Influence of density on mechanical properties of MOR and MOE for wood of *Pinus elliottii* Engelm.

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This study aimed to describe the wood of *Pinus elliottii* Engelm. coming from young reforestation through some physical and mechanical properties. For this, it was determined the density at 12% humidity and checked its influence on the modulus of rupture (MOR) and modulus of elasticity (MOE). The specimens for bending test were made according to ASTM D 143-94 (1995) and conditioned in an incubator to stabilize the moisture content of 12%. We found the average values of 555 kgf.cm^{-2} and 73266 kgf.cm^{-2} for MOR and MOE, respectively. The average value of apparent density of 12% was 0.43 g.cm^{-3}. The IPT (1989) reports an apparent density of 15% from 0.48 g.cm^{-3} and basic density of 0.40 g.cm^{-3} for the same species. The WOOD HANDBOOK (1999) reported a basic density of 0.59 g.cm^{-3}, a MOE of 139701.09 kgf.cm^{-2} and a MOR of 1149.22 kgf.cm^{-2}, all properties a moisture content 12%.

Table 1: regression models for MOE and MOR as a function of density to 12%.

Property	Equation	R^2_{aj}	Syx	F	P
Modulus of Rupture	MOR= -105.922+1553.52*ME	62	65	30	0.0001
Modulus of Elasticity	MOE= -10213.8+187625.0*ME	21	18243	6	0.0317

Where: MOE = modulus of elasticity (kgf.cm^{-2}); ME = density (g.cm^{-3}), MOR = modulus of rupture (kgf.cm^{-2}).

Thus, the regression models defined in Table 1 indicate that as the density increases, they also increase the values of MOR and MOE. We also conclude that the density has increased determination on the MOR, considering that the R^2_{aj} for this property was 62%, while for the other was only 21%. Defining then from the value of P <=0.05, we can say that there is a significant relationship of the apparent density to 12% with MOR and MOE for the species studied.

Keywords: bending, wood quality.

[1] ASTM – American Society for Testing and Materials. Standard methods of testing small clear specimens of timber, D 143-94. Philadelphia, 1995a.
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[3] WOOD HANDBOOK – Wood as an engineering material. Gen. Tech. Rep. FPL–GTR–113. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 1999. 463 p.

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