In vitro cell composition identification of wood decay fungi by Fourier transform infrared spectroscopy

Barun Shankar Gupta, Bjorn Petter Jelle and Tao Gao

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Review timeline
Original submission: 7 April 2020
1st revised submission: 27 October 2020
2nd revised submission: 6 January 2022
Final acceptance: 6 January 2022

Note: This manuscript was transferred from another Royal Society journal without peer review.
Recommendation?
Accept with minor revision (please list in comments)

Comments to the Author(s)
- Can the authors link changes in the amino acids and internal structure of the two fungi to any potential physiology changes in the two fungi?
- Was the SEM used required drying of the fungal specimens? If so, would influence your results?

Review form: Reviewer 2

Is the manuscript scientifically sound in its present form?
No

Are the interpretations and conclusions justified by the results?
Yes

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
No

Have you any concerns about statistical analyses in this paper?
No

Recommendation?
Reject

Comments to the Author(s)
This study describes monitoring of fungal growth during wood degradation by using FTIR spectroscopy.
Authors collected the spectra at 2 weeks interval to understand the behavior of fungi and discuss hydrogen bond energy.
Though the experiments have been well performed and discussion is an interesting, present version can not be accepted because there is little information on substrates such as weight loss rate and chemical component analysis.
SEM observation is unclear to understand the hyphal tip extension from single snapshot.

Despite critical comments, IR spectral monitoring of fungi during bio-degradation involves valuable information for readers. Therefore, reviewer hopes the document will be modified and improved for publish.

Decision letter (RSOS-200291.R0)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don’t hesitate to let us know at the email address below.
Dear Dr Gupta:

Manuscript ID RSOS-200291 entitled "Evaluating the scope of infrared spectroscopy in periodic cellular characterization of wood decay fungi" which you submitted to Royal Society Open Science, has been reviewed. The comments from reviewers are included at the bottom of this letter.

In view of the criticisms of the reviewers, the manuscript has been rejected in its current form. However, a new manuscript may be submitted which takes into consideration these comments.

Please note that resubmitting your manuscript does not guarantee eventual acceptance, and that your resubmission will be subject to peer review before a decision is made.

You will be unable to make your revisions on the originally submitted version of your manuscript. Instead, revise your manuscript and upload the files via your author centre.

Once you have revised your manuscript, go to https://mc.manuscriptcentral.com/rsos and login to your Author Center. Click on "Manuscripts with Decisions," and then click on "Create a Resubmission" located next to the manuscript number. Then, follow the steps for resubmitting your manuscript.

Your resubmitted manuscript should be submitted by 22-Dec-2020. If you are unable to submit by this date please contact the Editorial Office.

We look forward to receiving your resubmission.

Kind regards,
Andrew Dunn
Royal Society Open Science Editorial Office
Royal Society Open Science
openscience@royalsociety.org

on behalf of Prof R. Kerry Rowe (Subject Editor)
openscience@royalsociety.org

Associate Editor Comments to Author:
The editors would like you to resubmit a revised version of your paper to take into account the critiques of the reviewers. Please be aware that the editors may seek additional refereeing advice upon resubmission.

Reviewers' Comments to Author:
Reviewer: 1
Comments to the Author(s)
o Can the authors link changes in the amino acids and internal structure of the two fungi to any potential physiology changes in the two fungi?
o Was the SEM used required drying of the fungal specimens? If so, would influence your results?

Reviewer: 2
Comments to the Author(s)
This study describes monitoring of fungal growth during wood degradation by using FTIR spectroscopy.
Authors collected the spectra at 2 weeks interval to understand the behavior of fungi and discuss hydrogen bond energy. Though the experiments have been well performed and discussion is an interesting, present version can not be accepted because there is little information on substrates such as weight loss rate and chemical component analysis. SEM observation is unclear to understand the hyphal tip extension from single snapshot.

Despite critical comments, IR spectral monitoring of fungi during bio-degradation involves valuable information for readers. Therefore, reviewer hopes the document will be modified and improved for publish.

Author's Response to Decision Letter for (RSOS-200291.R0)
See Appendix A.

RSOS-201935.R0
Review form: Reviewer 2

Is the manuscript scientifically sound in its present form?
Yes

Are the interpretations and conclusions justified by the results?
Yes

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
No

Have you any concerns about statistical analyses in this paper?
No

Recommendation?
Accept as is

Comments to the Author(s)
The revised manuscript will be accepted.

Review form: Reviewer 3

Is the manuscript scientifically sound in its present form?
Yes
Are the interpretations and conclusions justified by the results?
Yes

Is the language acceptable?
Yes

Do you have any ethical concerns with this paper?
No

Have you any concerns about statistical analyses in this paper?
No

Recommendation?
Accept with minor revision (please list in comments)

Comments to the Author(s)
Dear Editor, Dear Authors

Please find my observation regarding the manuscript entitled: “In vitro cell composition identification of wood decay fungi by Fourier transform infrared spectroscopy” you requested to revise. The manuscript presents the application of ATR FTIR for analysing of molecular compositions the fungi cell structure. The manuscript is clearly written and easy to follow, I just have a few comments/observations that authors might consider for its improvement.

Why was the experiment conducted for 8 weeks? Does it refer to any standard? Please explain.

In line 15-31 you write: “In natural outdoor conditions, the process of fungal degradation of wood is a slow process and often do not show any visible discolouration, at the onset, causing difficulty in judgement of the soundness of wood. Contrarily, in accelerated laboratory conditions, using – (a) sterile materials, (b) nutrients, (c) monoculture, and (d) moisture, fungi grow faster than in natural environment. A study of fungal cell structure in accelerated laboratory conditions, therefore, provides meaningful information about the molecular compositions in microbial cell structure (5).”

Is it only the speed of growth different, or also kinetic? Please explain how the laboratory experiment can help the understanding of the processes occurring in nature.

The analysis of spectra is correct however rather a standard one. Much more information can be revealed by some chemometrics methods. I highly recommend using 2D spectral correlation analysis that enables the study of molecular-level changes induced by an external perturbation (time in this case). Perhaps you might consider this approach in your future analysis.

Please correct some punctuation errors.

Decision letter (RSOS-201935.R0)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don’t hesitate to let us know at the email address below.

Dear Dr Gupta

On behalf of the Editors, we are pleased to inform you that your Manuscript RSOS-201935 “In vitro cell composition identification of wood decay fungi by Fourier transform infrared spectroscopy” has been accepted for publication in Royal Society Open Science subject to minor
revision in accordance with the referees' reports. Please find the referees' comments along with any feedback from the Editors below my signature.

We invite you to respond to the comments and revise your manuscript. Below the referees' and Editors' comments (where applicable) we provide additional requirements. Final acceptance of your manuscript is dependent on these requirements being met. We provide guidance below to help you prepare your revision.

Please submit your revised manuscript and required files (see below) no later than 7 days from today's (ie 22-Apr-2021) date. Note: the ScholarOne system will 'lock' if submission of the revision is attempted 7 or more days after the deadline. If you do not think you will be able to meet this deadline please contact the editorial office immediately.

Please note article processing charges apply to papers accepted for publication in Royal Society Open Science (https://royalsocietypublishing.org/rsos/charges). Charges will also apply to papers transferred to the journal from other Royal Society Publishing journals, as well as papers submitted as part of our collaboration with the Royal Society of Chemistry (https://royalsocietypublishing.org/rsos/chemistry). Fee waivers are available but must be requested when you submit your revision (https://royalsocietypublishing.org/rsos/waivers).

Thank you for submitting your manuscript to Royal Society Open Science and we look forward to receiving your revision. If you have any questions at all, please do not hesitate to get in touch.

Best regards,
Lianne Parkhouse
Editorial Coordinator
Royal Society Open Science
openscience@royalsociety.org

on behalf of Professor R. Kerry Rowe (Subject Editor)
openscience@royalsociety.org

Associate Editor Comments to Author:

Thank you for engaging with the reviewers' concerns. While the paper is much nearer publication-readiness than the initial iteration, there are a number of outstanding queries that you should address before resubmitting a final version.

Reviewer comments to Author:
Reviewer: 2
Comments to the Author(s)
The revised manuscript will be accepted.

Reviewer: 3
Comments to the Author(s)
Dear Editor, Dear Authors

Please find my observation regarding the manuscript entitled: “In vitro cell composition identification of wood decay fungi by Fourier transform infrared spectroscopy” you requested to revise. The manuscript presents the application of ATR FTIR for analysing of molecular compositions the fungi cell structure. The manuscript is clearly written and easy to follow, I just have a few comments/observations that authors might consider for its improvement.
Why was the experiment conducted for 8 weeks? Does it refer to any standard? Please explain.

In line 15-31 you write: “In natural outdoor conditions, the process of fungal degradation of wood is a slow process and often do not show any visible discoloration, at the onset, causing difficulty in judgement of the soundness of wood. Contrarily, in accelerated laboratory conditions, using – (a) sterile materials, (b) nutrients, (c) monoculture, and (d) moisture, fungi grow faster than in natural environment. A study of fungal cell structure in accelerated laboratory conditions, therefore, provides meaningful information about the molecular compositions in microbial cell structure.”

Is it only the speed of growth different, or also kinetic? Please explain how the laboratory experiment can help the understanding of the processes occurring in nature.

The analysis of spectra is correct however rather a standard one. Much more information can be revealed by some chemometrics methods. I highly recommend using 2D spectral correlation analysis that enables the study of molecular-level changes induced by an external perturbation (time in this case). Perhaps you might consider this approach in your future analysis. Please correct some punctuation errors.

---PREPARING YOUR MANUSCRIPT---

Your revised paper should include the changes requested by the referees and Editors of your manuscript. You should provide two versions of this manuscript and both versions must be provided in an editable format:

one version identifying all the changes that have been made (for instance, in coloured highlight, in bold text, or tracked changes);

a 'clean' version of the new manuscript that incorporates the changes made, but does not highlight them. This version will be used for typesetting.

Please ensure that any equations included in the paper are editable text and not embedded images.

Please ensure that you include an acknowledgements' section before your reference list/bibliography. This should acknowledge anyone who assisted with your work, but does not qualify as an author per the guidelines at https://royalsociety.org/journals/ethics-policies/openness/.

While not essential, it will speed up the preparation of your manuscript proof if you format your references/bibliography in Vancouver style (please see https://royalsociety.org/journals/authors/author-guidelines/#formatting). You should include DOIs for as many of the references as possible.

If you have been asked to revise the written English in your submission as a condition of publication, you must do so, and you are expected to provide evidence that you have received language editing support. The journal would prefer that you use a professional language editing service and provide a certificate of editing, but a signed letter from a colleague who is a native speaker of English is acceptable. Note the journal has arranged a number of discounts for authors using professional language editing services (https://royalsociety.org/journals/authors/benefits/language-editing/).

---PREPARING YOUR REVISION IN SCHOLARONE---

To revise your manuscript, log into https://mc.manuscriptcentral.com/rsos and enter your Author Centre - this may be accessed by clicking on "Author" in the dark toolbar at the top of the page (just below the journal name). You will find your manuscript listed under "Manuscripts with Decisions". Under "Actions", click on "Create a Revision".
Attach your point-by-point response to referees and Editors at Step 1 'View and respond to decision letter'. This document should be uploaded in an editable file type (.doc or .docx are preferred). This is essential.

Please ensure that you include a summary of your paper at Step 2 'Type, Title, & Abstract'. This should be no more than 100 words to explain to a non-scientific audience the key findings of your research. This will be included in a weekly highlights email circulated by the Royal Society press office to national UK, international, and scientific news outlets to promote your work.

At Step 3 'File upload' you should include the following files:
-- Your revised manuscript in editable file format (.doc, .docx, or .tex preferred). You should upload two versions:
  1) One version identifying all the changes that have been made (for instance, in coloured highlight, in bold text, or tracked changes);
  2) A 'clean' version of the new manuscript that incorporates the changes made, but does not highlight them.
-- An individual file of each figure (EPS or print-quality PDF preferred [either format should be produced directly from original creation package], or original software format).
-- An editable file of each table (.doc, .docx, .xls, .xlsx, or .csv).
-- An editable file of all figure and table captions.
Note: you may upload the figure, table, and caption files in a single Zip folder.
-- Any electronic supplementary material (ESM).
-- If you are requesting a discretionary waiver for the article processing charge, the waiver form must be included at this step.
-- If you are providing image files for potential cover images, please upload these at this step, and inform the editorial office you have done so. You must hold the copyright to any image provided.
-- A copy of your point-by-point response to referees and Editors. This will expedite the preparation of your proof.

At Step 6 'Details & comments', you should review and respond to the queries on the electronic submission form. In particular, we would ask that you do the following:
-- Ensure that your data access statement meets the requirements at https://royalsociety.org/journals/authors/author-guidelines/#data. You should ensure that you cite the dataset in your reference list. If you have deposited data etc in the Dryad repository, please only include the 'For publication' link at this stage. You should remove the 'For review' link.
-- If you are requesting an article processing charge waiver, you must select the relevant waiver option (if requesting a discretionary waiver, the form should have been uploaded at Step 3 'File upload' above).
-- If you have uploaded ESM files, please ensure you follow the guidance at https://royalsociety.org/journals/authors/author-guidelines/#supplementary-material to include a suitable title and informative caption. An example of appropriate titling and captioning may be found at https://figshare.com/articles/Table_S2_from_Is_there_a_trade-off_between_peak_performance_and_performance_breadth_across_temperatures_for_aerobic_scope_in_teleost_fishes_/3843624.

At Step 7 'Review & submit', you must view the PDF proof of the manuscript before you will be able to submit the revision. Note: if any parts of the electronic submission form have not been completed, these will be noted by red message boxes.
Author's Response to Decision Letter for (RSOS-201935.R0)

See Appendix B.

Decision letter (RSOS-201935.R1)

We hope you are keeping well at this difficult and unusual time. We continue to value your support of the journal in these challenging circumstances. If Royal Society Open Science can assist you at all, please don’t hesitate to let us know at the email address below.

Dear Dr Gupta,

I am pleased to inform you that your manuscript entitled "In vitro cell composition identification of wood decay fungi by Fourier transform infrared spectroscopy" is now accepted for publication in Royal Society Open Science.

If you have not already done so, please ensure that you send to the editorial office an editable version of your accepted manuscript, and individual files for each figure and table included in your manuscript. You can send these in a zip folder if more convenient. Failure to provide these files may delay the processing of your proof.

Please remember to make any data sets or code libraries 'live' prior to publication, and update any links as needed when you receive a proof to check - for instance, from a private 'for review' URL to a publicly accessible 'for publication' URL. It is good practice to also add data sets, code and other digital materials to your reference list.

Our payments team will be in touch shortly if you are required to pay a fee for the publication of the paper (if you have any queries regarding fees, please see https://royalsocietypublishing.org/rsos/charges or contact authorfees@royalsociety.org).

The proof of your paper will be available for review using the Royal Society online proofing system and you will receive details of how to access this in the near future from our production office (openscience_proofs@royalsociety.org). We aim to maintain rapid times to publication after acceptance of your manuscript and we would ask you to please contact both the production office and editorial office if you are likely to be away from e-mail contact to minimise delays to publication. If you are going to be away, please nominate a co-author (if available) to manage the proofing process, and ensure they are copied into your email to the journal.

Please see the Royal Society Publishing guidance on how you may share your accepted author manuscript at https://royalsociety.org/journals/ethics-policies/media-embargo/. After publication, some additional ways to effectively promote your article can also be found here https://royalsociety.org/blog/2020/07/promoting-your-latest-paper-and-tracking-your-results/.

On behalf of the Editors of Royal Society Open Science, thank you for your support of the journal and we look forward to your continued contributions to Royal Society Open Science.

Kind regards,

Royal Society Open Science Editorial Office
Royal Society Open Science
Appendix A

To
Dr. Andrew Dunn
Royal Society Open Science Editorial Office
Royal Society Open Science
openscience@royalsociety.org

Subject: Manuscript RSOS-200291

Hello Dr. Dunn

Refer to your journal’s decision, communicated to us on 24 June 2020, we have done the manuscript revision as per the comments received from the reviewers:

Reviewer 1
Can the authors link changes in the amino acids and internal structure of the two fungi to any potential physiology changes in the two fungi?

The Abstract, Discussion and Conclusion section has been revised and modified to incorporate the details of physiological changes observed in the two fungi.

Was the SEM used required drying of the fungal specimens? If so, would influence your results?
In the methodology section, we have mentioned that we collected backscatter image avoiding charge build-up in the living cell specimens.

Reviewer 2
there is little information on substrates such as weight loss rate and chemical component analysis.

The discussion section has been rephrased and rewritten to incorporate informations regarding chemical component changes. Additionally, the Conclusion section has been rewritten to provide more information

SEM observation is unclear to understand the hyphal tip extension from single snapshot.

We cited a reference that says that propagation occurs via tip extension. Our future plan was to perform spectral mapping correlating with microscopic observations.

Despite critical comments, IR spectral monitoring of fungi during bio-degradation involves valuable information for readers. Therefore, reviewer hopes the document will be modified and improved for publish.

Thank you. We appreciate your critical comments.
Looking forward to get the article published in your journal soon

On behalf of all authors,

Kind regards

Barun Shankar Gupta (PhD,M.S.,MSc)
Editorial board member of *International Journal of Materials Science and Applications*
Norwegian University of Science and Technology (NTNU),
Høgskoleringen 7A, NO-7491 Trondheim, Norway.
Phone:  +47 73594640, +91-8902790048
Fax :    +47 73 59 70 21
bsbarun@gmail.com
https://www.researchgate.net/profile/Barun_Shankar_Gupta
Reviewer 2

The revised manuscript will be accepted.
The manuscript has been revised as per comments.

Reviewer 3

Why was the experiment conducted for 8 weeks? Does it refer to any standard? Please explain.

We have rephrased the paragraph. The new paragraph reads “From the above discussions, a hypothesis can be drawn that the cellular structure of wood fungi depends on the duration of wood deterioration process and 70-84 days of microbial exposure is sufficient for the wood cell wall material to get degraded. Henceforth, the aim of this study is to perform inter-species investigation of cell structure during the 8-week period of wood decay process through monoculture”.

Is it only the speed of growth different, or also kinetic? Please explain how the laboratory experiment can help the understanding of the processes occurring in nature?
We have rephrased the sentence. The new sentence reads “Contrarily, in accelerated laboratory conditions, using – (a) sterile materials, (b) nutrients, (c) monoculture, and (d) moisture, the interspecies antagonistic invasion is prevented thereby allowing the microbial cells to follow normal metabolic and enzyme activities.”

The analysis of spectra is correct however rather a standard one. Much more information can be revealed by some chemometrics methods. I highly recommend using 2D spectral correlation analysis that enables the study of molecular-level changes induced by an external perturbation (time in this case). Perhaps you might consider this approach in your future analysis.
Noted.

Please correct some punctuation errors.
We have run the Spelling & Grammar error check options, and wherever recommended have accepted the grammatical mistake corrections. Thank you. We appreciate your critical comments.