

**PENGEMBANGAN MODEL KALIBRASI
SPEKTROSKOPI NIR TERHADAP MUTU TEH
HERBAL DAUN GAMBIR (*Uncaria gambir* Roxb.)**



**FAKULTAS TEKNOLOGI PERTANIAN
UNIVERSITAS ANDALAS
PADANG
2025**

Pengembangan Model Kalibrasi Spektroskopi NIR terhadap Mutu Teh Herbal Daun Gambir (*Uncaria gambir* Roxb.)

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ABSTRAK

Teh herbal daun gambir merupakan produk inovatif berbahan dasar daun gambir (*Uncaria gambir* Roxb.) yang berpotensi sebagai komoditas ekspor. Kadar air menjadi indikator penting karena sifat higroskopis produk ini, sedangkan kandungan tanin memiliki peran fungsional sebagai antioksidan yang bermanfaat bagi kesehatan. Penelitian ini bertujuan untuk mengevaluasi metode spektroskopi *Near-Infrared* (NIR) dalam memprediksi kadar air dan tanin secara cepat dan non-destruktif. Sebanyak 60 sampel teh herbal berbentuk serbuk dengan berat 20–21 gram dianalisis menggunakan NIR pada rentang panjang gelombang 1.000–2.500 nm. Nilai referensi kadar air ditentukan menggunakan metode oven, sedangkan kadar tanin dianalisis menggunakan metode spektrofotometri. Model kalibrasi dibangun menggunakan regresi *Partial Least Squares* (PLS). Hasil penelitian menunjukkan bahwa metode NIR mampu memprediksi kadar air dan tanin dengan performa model yang baik. Model prediksi kadar air bekerja optimal tanpa *pre-treatment*, sedangkan model kadar tanin menunjukkan hasil terbaik setelah penerapan *pre-treatment* kombinasi *Derivative Gap Segment* + *Standard Normal Variate* (SNV). Temuan ini menunjukkan bahwa spektroskopi NIR dapat diandalkan sebagai metode prediksi cepat dan efisien dalam pengendalian mutu teh herbal daun gambir.

Kata Kunci: Daun Gambir, Teh Herbal, Kadar Air, Tanin, Spektroskopi NIR.

Development of a NIR Spectroscopy Calibration Model for the Quality of Gambir Leaf Herbal Tea (Uncaria gambir Roxb.)

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ABSTRACT

Gambir leaf herbal tea is an innovative product derived from gambir leaves (Uncaria gambir Roxb.) with strong potential as an export commodity. Moisture content is a crucial indicator due to the product's hygroscopic nature, while tannin content plays a functional role as an antioxidant beneficial to health. This study aims to evaluate the use of Near-Infrared (NIR) spectroscopy to predict moisture and tannin content rapidly and non-destructively. A total of 60 powdered tea samples weighing 20–21 grams each were analyzed using NIR spectroscopy within the wavelength range of 1,000–2,500 nm. Reference moisture content was determined using the oven-drying method, while tannin content was analyzed using spectrophotometry. Calibration models were built using Partial Least Squares (PLS) regression. The results showed that NIR spectroscopy was capable of predicting both moisture and tannin content with good model performance. The moisture content model performed optimally without any pre-treatment, while the best tannin prediction model was obtained after applying the Derivative Gap Segment + Standard Normal Variate (SNV) pre-treatment combination. These findings indicate that NIR spectroscopy can be relied upon as a rapid and efficient prediction method for quality control of gambir leaf herbal tea.

Key Word: *Gambir Leaves, Herbal Tea, Moisture Content, Tannin, NIR Spectroscopy*