HOW TO WRITE AND PUBLISH A SCIENTIFIC PAPER

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The ACS Cycle of Excellence
contribute / publish / review

Dear Valued ACS Reviewer:

Dr. I Made Supartha Utama

Thank you for the work you have performed this year as a reviewer for the journals of the American Chemical Society. Peer review is an essential element of the publication process and vital to the advancement of science. Your participation in that process is greatly appreciated by all of us at the ACS, whose mission it is to "advance the chemical enterprise and its practitioners."

Through the contributions of authors and reviewers like you, ACS remains the most-cited publisher in chemistry and its related disciplines.

As reported in the 2006 Journal Citation Reports® published by Thomson Scientific, the peer-reviewed journals of the ACS rank #1 in total citations and/or ISI® Impact Factor in the 7 core chemistry categories as well as in 8 additional categories, from Agriculture and Environmental Science, to Crystallography and Nanoscience & Nanotechnology. We are also delighted to report that 24 ACS journals achieved their highest ISI® Impact Factors ever in 2006!

We appreciate your contributions to the ACS Cycle of Excellence. Best wishes to you for the holidays and in 2008.

Sincerely,

Dean Smith
Vice President, Sales & Marketing
Learning Objectives

• Learn what is required to put together a research paper that stands a chance of being published

• Recognize the significance of quality with respect to scientific publications

• Be aware of the pit-falls associated with scientific writing – how to avoid them.

• How to prepare effective illustrations of your data for Publication.
THE PROCESS OF PUBLICATION OF A RESEARCH PAPER

1. Researchers conduct scientific research.
2. Researchers submit a manuscript to a journal.
3. The manuscript undergoes peer review.
4. If revisions are needed, the manuscript is returned for revision.
5. If the manuscript is accepted, it goes to page proofs.
6. If the manuscript is rejected, the process ends.
7. If the manuscript is accepted, it is published.

Researchers, Referees, and Editors oversee the process.
CHOOSING THE JOURNAL

The choice is important:

• to publish it quickly [RAPID REVIEW]
• to publish in a ‘quality’ journal [PRESTIGE]
• everyone in your field to read it [CIRCULATION]
• other researchers to cite your work [CITATION]
When making your choice you should consider:

- Is the journal covered in Current Contents etc?
- Does it publish papers in your field?
- Are the best papers in your field published in that journal?
- Do you read papers published in that journal?
- Are there associated page charges?
- Does the journal offer free reprints?
- Is it a new journal?
- Are there familiar names on the Editorial Board?
- WHAT IS ITS IMPACT FACTOR???
What is the “Impact Factor”

‘A measure of the frequency with the average article in a journal has been cited in a particular year’

no citations to articles publishing in journal X

no articles published in journal X
### e.g impact factor 1993

<table>
<thead>
<tr>
<th>Journal</th>
<th>Impact Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMBO Journal</td>
<td>13.208</td>
</tr>
<tr>
<td>European Journal of Biochemistry</td>
<td>3.306</td>
</tr>
<tr>
<td>Biochem. Soc. Transaction</td>
<td>1.807</td>
</tr>
<tr>
<td>Journal of Biological Chemistry</td>
<td>6.793</td>
</tr>
<tr>
<td>Cell</td>
<td>37.192</td>
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<tr>
<td>Nature</td>
<td>22.326</td>
</tr>
<tr>
<td>Journal of Bacteriology</td>
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<tr>
<td>Biochim Biophys Acta</td>
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<td>Journal Applied Bacteriology</td>
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<tr>
<td>FASEB Journal</td>
<td>16.634</td>
</tr>
<tr>
<td>Applied Biochem Biotech</td>
<td>0.731</td>
</tr>
</tbody>
</table>
ARRANGEMENT OF THE MANUSCRIPT

Title:
- Concise but informative
- Treat as a label NOT a sentence
- Avoid abbreviations and jargon
- Does the title effectively communicate the contents and major points of the paper?
- Does it contain extra and often meaningless words (e.g., effects of…, part 1, study of…)
- Be aware of faulty syntax

In Vitro Efficacy of Plant Volatiles for Inhibiting the Growth of Fruit and Vegetable Decay Microorganisms

I Made S. Utama,*,† Ron B. H. Wills,‡ Shimshon Ben-Yehoshua,§ and Clem Kuek¶

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Abstract:

- Usually 200 words or less
- Should be intelligible without reference to other parts of the paper
- *Mostly written in the past tense*
- Does the abstract provide enough information so the content of the paper is clear?
- Does it contain too much background or too much detail? It must report the major results with terse interpretation.
- Method details should not be reported unless a particularly novel method was used.
Introduction:

• Are there portions of the introduction that are peripheral to the topic?

• The introduction should not cite all the related literature. It should cite important papers that deal directly with both the experiment as well as the methods used for the measurements taken.

• Are too many papers, not directly on-topic?

• Do NOT provide an extensive review of the literature.

• Define any specialized terms or abbreviations
Materials & Methods:

- Is there enough information provided so that a knowledgeable scientist is able to repeat the experiments? Should include enough detail to permit reproduction of the experiments by a competent researcher.
- *Should be written in the past tense*
- Include exact technical specifications and quantities and sources or method of preparation.
- Use subheadings.
- If the method is new provide all the details, if not then only give the literature reference.
- Do NOT include result in this section.
Result:

• Are all the results mentioned in the text? While some bits of data can be presented only in tables, it is not appropriate to say, “...see our results in Table x” and not mention the data further.

• Are tables and figures of high quality which can be reproduced well?

• Are figure titles complete, are axes appropriately labeled, are figure components clearly labeled, and are footnotes clear?

• Are table titles concise and complete?

• Are columns and rows properly and completely labeled? Are footnotes complete?

• Are some data presented both in a table and in a figure? This is not permitted. The most effective way to present the information should be chosen but not both ways.
Discussion:

• Usually the hardest section to write
• Results should be interpreted NOT recapitulated
• Avoid excessive speculation, but don’t be shy
• Never try to cover up or fudge data that do not quite fit
• Relate your findings to previous findings – even if they are not agreement
• State your conclusions as clearly as possible
Summary and Conclusions:

- Some Journals do not have a separate section for a summary or conclusions. These should be placed in Results and Discussion section.
- However, the discussion should close with some assessment of the paper’s significance with regard to the purpose described in the introduction.
TENSE IN SCIENTIFIC WRITING

• Whenever you quote previously published work you should use the PRESENT tense
• Your own present work must be referred to in the PAST tense
• Most of the Abstract will be in the PAST tense
• Materials & methods and Results should be in the PAST tense
• Much of the Introduction and Discussion should be in the PRESENT tense
Table 1. Quality attributes of mature-green bell peppers in relation to weight loss at 20°C. Data are averages from 16 fruits per treatment.

<table>
<thead>
<tr>
<th>Actual Wt Loss, %</th>
<th>Visual Quality Score ¹</th>
<th>Dehydration Score ²</th>
<th>Firmness, Newtons ³</th>
<th>Gloss Meter Value ⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>8.4</td>
<td>1.1</td>
<td>23.3</td>
<td>6.7</td>
</tr>
<tr>
<td>2.0</td>
<td>7.2</td>
<td>2.3</td>
<td>16.2</td>
<td>5.8</td>
</tr>
<tr>
<td>2.8</td>
<td>5.9</td>
<td>2.8</td>
<td>12.5</td>
<td>4.7</td>
</tr>
<tr>
<td>3.9</td>
<td>4.8</td>
<td>3.1</td>
<td>7.1</td>
<td>3.4</td>
</tr>
<tr>
<td>LSD.05</td>
<td>0.4</td>
<td>0.4</td>
<td>2.8</td>
<td>1.0</td>
</tr>
</tbody>
</table>

¹ Visual quality was scored on a 9 to 1 scale, where 9=excellent, fresh appearance, 7=good, 5=fair (limit of salability), 3=fair (useable but not salable), 1=unuseable.

² Dehydration was scored on a 1 to 5 scale, where 1=none, 2=slight, 3=moderate (would result in price adjustment commercially), 4=moderately severe, 5=severe.

³ Firmness measured as force in Newtons to compress the fruit at the equator with a 25 mm diameter flat probe to a depth of 5 mm. 1 Newton= 9.81 kg-force or 4.45 pounds-force.

⁴ Gloss was measured with a BYK-Gardner gloss meter; the higher the value, the glossier.
Table 6. Effect of \( C_2H_4 \) treatments on lesion development due to *Penicillium italicum* on navel oranges at 20 °C

<table>
<thead>
<tr>
<th>Treatment (( \mu l ) ( C_2H_4 ) per liter of air)</th>
<th>Mean diameter of lesions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( A^\gamma )</td>
</tr>
<tr>
<td>0 (air control)</td>
<td>51 a ( ^z )</td>
</tr>
<tr>
<td>1</td>
<td>53 a</td>
</tr>
<tr>
<td>10</td>
<td>46 a</td>
</tr>
<tr>
<td>100</td>
<td>53 a</td>
</tr>
<tr>
<td>1,000</td>
<td>51 a</td>
</tr>
</tbody>
</table>

\( ^\gamma \) Fruits incubated for 6 days following inoculation, and \( B \) = fruits subjected to \( C_2H_4 \) treatments for 3 days before inoculation, then incubated in air for 6 days.

\( ^z \) Mean separation in columns according to Duncan’s new multiple range test, \( P = 0.05 \).

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Table 1. Minimum Inhibitory Concentration (MIC) of Volatiles against Decay Microorganisms at 25 °C

<table>
<thead>
<tr>
<th>volatile</th>
<th><em>R. stolonifer</em></th>
<th><em>P. digitatum</em></th>
<th><em>C. musae</em></th>
<th><em>E. carotovora</em></th>
<th><em>P. aeruginosa</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>acetaldehyde</td>
<td>0.88bA</td>
<td>0.84cA</td>
<td>0.91bA</td>
<td>0.91cA</td>
<td>0.88bA</td>
</tr>
<tr>
<td>benzaldehyde</td>
<td>0.50aA</td>
<td>0.50bA</td>
<td>0.49bA</td>
<td>0.49bA</td>
<td>0.50aA</td>
</tr>
<tr>
<td>cinnamaldehyde</td>
<td>0.42aB</td>
<td>0.09aA</td>
<td>0.39aB</td>
<td>0.11aA</td>
<td>0.41aB</td>
</tr>
<tr>
<td>ethanol</td>
<td>15.33dB</td>
<td>9.87cA</td>
<td>16.59fB</td>
<td>14.91dB</td>
<td>16.38dB</td>
</tr>
<tr>
<td>benzyl alcohol</td>
<td>12.67cC</td>
<td>0.48bA</td>
<td>1.06bB</td>
<td>0.45bA</td>
<td>0.49aA</td>
</tr>
<tr>
<td>2-nonanone</td>
<td>NE</td>
<td>4.82cB</td>
<td>3.58cA</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>( \beta )-ionone</td>
<td>NE</td>
<td>NE</td>
<td>4.65d</td>
<td>NE</td>
<td>NE</td>
</tr>
<tr>
<td>ethyl formate</td>
<td>11.49cB</td>
<td>NE</td>
<td>7.45cA</td>
<td>6.52cA</td>
<td>6.21cA</td>
</tr>
</tbody>
</table>

\( ^a \) Data are the means of eight replications. Values followed by the same lower case letters in the same column, or values followed by the same upper case letters in the same row, are not significantly different (DMRT 5%). NE indicates compound ineffective in preventing microbial growth at 1.5 mL/dish.
WHEN TO USE A GRAPH?

- IF the data show pronounced trends making an interesting picture, USE A GRAPH

Gambar 2. Persentase penurunan bobot sayuran selada, kangkung, bawang prei dan sawi cina hasil proses crisping setelah satu hari pemajangan pada suhu 10±2°C.
Fig. 3. Effects of superatmospheric O₂ levels on rates of respiration, ethylene production, and softening of 'Bartlett' pear slices kept at 10°C for 4 days.

Fig. 1. Effects of superatmospheric O₂ levels on respiration rates of grapefruit kept at 14°C.
PREPARING A GRAPH

• Size of the letters and symbols must be chosen so that the final printed version is clear and readable
• Do not include too many data sets on a single figure
• Do not extend the ordinate or abscissa beyond what the graph demands
• Only use standard symbols
• Connecting lines can be of different types (solid, dashed)
• Lines must be black and photocopy able
• Should always be accompanied by a legend
POTHOGRAPHS AND MICROGRAPHS

- Remember the print must fit either column or page width of the journal
- Is the photograph actually necessary?
- Does the journal you want to publish in have high-quality reproduction standards?
- Be prepared to ‘crop’ your original picture
- Never taken a photograph of a photograph
- Provide simple, self-explanatory labeling
- Provide a title and detailed legend for all figures
- Be aware about the cost.
CA Delays Ripening of Bartlett Pears

Benzaldehyde

C. musae

P. digitatum

Ethanol
KLORIN 100 ppm
DAN TANPA SURFAKTAN

Keterangan:
A. Semut pada bagian bawah buah bertahan selama pencelupan
B. Semut yang meninggalkan buah (panah horisontal) dan semut yang beraktivitas tanpa gelembung udara (panah vertikal)
C. Semut terlepas dari buah setelah bertahan selama 8 detik
D. Semut mati di bagian luar toples setelah meninggalkan buah
The review should give a specific and substantive evaluation of strengths and weaknesses of the manuscript.
Quality of the Work
• Is there originality in the concepts, experimental approach and interpretation, or is it a routine application of known methods to a new sample?
• Is the work substantial, or is it a routine addition to an already well studied field?

Appropriateness for the specific journal
• Is there clear emphasis on the mechanical engineering?
Technical Quality

• Is the experimental design appropriate?
• Are there adequate controls and sampling, and is it established in the report?
• Are new compounds unequivocally or clearly established by spectroscopic methods and elemental analyses?
• Are all the tables and figures essential and of high quality?
• Are experimental details and statistics appropriately described to allow others to repeat the experiments?
Clarity of Presentation

- Is the presentation clear and objective?
- Is the manuscript written in standard language (e.g. Standard American English or Bahasa Indonesia)?
- Are all the figures and tables essential?
- Are the figures well drawn and easily understood?
- Are experimental details and/or statistics sufficiently detailed?
- Are the chemical structures sufficient to illustrate the concepts?
Professional Ethics

• Is there clear evidence of plagiarism, simultaneous submission to another journal or was the manuscript previously published?
• Is there clear evidence of conflict of interest?
• Are there concerns in experimental animal treatment?
• Permission to reproduce someone else data
• Who should be on the author list?, And In which order should the names be?
  – Senior author : major contributor to the overall design and execution of experiments
  – All authors must share the intellectual responsibility for the research result being presented
  – All authors should agree on the author list before the paper is written
TERIMA KASIH