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The 2nd **ICOLIB**

International Conference on Life Sciences and Biotechnology
Biology Department, Faculty of Mathematics and Natural Sciences, University of Jember
(ICOLIB BIO-UNEJ 2017)

CERTIFICATE

given to

I Made Agus Gelgel Wirasuta

has participated as a

Oral Presenter

in The 2nd International Conference on Life Sciences and Biotechnology 2017
Integrated Biological Sciences for Human Welfare

The Panorama Hotel and Resort Jember, East Java, Indonesia, August 7 - 8, 2017

**Chairwoman of Organizing
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International Conference on Life Sciences and Biotechnology
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Integrated Biological Sciences for Human Welfare



ABSTRACT BOOK

The Panorama Hotel and Resort Jember
East Java, Indonesia
August 7 - 8, 2017



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THE PREDICTION OF CURCUMIN CONTENT IN THE TURMERIC RHIZOME WITH RAMAN HANDHELD SPECTROSCOPY

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Abstract

The quality control of herbal medicine should be started from the determination of the active substance at harvest time. The Raman spectrometry has been used for this propose. The aim of this study is to determine the quantification of *curcumin* in turmeric rhizome (*Curcuma longa* Linn.) using Raman spectroscopy combined with multivariate analysis of PLS-R that are expected to provide reference method for quality control in turmeric rhizome, especially for raw materials of Herbal drugs. Parameters that can be used for analysis of *curcumin* levels on turmeric rhizome obtained using intensity of data Raman and the data obtained from the standard method will be processed with multivariate analysis methods PLS-R. The validation value of quantification result using Raman-PLSR is seen from R^2 value of 0.999, RMSEC value of 0,119 and p-value of 0.00. The study showed the developed method could be implemented on to determine the prediction quantification of raw material herbal medicine.

Keywords: *Curcumin*, PLS-R, Turmeric, Raman Spectroscopy

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The Prediction of Curcumin Content in the Turmeric Rhizome with Raman Handheld Spectroscopy

I Made Agus Geigel Wirasata
Cokorda Isti Tirta Ruumala Dewi
Ni Putu Linda Laksmiari
I Gusti Ayu Made Srinadi

Method

- Sample preparation and Raman measurement
 - Turmeric rhizome: cleaning, drying (60 oC), powdering.
- Raman Spectroscopy:
 - The single-mode laser light (1064 nm),
 - the laser power 100 mV,
 - the exposer time 2000 ms.
 - The spectral range 200 – 2000 cm-1.
- Quantification of curcuminoid
 - The curcumin content in turmeric rhizome was determined with TLC-spectrodensitometry.
 - TLC si GF254, mobile phase: chloroform: methanol (95:5, v/v).

Introduction

3 good agricultural and collection practice (GACP)
good plant authentication and identification practice (GPAIP)

S Govindaraghavan and N. J. Sucher (2015)

Method

- PLS-R
 - multivariate calibration of (PLS-R) was performed with Minitab 17 statistical software.
 - A "Leave One Out Cross Validation" procedure was applied to result the R²-value, and RMSEC (Root Mean Square Error of Calibration), and RMSEP (Root Mean Square Error of Prediction).

Raman Handheld Spectroscopy

FirstGuard™ Handheld Raman Analyzer

Results and Discussion

(a) densitogram

(b) in-situ UV-Vis Curcuminoid

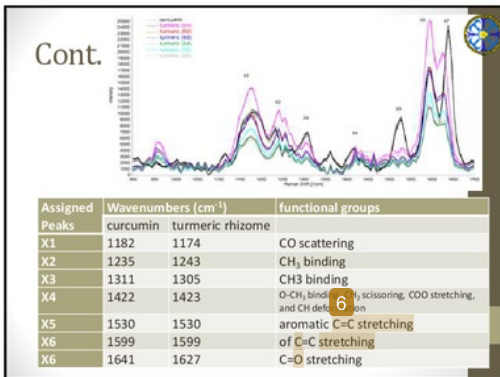
TLC Densitogram of curcumin reference "A" and turmeric rhizome "B" and (b)The in-situ UV-Vis spectra of curcumin, demethoxycurcumin, bisdemethoxycurcumin

Cont..

Sample	Actual determinate by TLC densitometry [% b/b]
S1	3.38
S2	2.56
S3	2.37
S4	1.37
S5	1.47
S6	2.14

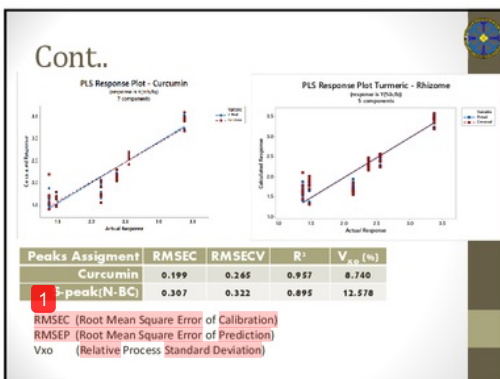
Cont..

Sample	Actual (TLC)	Raman predicted values [% b/b (%RSD)]	
		Curcumin peaks	Rhizome peaks
S1	3.38	3.42 (2.72)	3.38 (1.83)
S2	2.56	2.58 (3.00)	2.38 (2.69)
S3	2.37	2.20 (2.83)	2.38 (3.09)
S4	1.37	1.59 (9.73)	1.65 (3.27)
S5	1.47	1.60 (5.56)	1.87 (2.87)
S6	2.14	1.90 (7.99)	1.63 (4.18)
Tur 2 bln		5.44	
Tur 6 bln		9.49	
Tur 10 bln		13.82	



Conclusion

- Prediction Curcuminoid content using curcumin peaks assignment possessed better coefficient regression and low relative Process Standard Deviation



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