

Title of the Paper (Ariel Narrow, 26pt, Bold, Left, Title-Case)

**First_author_first_name First_author_family_name^{1*},
Second_author_first_name Second_author_family_name² &
Third_author_first_name Third_author_family_name³** (Ariel Narrow, 16pt, Bold, Right)

1 Affiliation of author, Name of Department, Name of University, City, COUNTRY. (Ariel Narrow, 8pt)

2 Vibration and Sound Research Group (e-VIBS), Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah, MALAYSIA.

3 Faculty of Sustainable Agriculture, Universiti Malaysia Sabah, Sandakan Campus, Mile 10, Sg. Batang, 90000, Sandakan, Sabah, MALAYSIA.

*Corresponding author. E-Mail manuscript@transectscience.org; Tel: +6088-320000; Fax: +6088-435324.

(Please include email, Tel and Fax number only for the corresponding author)

ABSTRACT

Ganoderma boninense is a basidiomycetes fungus that causes basal stem rot disease (BSR) in oil palm trees. In Malaysia alone, the loss caused by this disease was estimated between RM 225 Million to RM 1.5 Billion in 2011 by Malaysian Palm Oil Board. Unfortunately, many planters do not realize that their fields were infected with BSR until it is too late. Several methods have been proposed for early detection of *Ganoderma boninense* infection. In this paper, Fourier transform infrared spectroscopy (FTIR) is investigated as a tool to detect the presence of *Ganoderma boninense* in oil palm tree.....(Ariel Narrow, 11pt, Justify, Single Spacing).

KEYWORDS: Watercress; Gluconasturtiin; PEITC; Myrosinase activity; ... (Please provide 5 suitable keywords)

Received xxxxxx Revised xxsxxxx Accepted xxxxxx In press xxxxxx Online xxxxxx

© Transactions on Science and Technology 2017

(Please use Palatino Linotype, 11pt font size for the rest of the paper with single spacing)

INTRODUCTION (headings should be written in UPPER-CASE)

Oil palm (*Elaeis guineensis* Jacq.) has been known as a truly “golden crop of Malaysia” since it generated profitable export earnings for the country and truly nature’s gifts for alleviating poverty in Malaysia (Basiron - family name, 2007 - for single author; Alexander & Chong, 2013 - for 2 authors; Yunus & Radhakhrisnan, 2004). However, the oil palm industry is being jeopardized with one major disease known as Basal Stem Rot (BSR) which is mainly caused by *Ganoderma boninense* (MPOB, 2012). This disease cause serious threat to the oil palm industry in the Southeast Asian countries, especially Malaysia and Indonesia (Joy *et al.*, 2001 - use *et al.* for more than 2 authors), as which are of the major producers and exporters of palm oil in the world. Linares (2011) on the other hand found that ... However, according to Corley and Tinker (2003) infection of this disease can cause numerous yield losses and ultimately result in the destruction of basal tissues hence death of disease palms.....(please provide single enter spacing between paragraph)

This template is the official guidelines for authors of Transactions on Science and Technology journal. These guidelines include complete descriptions of the fonts, spacing, paragraphs and other related information to prepare your manuscript for publishing in Transactions on Science and Technology journal. Please do not change or adjust the margins, line spacing and other related styles in this template.

Glucosinolates (GLS) are sulphur-containing secondary metabolites found largely in cruciferous vegetables. Certain GLS are precursor to health-promoting isothiocyanates (ITCs). Watercress (*Nasturtium officinale*) contains phenyl ethyl GLS (PEGLS) or its common name, gluconasturtiin (Williams *et al.*, 2009). The hydrolysis product of PEGLS, i.e. phenyl ethyl ITC (PEITC), is proven to restrain the growth of cancer cells (Gill *et al.*, 2007). Gupta *et al.* (2014) have published a comprehensive review on the anti-cancer effects of PEITC. However, the formation of PEITC is easily affected by various factors such as temperature, pH and presence of additives (Eylen *et al.*,

2008). PEGLS is hydrolyzed into PEITC by the naturally-occurring enzyme myrosinase in plant. This aspect needs to be investigated further because food preparation commonly involved cutting, heating and addition of other additives which may affect the PEITC formation. Currently, there are still scarce reports on the dynamic of hydrolysis of PEGLS in watercress under various external factors. Thus, this paper described the effects of temperature and pH on myrosinase activity and PEGLS hydrolysis products in watercress.

BACKGROUND THEORY

The Beer-Lambert Law (italic in sentence-case)

Protocorm proliferation and regeneration were investigated on KC medium (Knudson C, 1946) supplemented with 2% (w/v) sucrose, and treated with organic additives or plant growth regulators. Four types of organic additives tested are coconut water, tomato juice (10%, 15% and 20% v/v), banana pulp (25, 75 and 125 g/L) and peptone (2 g/L). Plant growth regulators tested in this study are Naphthalene acetic acid (NAA), Zeatin and 6-Benzylaminopurine (BAP) at concentrations of 2, 4, 6 μM , respectively. Basal medium devoid of any organic additive or plant growth regulator served as control. The medium pH was adjusted to 5.3 ± 0.02 and solidified with 0.8% (w/v) agar (Sigma) prior to autoclaving for 20 min at 15 psi, 121°C . The cultures were maintained at $24 \pm 2^\circ\text{C}$ under a 24 h d^{-1} photoperiod with a PPF of $20\text{--}50 \mu\text{mol m}^{-2}\text{s}^{-1}$ provided by cool white fluorescent tubes (Philips, Malaysia).

The following is an example how equation is written given as:

$$A_{\lambda} = \log(1/R_{\lambda}) = c\epsilon_{\lambda}I \quad (1)$$

where A_{λ} is absorption, R_{λ} is reflection, c is the concentration of the ingredient, ϵ_{λ} is extinction coefficient of the ingredient for wavelength λ , and I is the pathlength of the light through the sample.

METHODOLOGY

Sample Collection (Maximum first level of subheading is allowed, sentence-case)

Healthy and infected tissues samples were collected from oil palm plantation in Sandakan, Sabah, Malaysia. Collection of trunk tissues was carried out following the method described by (Chong, 2012).

Preparation of Buffered Water and Bligh-Dyer

300 ml of double distilled water was transferred into a separating funnel and 2.04 g potassium dihydrogen phosphate (KH_2PO_4) was added to create a 0.05 M solution. The pH was adjusted to pH 7.2 by addition of sodium hydroxide (NaOH) pellets and the mixture was extracted with 3 x 50 ml dichloromethane (DCM). The Bligh-Dyer solvent mixture was made up using buffered water: chloroform: methanol with ratio 4:5:10, respectively.

RESULT AND DISCUSSION

In this result, the presence of *Ganoderma* in the infected tissue was detected with the similar peak absorbance in region.....

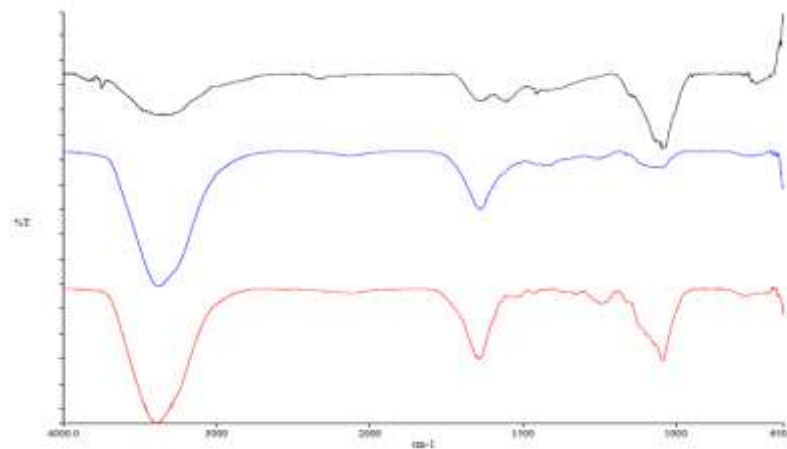


Figure 1. FTIR spectra of *Ganoderma boninense*, healthy oil palm trunk tissues and infected oil palm trunk tissues (Alexander & Chong, 2013). (Palatino Linotype, 11pt, centred, single spacing. If the caption is more than one line, please make it justify)

Table 1. Functional Group of *G. boninense* mycelia and healthy oil palm trunk tissues. (Palatino Linotype, 11pt, centred, single spacing. If the caption is more than one line, please make it justify)

Wavelength (cm ⁻¹)	Functional group	
	<i>Ganoderma boninense</i>	Healthy trunk tissue
3500-3200		O-H (phenol)
3400-3200	N-H (amine)	
1650-1600	C=O (amide)	C=O (amide)
1580-1500	C=N (imine)	
1470-1450	C-H (alkane)	
1400-1390		C-O(carboxylic acid)
1250-1000	C-O-C (ether)	
1100-1000		Si-O (silicone)

CONCLUSION

Please prepare your paper in MSWords 97-2003 format. After carefully checking the English usage and the whole content of your paper, you may make online submission at the URL MSWords 97-2003. Alternatively, you may email your paper to the Managing Editor, Dr. Chee Fuei Pien at manuscript[at]transectscience.org or fpchee06[at]ums.edu.my. Also, please strictly follow the format of the journal to increase the visibility of your paper amongst researchers. Please refer to the latest published paper by the journal for further example of format.

ACKNOWLEDGEMENTS

REFERENCES (Arrange the reference list in alphabetical order with numbering, in Palatino Linotype, 11pt.)

- [1] Alexander, A. & Chong, K. P. (2013). Evaluation on the Efficacy of Microbial approach in Managing *Ganoderma boninense* Colonization and its Effect to Soil Microbial Community. *International Symposium on Engineering and Natural Science*. 29-31 August, 2013, Macau, China. (Example of conference paper. PLEASE PROVIDE FULL NAME OF THE CONFERENCE TOGETHER WITH THE CONFERENCE DATE AND PLACE) (Palatino Linotype, 11pt, Justify, Single Spacing).
- [2] Basiron, Y. (2007). Palm oil production through sustainable plantations. *European Journal of Lipid Science and Technology*, **109**(3), 289-295. (Example of journal paper. PLEASE PROVIDE FULL NAME OF THE JOURNAL and ANY GOOGLE SCHOLAR URL LINK to the actual document.)
- [3] Chong, K. P. (2012). An evaluation of The *Ganoderma* Fungal Colonisation Using Ergosterol Analysis and Quantification. *Planter*, **88**(1034), 311-319.
- [4] Corley, R. H. V. & Tinker, P. B. (2003). *The Oil Palm* (4th edition). Oxford (city of the publisher): Blackwell Publishing (publisher). (Example of book)
- [5] Joy, P. P., Thomas, J., Mathew, J. & Skaria, B. P. (2001). Medicinal Plants. In: Bose, T. K., Kabir, J., Das, P. & Joy, P. P. (eds.). *Tropical Horticulture* (Vol. 2). Calcutta (city of the publisher): Naya Prokash (publisher). (Example of book chapter)
- [6] Linares, N. V. (2011). *Analysis of Solar Water Heating Systems in Single Family Houses-Comparison between Finnish and Spanish Situation*. MSc Thesis, Tampere University of Technology, Finland. (Example of thesis)
- [7] Malaysian Palm Oil Board (MPOB) (2012). *Summary of The Malaysian Oil Palm Industry 2012* (title of the webpage) (http://econ.mpob.gov.my/stat/web_report1.php?val=201284 - copy and paste the webpage URL). Accessed on 2 January 2013. (Example of internet access)
- [8] Yunus, N. M. & Radhakhrisnan, V. R. (2004). Absorption of CO₂ and Other Acid Gases in Aqueous Solutions of Amines - A Review. *Proceedings of the 18th Symposium of Malaysian Chemical Engineers (SOMChE)*. 29-31 August, 2013. Macau, China. pp 2-9. (Example of conference proceedings. PLEASE PROVIDE FULL NAME OF THE PROCEEDINGS TOGETHER WITH THE CONFERENCE DATE AND PLACE AND PAGE NUMBER)