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Predicting extractives content of *Eucalyptus bosistoana* F. Muell. heartwood from stem cores by near infrared spectroscopy

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Abstract:

Time and resource are the restricting factors for the wider use of chemical information of wood in tree breeding programs. NIR offers an advantage over wet-chemical analysis in these aspects and is starting to be used for tree breeding. This work describes the development of a NIR-based assessment of extractive content in heartwood of *E. bosistoana*, which does not require milling and conditioning of the samples. This was achieved by applying the signal processing algorithms (external parameter orthogonalisation (EPO) and significance multivariate correlation (sMC)) to spectra obtained from solid wood cores, which were able to correct for moisture content, grain direction and sample form. The accuracy of extractive content predictions was further improved by variable selection, resulting in a root mean square error of 1.27%. Considering the range of extractive content in *E. bosistoana* heartwood of 1.3 to 15.0%, the developed NIR calibration has the potential to be used in an *E. bosistoana* breeding program or to assess the special variation in extractive content throughout a stem.

Keywords: Grain angle, external parameter orthogonalisation (EPO), partial least squares regression (PLS), significance multivariate correlation (sMC), moisture content (MC), natural durability, variable selection

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