# Drying aptitude of *Eucalyptus nitens*

Proyecto Fondecyt 1110500

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## ABSTRACT

In Chile there are about 585 MHa planted with *Eucalyptus*, which correspond primarily *E. nitens* and *E.globulus*. *E. nitens* is a native specie to the forest southeastern Australia, established in Chile since 1960 by the Forest Institute (INFOR), this specie has been strongly diffused between VIII and X region of Chile with faster growth values up to 77 $m^3$/ha/year. The use of *E. nitens* in higher added products such lumber, furniture remanufacturing has been limited by difficulties in wood drying because their propensity for surface checks, internal checking and collapse.

This project aims to characterize the drying aptitude of *E. nitens* families, by assessing the variability of the radial and apical anatomical properties and physical, such as thickness and diameter of fibers, shrinkage and collapse, permeability and diffusion coefficients. These properties will be applied to perform a multiple-mechanism drying model at conventional temperatures.

For this study, 15 trees will be selected from 3 *E. nitens* families. Each tree will provide the sample timber to DAP and height to 25%, 50% and 100%. Microtome cuts will be performed to determine the radial and apical variability of the vessel and fiber characteristics. These anatomical properties will be evaluated by image analysis with the support of software and equipment purchased specifically for this project.

The variability of the moisture content, density, shrinkage and collapse will be determined according to the Chilean standards. The permeability will be evaluated according to Darcy's law using apparatus for measuring gas flow. The isothermal diffusion coefficient, will be determined using the vapometer technique in according to Fick's law. The experimental factors include such as family, tree, radial and height position in the tree and grain direction.

From the anatomical and physical characteristics drying models will be studied. The use of phenomenological model as a first approximation will be implement an a multiple-mechanism model approach will be proposed.

Sawn boards in radial and tangential sections will be dried. Air-drying and pre-drying to the fiber saturation point combined with convective drying al conventional temperature up to 12% final moisture content will be performed. Then drying curves, using the experimental values of the anatomical and physical properties will be obtained in this project.

The main results are a characterization of wood in terms of their properties anatomical and physical to define drying aptitude of *E. nitens* families and the optimization of drying processes of wood through the modeling of the drying kinetics.