Corn Husks Mechanical Characterization

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Corn husks are used in many areas such as corn husk cigars and handcrafts[1,2]. The aim of this work is to mechanically characterize the corn husks with a tensile test, proposing a methodology of corn husk testing. This characterization will help groups that use corn husks and corn breeders in the selection of plants that have specific properties.

Two types of specimen were tested, specimen that were longitudinal and transversal to the corn husk fibers. These were taken from the inner third of the corn husk to prevent irregular specimen and stress concentration.

Initially 60 specimen were tested, 30 longitudinal and 30 transversal specimen, to verify the methodology. The tensile tests were conducted in an EMIC universal testing machine model DL3000 with pneumatic grips and a 50 kgf load cell. The tensile test speed was 5mm/mim.

Table 1 shows the results for tensile strength, elastic modulus and rupture strength.

Table 1 – Specimen mechanical properties.

	Longitudinal		Transversal	
	Mean	Standard Deviation	Mean	Standard Deviation
Tensile strength (MPa)	10.8	4.32	4.2	2.35
Elastic modulus(MPa)	387.4	141.7	169.3	81.0
Rupture strain (%)	5.03	1.02	3.7	1.4

The mechanical properties varied between the longitudinal and transversal specimen and tensile tests are possible to be made and are appropriated for mechanical corn husks characterization.

[1] N. Reddy,Y. Yang, Properties and potential applications of natural cellulose fibers from cornhusks. *Green Chem.*, 2005, **7**, 190.

[2] N. Reddy,Y. Yang. Biofibers from agricultural byproducts for industrial applications. TRENDS in Biotechnology Vol.23 No.1 January 2005.

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