particles, amylose contents, Rapid Visco Analyser (RVA) profile (Avila, 2012) and affective sensory test for “chicha” was determined (Figure 1). In all tests, grain samples of a normal corn “Comercial” widely used in Venezuela were used as reference.



A) Cooking: 60 g whole-grain corn flour + 100 g sugar +1000 ml water B) Chicha C) Sensory test

Figure 1. Sequence sensory test of chicha

RESULTS

Corn have different physical, amylose content, and rheological properties ($P < 0.01$). Characteristics of the three corn samples are presented in Table 1. LMD/Wx presented a test weight of 898 g/L and a +4 mesh particles predominant proportion of 75.8%, while Wx127 presented a test weight of 785g/L and a +6 mesh particles predominant proportion of 43.5%. All cultivars presented good grit yields for corn flour production through dry milling, being the best LMD/Wx with 78.1%. Amylose contents were 22.1%, 17%, and 2.2% for normal corn, LMD/Wx, and Wx127, respectively. In the amylograph profile, Wx127 cultivar obtained higher values of peak viscosity, hold strength, breakdown and pasting, and lower values for final viscosity, setback and consistency. Sensorial profile revealed that waxy cultivars has similar levels of acceptance than normal corn for appearance, aroma and flavor, however, for texture and global quality LMD/Wx cultivar was significantly superior ($p < 0.05$).

Table 1. Characteristics physical and rheological of three corn¹

Genotype	Length (mm)	Width (mm)	Thickness (mm)	Test Weight (g/L)	Weight 100 Kernels (g)	Grits yield (%)	Grits +4 mesh (%)	Grits +6 mesh (%)	Grits +8 mesh (%)	Grits +10 mesh (%)	Grits -10 mesh (%)
LMD 23/Wx	10.3B	8.7B	5.3A	898A	30.3C	78.1A	75.8A	23.4B	0.8A	0.0A	0.0A
Wx27	11.2A	9.0AB	4.9A	785B	32.2B	75.7B	52.7B	43.5A	3.1A	0.5A	0.3A
Comercial	9.8B	9.4A	5.0A	793B	37.7A	77.7A	61.8AB	33.4AB	4.0A	0.5A	0.3A
	Amylose content (%)		Visc. Peak (RVU)	Hold strength (RVU)	Breakdown (RVU)	Final Visc. (RVU)	Setback (RVU)	Consistency (RVU)	Pasting (RVU)		
LMD 23/Wx	17.0B		158.5B	126.1AB	32.4A	252.7B	94.2B	126.6B	66.5A		
Wx27	2.2C		190.7A	157.3A	33.5A	208.2B	17.5C	50.9C	68.7A		
Comercial	22.1A		139.2C	118.9B	20.3A	358.0A	218.8A	239.2A	65.0A		

¹ Different letters indicate significant difference (Tukey Test, $p \leq 0.05$)

CONCLUSION

The results showed the aptitude of these corn genotypes, carrying the waxy gen, for alternative uses in Venezuela.

REFERENCES

Avila, M. 2012. Caracterización de dureza de grano de maíces cultivados en Venezuela. Editorial Academica Española. Spain. 124 p