VARIATION OF COMPRESSION AND TENSILE PROPERTIES OF CORK

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The compression and tensile properties of cork were studied on samples obtained from cork planks with densities ranging 0.12 - 0.20 g.cm^{-3} and porosities 0.5 to 22.0%, and different commercial quality classes.

The stress-strain curves in compression were characterized by an elastic region up to approximately 5% strain, followed by a large plateau for strains up to 60% caused by the progressive buckling of cell walls, with a steep increase of stress for higher strains corresponding to cell collapse and densification. The direction of compression was a highly significant factor of variation, with cork showing higher strength for the radial compression. The stress-strain curves were also very similar regardless of the porosity of the samples.

The tensile properties of cork were measured in three radial positions in the cork planks: the inner side (belly side), the outer site (back side) and a mid position. The results showed that the distance to the inner part plank in tensile tests was a highly significant factor of variation. The Young moduli measured by a tensile stress were significantly higher near the inner part of the plank and lower in the outer part.

The compression and tensile properties of cork samples obtained from cork planks of different quality classes did not differ significantly.

An exponential model of Young's modulus in function of cork density and porosity could be adjusted for the compression and tensile behaviour of cork. The large variability observed is strongly influenced by the structural features involving the lenticular channels walls, namely the presence of thick walled and lignified cells.

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