

## Developing a Calibration Curve to Quantify Chlorophyll Content in Rubber (*Hevea brasiliensis*)

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Chlorophyll meter, SPAD-502 is widely used in determining leaf chlorophyll content in field plants as it is non-destructive and less time consuming. Variations in chlorophyll content among varieties of different species have been identified. However, investigations of any genotypic variations related to rubber have not been reported so far. In order to convert relative SPAD meter values into units of absolute chlorophyll concentration, it is necessary to employ a calibration curve. Genotypic variations in leaf characteristics such as leaf thickness, epicuticular wax content, water content and leaf biomass could affect the readings of the SPAD-502 chlorophyll meter. Therefore, this study was carried out to develop a calibration curve to quantify chlorophyll content and effect of leaf thickness, epicuticular wax content, water content and leaf biomass on the readings of SPAD-502 meter. Leaf samples of most commonly used grown rubber genotypes i.e. RRIC 121, RRIC 100, RRISL 203 and RRISL 2001 were selected. Leaf samples of each genotype that in the similar growth stages were collected from the budwood nurseries in Dartonfield estate, Agalawatta. SPAD values of each leaf sample were measured and the actual leaf chlorophyll content (LCC) was analyzed by acetone extraction method. Leaf thickness, water content, epicuticular wax content (EWC) and leaf biomass of each leaf sample were also determined by using standard test methods. Standard calibration curves were developed separately for each genotype on per leaf biomass (mg/g) and per leaf area (mg/cm<sup>2</sup>) basis by regressing with correspondent SPAD values. The most appropriate calibration model for all tested genotypes was the second order polynomial with above 95 % accuracy ( $R^2= 0.95$ ). Highest leaf thickness and EWC were observed in RRIC 100 genotype whilst RRISL 203 genotype gave the lowest values. The highest water content and leaf biomass were observed in RRIC 121 and RRISL 2001, respectively. LCC of RRIC 121 genotype was comparatively lower with averages of 3.598 mg/g and 0.036 mg/cm<sup>2</sup>. The highest LCC was observed in RRISL 203 genotype and the average values were 5.238 mg/g and 0.054 mg/cm<sup>2</sup>. The genotypic averages of leaf EWC, water content, leaf biomass and leaf thickness were 0.079 mg/cm<sup>2</sup>, 7.998 mg/cm<sup>2</sup>, 10.889 mg/cm<sup>2</sup> and 0.126 mm, respectively. Correlation between leaf thickness, EWC, leaf biomass and water content with the reading of SPAD-502 chlorophyll meter were not significant in all four genotypes. This indicates that these four parameters do not affect the reading of SPAD-502 chlorophyll meter in determining LCC of rubber.

Keywords: Chlorophyll content, Epicuticular wax, Leaf biomass, Leaf thickness, SPAD-502 Chlorophyll meter