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Journal Name:	Journal of Experimental Agriculture International
Manuscript Number:	Ms_JEAI_31502
Title of the Manuscript:	Application of Spectroscopy for Nutrient Prediction of Oil Palm
Type of the Article	Original research paper

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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SDI Review Form 1.6

PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	1. Experimental protocole: Some additional content should be carefully given to describe the experimental protocol, so that it clearly appears without bias. It is not very clear wether the protocole is adapted to a generic result of the analysis or if some parts of the protocol are discussable for rigourous comprehension. Here follow some details about this description: Line 63: only 5 year old oil palm trees were considered in the study. That's is good not to mix several ages, but, my question is: why so young trees, almost juvenile? 5 years is just the beginning of production or even earlier to production: what would happen if older trees, mostly found in plantations, were considered? Please comment. Line 66: it is not fair to talk about 90 samples in total, because samples are not independent three per three... there are actually 30 samples of 3 levels of measurements! Indeed, line 129 it is written that 3 models were derived, proving that the 3 fronds are taken as independent experimental material. Line 88 : it is written that 10 readings were taken: where exactly? At the same location in the leaflet or scattered, in what area, and are the two average data for each side of the leaflet (right and left) average also at the end? Line 93: please give the materiel of white reference panel (is it spectralon, other industrial material, or lab-specific material??). Line 122, it is mentioned a range of date, but it was not explained before: how long did the field experiment last? Can it have an impact on oil palm tree evolution? What about the rain status and the fertilization status of the plots? Are the palm feeded or not, is there an homogeneous management of all the measured trees? Explain the choice of F3, F9 and F17: it is maybe obvious for palm expert but not for the common scientists. On which frond si done	Thank you very much for the comments on this paper. The following correction were made; 1a: Line 63 : 5 year old tree explained Line 66: Number of samples described in detail. Line 88: Exact location of reading taken is explained. Line 93: White reference explained. Line 122: Wrong spell/typo error for data as date. F3, F9 and F17 explained. 1b: Another paper on preprocessing was written but is yet to be published (still under review status). If I could, It would be best to cite that paper. However, more detailed explanation is given to explain criteria chosen for the pre-processing methods. 2: More explanation on settings of PLS is explained. Line 120: Max LV expalined Line 121: Range of data expalined Line 122: Segment explained Line 122-123 rephrased for better understanding. Line 129: Number of models clarified. 3:Results & Discussion Line 135: Figure explained.



SDI Review Form 1.6

	the chemical analysis oin lab? Also, my complementary question is: why the F3 which is not ready and still in the arrow of the palm tree? 1.b Preprocessing: the preprocessing analysis is much too little explained and discussed: on which criteria do the authors base their assumption that the MSC is the best preprocessing method? It is written line 99 and following that several preprocessinf methods were applied but not how they were compared to select the best one. Please develop this part. Some reference on the cited preprocessing method would be also welcome. 2. Processing: again the text is poor of justifications and should be completed to prove the reliability and robustness of the methodology. PLS is a quite efficient and well-known method, but it implies many assumptions and brainstorming steps, that have to be justified. Indeed: - line120: how was the number of 10 maximum LV set to 10? Why? - line 122: it is the first time that a range of date in evocated (not existing in the data paragraph)... could you explain and detail? - line 121: of course the selection of 1 every 4 is one arbitrary way to select the samples but maybe it would be interesting to test if this sampling has or not an impact on the model by doing all the process independently with another sampling and compare the coefficients found at the end for the PLS regression and concentration formulae. - What does the word "segment" means line122? In addition, sentence lines 122-123 is just un understandable ! - Line 129: it is mentioned 3 calibration model but it seems instead that each leaf is used independently so there should be 9 models... this is very unclear how leaves were used as independent or just mixed together just as single kind of data. This has to be explained very carefully, because oil palm leaves have different compositions and element concentrations so they might not follow the same model for prediction, or maybe on the	Line 145-205: Rediscussed with references. 4: Conclusion- Revised -Figure 2,3,4 and 5 reworked. -units of graph axis reminded. -Language in line 109-111 corrected -Reference 15 corrected and 17 in line 94 explained -More references on PLS and Pre-processing added..
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SDI Review Form 1.6

	contrary if it was tested with all the leaves together it could be very interesting to compare the results 3. Results and discussion Line135 and following: fig 2 is supposed to show younger and more mature leaves, for instance, but the figure caption indicates the reflectance for F17.... Explain more about this difference please. Lines 145 to 205: this is not a discussion, this is a description ! In the case of concentration estimation, also, relative errors would be more significant than RMSE, and also the significance of errors in terms of concentration difference (with the correct units, for instance in %) to have an opinion on the <i>usefulness</i> of the prediction. That means, compare the error values to admitted or rejected deficiencies in the oil palm (refer for instance to "Oil palm: nutrient disorders and nutrient management : diagnosis, causes, prevention, treatment" by Fairhurst et al. 2005. Singapore : PPI-CIRAD-CP, 124p, ISBN 2-87614-592-8 ; 981-05-2452-8, and Foster, H. 2003. Oil palm: Management for large and sustainable yields. In Fairhurst, T.H. and R. Härdter, eds. Singapore: Potash & Phosphate Institute/Potash & Phosphate, Institute of Canada (PPI/PPIC) and International Potash Institute (IPI). p. 231-257 Also, results should be compared to other similar works like Lelong et al "Towards precision agriculture for oil palm mineral nutrition management: relationships between the reflectance spectrum of oil palm leaves and nutrient deficiencies", published at the PIPOC 2007 International Palm Oil Congress Palm oil: <u>Empowering change August 26-30 Kuala Lumpur</u>. (also published in a consensed way at RAQRS 2006), who obtained a prediction model of [N] with PLS applied to spectral indices with an error bin of ± 0.44 only, compared to 1.46 obtained in the presented work. 4. Conclusion: again, this is not a conclusion but more a resume of	
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	the description cited above.... For instance: how can explain the authors that F17 is the more efficient to determine the concentrations? For instance why not discuss this result with the fact that F17 is usually the one used in chemical foliar analysis ? this is actually a very good result to prove that for reflectance studies this is the same frond that is the more efficient to give information. References are needed also on the usual N, P and K leaf content, to understand Figures: Most figures are to be reworked. Fig 2 is unreadable: impossible to see the lines except the one on the top of the pile. There also should be a legend inside the figure. Cut the x scale to the useful extent. Fig3, 4 and 5 a) have to be discarded because they do not show anything more than the fact that the value used for model are correctly predicted, that is the first and main thing we demand to a model, otherwise it is not even useful to continue with prediction! Emphasize on the contrary the b) graph, which is really the result to be discussed. Give the same scaling on both axes to facilitate the analysis. Remind the reader the units on both axes. Language: Please check and correct the writing through the whole text, because there are several sentences that are not grammatically correct and thus difficult to understand, like lines 109-111, but it os really often in the text and thus sometimes hard to understand. References: Line 259: reference #15: Last name of the first author of this publication is LELONG (Camille is the forename) and thus this reference should be corrected to: Lelong CCD, Roger JM, Bregand S, Dubertret F etc... this important for citation registration. Why was [17] cited line 94? Maybe some key reference about PLS and preprocessing methodologies could be added. Also, bibliography lacks of references about the oil palm nutrient	
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SDI Review Form 1.6

	(cf. formerly cited Fairhurst et al x2) Not on the study itself, but on the way the article is presented and the work explained. Too many things are unclear; some even tend to be false the way they are written, so some hard work has to be done to improve the paper in a scientific way so that the work, which seems more or less correct and interesting.	
<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		