DESCRIPTION

Food Chemistry has two open access companion journals Food Chemistry: X and Food Chemistry: Molecular Sciences.

The Aims and Scope of Food Chemistry are assessed and modified on an annual basis to reflect developments in the field. This means that research topics that have been deemed in scope previously may now fall outside of the scope of the journal as our scientific and technical understanding of the fields evolve and topics become less novel, original or relevant to Food Chemistry.

Food Chemistry publishes papers dealing with the advancement of the chemistry and biochemistry of foods or the analytical methods/approach used. All papers should focus on the novelty of the research carried out.

Research advancing the theory and practice of molecular sciences of foods or cure/prevention of human diseases will not be considered for inclusion in Food Chemistry.

Topics featured in Food Chemistry include:

– Chemistry relating to major and minor components of food, their nutritional, physiological, sensory, flavour and microbiological aspects;

– Bioactive constituents of foods, including antioxidants, phytochemicals, and botanicals. Data must accompany sufficient discussion to demonstrate their relevance to food and/or food chemistry;

– Chemical and biochemical composition and structure changes in molecules induced by processing, distribution and domestic conditions;

– Effects of processing on the composition, quality and safety of foods, other bio-based materials, by-products, and processing wastes;

– Chemistry of food additives, contaminants, and other agro-chemicals, together with their metabolism, toxicology and food fate.

Analytical papers related to the microbiological, sensory, nutritional, physiological, authenticity and origin aspects of food. Papers should be primarily concerned with new or novel methods (especially
instrumental or rapid) provided adequate validation is described including sufficient data from real samples to demonstrate robustness. Papers dealing with significant improvements to existing methods, or data from application of existing methods to new foods, or commodities produced in unreported geographical areas, will also be considered.

For Analytical Papers, especially those dedicated to the development and validation of methods, authors are encouraged to follow internationally recognized guidelines, such as EURACHEM - for chemical compounds (https://www.eurachem.org/index.php/publications/guides/mv) or FDA - for microbiological data (https://www.fda.gov/downloads/ScienceResearch/FieldScience/UCM298730.pdf) and proper statistical methods should be applied. Special attention should be given to linearity, selectivity, determination of LOD/LOQ, repeatability and reproducibility of the analysis. Authors should also pay attention to trueness and, when possible (quantitative methods), determine the uncertainty of measurement. Overall, real samples should be analyzed by the state-of-the-art and the newly developed method for validation purposes.

- Methods for the determination of both major and minor components of food especially nutrients and non-nutrient bioactive compounds (with putative health benefits) will be considered.

- Results of method inter-comparison studies and development of food reference materials for use in the assay of food components;

- Methods concerned with the chemical forms in food, nutrient bioavailability and nutritional status;

- General authentication and origin [e.g. Country of Origin Labelling (COOL), Protected Designation of Origin (PDO), Protected Geographical Indication (PGI), Certificate of Specific Character (CSC)] determination of foods (both geographical and production including commodity substitution, and verification of organic, biological and ecological labelling) USING CHEMICAL MARKERS, providing sufficient data from authentic samples should be included to ensure that interpretations are meaningful.

*Food Chemistry* will not consider papers that focus on purely clinical or engineering aspects without any contribution to chemistry; pharmaceutical or non-food herbal remedies; traditional or folk medicines; or survey/surveillance data.

Papers on therapeutic application of food compounds/isolates for treatment, cure or prevention of human diseases will not be considered for inclusion in *Food Chemistry*.

**AUDIENCE**

Food technologists, scientists and chemists

**IMPACT FACTOR**

2019: 6.306 © Clarivate Analytics Journal Citation Reports 2020
ABSTRACTING AND INDEXING

Global Health
Publications in Food Microbiology
Current Contents
Science Citation Index
Web of Science
Embase
Chemical Abstracts
Nutrition Abstracts
EMBiology
CAB International
Chemical Engineering Biotechnology Abstracts
Sociedad Iberoamericana de Informacion Cientifica (SIIC) Data Bases
Scopus
BIOSIS Citation Index
FSTA (Food Science and Technology Abstracts)

EDITORIAL BOARD

Editor-in-Chief
Paul Finglas, Quadram Institute Bioscience, NR4 7UA, Norwich, United Kingdom

Editorial Office
Mélanie Lowie, EuroFIR AISBL, Brussels, Belgium

Senior Editors
Dimitris Charalampopoulos, University of Reading, Reading, United Kingdom
Dongxiao Sun-Waterhouse, South China University of Technology, Guangzhou, China

Editors
Cesarettin Alasalvar, TUBİTAK Marmara Research Centre Food Institute, Gebze, Turkey
Sian Astley, EuroFIR AISBL, Brussels, Belgium
J. Stephen Elmore, University of Reading, Reading, United Kingdom
Daniel Granato, University of Limerick Faculty of Science and Engineering, Limerick, Ireland
Francisco Hidalgo, Fat Institute, Sevilla, Spain
Kazuo Miyashita, Obihiro University of Agriculture and Veterinary Medicine Center for Regional Collaboration in Research and Education, Obihiro, Japan
John Van Camp, Ghent University, Gent, Belgium

Associate Editors
Carlos Álvarez García, Teagasc Food Research Centre Ashtown, Dublin, Ireland
Edna Regina Amante, Federal University of Santa Catarina, Florianópolis, Brazil
Nandika Bandara, University of Manitoba, Department of Food & Human Nutritional Sciences, Winnipeg, Manitoba, Canada
Alaa El-Din A. Bekhit, University of Otago Department of Food Science, Otago, New Zealand
Krzysztof Buksa, University of Agriculture in Krakow, Faculty of Food Technology, Department of Carbohydrates Technology, Kraków, Poland
Beatriz Cabanillas, 12th of October Hospital Research Institute, Madrid, Spain
Isabel Castanheira, National Institute of Health Doctor Ricardo Jorge, Lisboa, Portugal
Vural Gökmen, Hacettepe University, Ankara, Turkey
Melvin Holmes, University of Leeds School of Food Science and Nutrition, Leeds, United Kingdom
Amin Ismail, Putra Malaysia University Faculty of Medicine and Health Sciences, Serdang, Malaysia
Baraem Ismail, University of Minnesota Department of Food Science and Nutrition, Saint Paul, Minnesota, United States of America
Ron Pegg, The University of Georgia, Athens, Georgia, United States of America
Jesus Simal-Gandara, University of Vigo, Faculty of Food Science and Technology, Department of Analytical Chemistry and Food Science, Ourense, Spain
Peng Zhou, Jiangnan University, Wuxi, Jiangsu, China

Special Content Editor
Jianbo Xiao, University of Vigo, Vigo, Spain
Editorial Board Members

Rotimi Aluko, University of Manitoba, Winnipeg, Manitoba, Canada
Muhammad Hussein Al-udatt, Jordan University of Science and Technology, Department of Nutrition and Food Technology, Irbid, Jordan
Ryszard Amarowicz, Institute of Animal Reproduction and Food Research PAS, Olsztyn, Poland
Paula Andrade, University of Porto, Porto, Portugal
Skelte Anema, Fonterra Research and Development Centre, Palmerston North, New Zealand
Marco Arlorio, University of Eastern Piedmont, Vercelli, Italy
Joseph H. Banoub, Fisheries and Oceans Canada Newfoundland and Labrador Region, St John’s, Newfoundland and Labrador, Canada
Yongping Bao, University of East Anglia Norwich Medical School, Norwich, United Kingdom
João Barreira, Polytechnic Institute of Bragança, Braganca, Portugal
Maurizio Battino, Polytechnic University of Marche, Ancona, Italy
John Beaulieu, USDA-ARS Southern Regional Research Center, New Orleans, Louisiana, United States of America
R.G. Berger, Leibniz University Hanover, Hannover, Germany
Trust Beta, University of Manitoba, Winnipeg, Manitoba, Canada
Mirko Bettii, University of Alberta, Edmonton, Alberta, Canada
Alessandra Miranda Cabral, Federal University of Rio Grande do Norte, Natal, Brazil
Jinxuan Cao, Ningbo University, Ningbo, China
Harold Corke, Guangdong Technion-Israel Institute of Technology Department of Biotechnology and Food Engineering, Shantou, China
Lisa Dean, North Carolina State University, Raleigh, North Carolina, United States of America
Sushil Dhital, Monash University Department of Chemical Engineering, Clayton, Victoria, Australia
Hao Dong, Zhongkai University of Agriculture and Engineering, Guangzhou, China
Bruno Fedrizzi, The University of Auckland, Auckland, New Zealand
Mike Gidley, University of Queensland, Brisbane, Queensland, Australia
Wenqiang Guan, Tianjin University of Commerce, Tianjin, China
Jette Jakobsen, National Food Institute, Søborg, Denmark
Zheng-Qiang Jiang, China Agricultural University, College of Food Science and Nutritional Engineering, Beijing, China
Owen Jones, Purdue University, West Lafayette, Indiana, United States of America
Mun Yhung Jung, Woosuk University Department of Food Science and Biotechnology, Wanju-gun, South Korea
Simona Kelly, Food and Environmental Protection Laboratory | Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture| Department of Nuclear Sciences and Applications | International Atomic Energy Agency | Vienna International Centre, Vienna, Austria
Brad Kim, Purdue University Department of Animal Sciences, West Lafayette, Indiana, United States of America
Hua Kuang, Jiangnan University, Wuxi, Jiangsu, China
Hungmin Lee, USDA-ARS Horticultural Crops Research Unit, Parma, Idaho, United States of America
Hetong Lin, Fujian Agriculture and Forestry University, Fuzhou, China
Yuan Liu, Shanghai Jiao Tong University, Shanghai, China
Mei Lu, University of Nebraska-Lincoln, Lincoln, Nebraska, United States of America
Asghan Madadlou, National Research Institute for Agriculture Food and Environment Bretagne-Normandie Center, Rennes, France
Mohamed Mathlouthi, Reims Champagne-Ardenne University, Reims, France
S. Porretta, Experimental Station for Food Preservation Industry, Parma, Italy
Predrag Putnik, University North, Department of Food Technology, Koprivnica, Croatia
Patrizia Rubiolo, University of Turin, Turin, Italy
Sonia Sáyago-Ayerdi, Technological Institute of Tepic, Tepic, Mexico
Fereidoon Shahidi, Memorial University of Newfoundland Department of Biochemistry, St John’s, Newfoundland and Labrador, Canada
Jae-Han Shim, Chonnam National University, Gwangju, South Korea
Fidel Toldrá, Instituto de Agroquimica y Tecnologia de Alimentos (CSIC), Valencia, Spain
Rong Tsao, Agriculture and Agri-Food Canada Guelph Research and Development Centre, Guelph, Ontario, Canada
Shujun Wang, Tianjin University of Science and Technology, Tianjin, China
Haizhou Wu, Chalmers University of Technology Department of Biology and Biological Engineering, Gothenburg, Sweden
Bao Yang, South China Botanical Garden, Guangzhou, China
Varoujan Yaylayan, McGill University Department of Food Science and Agricultural Chemistry, Sainte-Anne-de-Bellevue, Quebec, Canada
Lucy Yu, University of Maryland at College Park, College Park, Maryland, United States of America
Rosario Zamora, Spanish Scientific Research Council Andalucia Office, Sevilla, Spain
Reinhard Zeleny, European Commission Joint Research Centre, Brussels, Belgium
Ying Joy Zhong, DuPont Company, Olathe, Kansas, United States of America
Dayong Zhou, Dalian Polytechnic University, Dalian, China
Beiwei Zhu, Dalian Polytechnic University, Dalian, China
GUIDE FOR AUTHORS

INTRODUCTION
Food Chemistry has two open access companion journals Food Chemistry: X and Food Chemistry: Molecular Sciences

Submission checklist
You can use THIS LIST to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

All necessary files have been uploaded:
Manuscript:
• Include keywords
• All figures (include relevant captions)
• All tables (including titles, description, footnotes)
• Ensure all figure and table citations in the text match the files provided
• Indicate clearly if color should be used for any figures in print
Graphical Abstracts / Highlights files (where applicable)
Supplemental files (where applicable)

Further considerations
• The manuscript fits within Aims and Scope of Food Chemistry. Please note that the Aims and Scope are regularly updated.
• The research is novel and has not been published previously - see "Responsible research publication: international standards for authors" from COPE for more information.
• Ethical consent has been obtained in case of work on animals and/or humans.
• Manuscript has been 'spell checked' and 'grammar checked'.
• All references mentioned in the Reference List are cited in the text, and vice versa.
• Permission has been obtained for use of copyrighted material from other sources (including the Internet).
• A competing interests statement is provided, even if the authors have no competing interests to declare - more detail here
• Journal policies detailed in this guide have been reviewed.
• Referee suggestions and contact details provided, based on journal requirements.

For further information, visit our Support Center.

Types of paper
Original research papers; review articles; short communications; letters to the Editor/Commentary.

1. Research papers - original full-length research papers that have not been published previously, except in a preliminary form, and should not exceed 7,500 words from introduction to conclusion (not including references) (including no more than six tables and figures combined - additional tables and figures can be submitted as supplementary material). Research papers should not contain more than 40 references.

2. Review articles - will be accepted in areas of topical interest, will normally focus on literature published over the previous five years, and should not exceed 10,000 words from introduction to conclusion (not including references) (including allowance for no more than six tables and figures combined). Review articles should not contain more than 120 references. If it is felt absolutely necessary to exceed these numbers (tables, figures, references), please contact the editorial office for advice before submission.
3. Short communications - Short communications of up to 3000 words from introduction to conclusion (not including references), describing work that may be of a preliminary nature but merits publication. These papers should not contain more than 40 references.

4. Letters to the Editor/Commentary - Letters are published from time to time on matters of topical interest.

Special Issues
If you would like to suggest a special issue, please contact our Special Content Editor, Prof Jianbo Xiao jianboxiao@yahoo.com with a proposal for the special issue including the rationale for the special issue topic, potential contributors and how you plan to attract high quality papers. Before submitting your proposal, please read our Guide for Guest Editors.

BEFORE YOU BEGIN

Ethics in publishing
Please see our information on Ethics in publishing.

Declaration of interest
All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors should complete the declaration of interest statement using this template and upload to the submission system at the Attach/Upload Files step. If there are no interests to declare, please choose: 'Declarations of interest: none' in the template. This summary statement will be published within the article if accepted. More information.

Submission declaration and verification
Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see 'Multiple, redundant or concurrent publication' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service Crossref Similarity Check.

Preprints
Please note that preprints can be shared anywhere at any time, in line with Elsevier's sharing policy. Sharing your preprints e.g. on a preprint server will not count as prior publication (see 'Multiple, redundant or concurrent publication' for more information).

Use of inclusive language
Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Articles should make no assumptions about the beliefs or commitments of any reader, should contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic, and should use inclusive language throughout. Authors should ensure that writing is free from bias, for instance by using 'he or she', 'his/her' instead of 'he' or 'his', and by making use of job titles that are free of stereotyping (e.g. 'chairperson' instead of 'chairman' and 'flight attendant' instead of 'stewardess').

Author contributions
For transparency, we encourage authors to submit an author statement file outlining their individual contributions to the paper using the relevant CRediT roles: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Roles/Writing - original draft; Writing - review & editing. Authorship statements should be formatted with the names of authors first and CRediT role(s) following. More details and an example

Changes to authorship
All authors should have made substantial contributions to all of the following:
• the conception and design of the study, or acquisition of data, or analysis and interpretation of data
• drafting the article or revising it critically for important intellectual content
• final approval of the version to be submitted.
If all 3 of these conditions are not met, a person does not qualify as an author, and any contribution made by them should be mentioned in the Acknowledgements section of the manuscript.

Authors are expected to consider carefully the list and order of authors before submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only before the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the corresponding author: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors after the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

Copyright
Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' (see more information on this). Permitted third party reuse of open access articles is determined by the author's choice of user license.

Author rights
As an author you (or your employer or institution) have certain rights to reuse your work. More information.

Elsevier supports responsible sharing
Find out how you can share your research published in Elsevier journals.

Role of the funding source
You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

Subscription or open access: your choice
This journal offers authors a choice in publishing their research:

Subscription
• Articles are made available to subscribers as well as developing countries and patient groups through our access programs.
• No open access publication fee payable by authors.

Open access
• Articles are freely available to both subscribers and the wider public with permitted reuse.
• An open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.

Regardless of how you choose to publish your article (subscription or open access), the journal will apply the same peer review criteria and acceptance standards.

For open access articles, permitted third party (re)use is defined by the following Creative Commons user licenses:

Open access
Please visit our Open Access page for more information
Elsevier Researcher Academy

Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

Language (usage and editing services)

Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's Author Services.

Submission

Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

PREPARATION

Queries

For questions about the editorial process (including the status of manuscripts under review) or for technical support on submissions, please visit our Support Center.

Peer review

This journal operates a single anonymized review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. Editors are not involved in decisions about papers which they have written themselves or have been written by family members or colleagues or which relate to products or services in which the editor has an interest. Any such submission is subject to all of the journal's usual procedures, with peer review handled independently of the relevant editor and their research groups. More information on types of peer review.

Review Policy

The Managing Editor and Editors have the right to decline formal review of a manuscript when it is deemed that the manuscript
1. is on a topic outside the scope of the Journal;
2. makes no contribution to the advancement of the chemistry of foods
3. is lacking technical or scientific merit;
4. is focused on foods or processes that are of narrow regional scope and significance;
5. is fragmentary and providing marginally incremental results;
6. reports only routine work (lacks novelty) or is poorly written.

Use of word processing software

It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. See also the section on Electronic artwork. To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.
**Article structure**

Follow this order when typing manuscripts: Title, Authors, Affiliations, Abstract, Keywords, Main text (Introduction, Material and Methods, Results, Conclusion), Acknowledgements, Appendix, References, Figure Captions. The corresponding author should be identified with an asterisk and footnote. All other footnotes (except for table footnotes) should be identified with superscript Arabic numbers. The title of the paper should unambiguously reflect its contents.

**Essential title page information**

- **Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
- **Author names and affiliations.** Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lowercase superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.
- **Corresponding author.** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. **Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.**
- **Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.

**Highlights**

Highlights increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: example Highlights. example Highlights.

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

**Abstract**

A concise and factual abstract is required. The abstract should state briefly the purpose of the research, the principal results and major conclusions. An abstract is often presented separately from the article, so it must be able to stand alone. For this reason, References should be avoided, but if essential, then cite the author(s) and year(s). Also, non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

The abstract should not exceed 150 words.

**Keywords**

Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

**Subdivision - numbered sections**

Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

**Introduction**

State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.
Hypotheses
Nearly all scientific papers benefit from inclusion of a statement of hypothesis. Such statements should be clear, concise, and declarative. The statement should describe the one or more key hypotheses that the work described in the manuscript was intended to confirm or refute. Inclusion of a hypothesis statement makes it simple to contrast the hypothesis with the most relevant previous literature and point out what the authors feel is distinct about the current hypothesis (novelty). It also permits the authors to describe why they feel it would be important to prove the hypothesis correct (significance). The hypothesis shall be stated in the introductory section, and the conclusion section shall include your conclusion about whether the hypothesis was confirmed or refuted, as well as describing any new hypotheses generated by the work described. Here is an example of a famous, excellent hypothesis statement; declarative, concise, clear, and testable: "Equal volumes of gases, at the same temperature and pressure, contain equal numbers of molecules." Lorenzo Romano Amedeo Carlo Avogadro di Quareqa e di Carreto (Avogadro), 1811

Material and methods
Provide sufficient details to allow the work to be reproduced by an independent researcher. Methods that are already published should be summarized, and indicated by a reference. If quoting directly from a previously published method, use quotation marks and also cite the source. Any modifications to existing methods should also be described.

Theory/calculation
A Theory section should extend, not repeat, the background to the article already dealt with in the Introduction and lay the foundation for further work. In contrast, a Calculation section represents a practical development from a theoretical basis.

Results
Results should be clear and concise.

Discussion
This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Conclusions
The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

Appendices
If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

Graphical abstract
Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view Example Graphical Abstracts on our information site. Authors can make use of Elsevier’s Illustration Services to ensure the best presentation of their images and in accordance with all technical requirements.

Abbreviations
Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

Acknowledgements
Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).
**Chemical compounds**
You can enrich your article by providing a list of chemical compounds studied in the article. The list of compounds will be used to extract relevant information from the NCBI PubChem Compound database and display it next to the online version of the article on ScienceDirect. You can include up to 10 names of chemical compounds in the article. For each compound, please provide the PubChem CID of the most relevant record as in the following example: Glutamic acid (PubChem CID: 611). Please position the list of compounds immediately below the 'Keywords' section. It is strongly recommended to follow the exact text formatting as in the example below:

Chemical compounds studied in this article
Ethylene glycol (PubChem CID: 174); Plitidepsin (PubChem CID: 44152164); Benzalkonium chloride (PubChem CID: 15865)

More information.

**Formatting of funding sources**
List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Math formulae**
Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (/) instead of a horizontal line for small fractional terms, e.g., X/Y. In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).

**Footnotes**
Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

**Statistics**
Appropriate application of statistical analysis should be applied throughout the article.

**Units**
Follow internationally accepted rules and conventions: use the international system of units (SI). If other units are mentioned, please give their equivalent in SI. Temperatures should be given in degrees Celsius. The unit ‘billion’ is ambiguous and should not be used. Abbreviations for units should follow the suggestions of the British Standards publication BS 1991. The full stop should not be included in abbreviations, e.g. m (not m.), ppm (not p.p.m.); % and '/' should be used in preference to 'per cent' and 'per'. Where abbreviations are likely to cause ambiguity or might not be understood easily by an international readership, units should be spelled out in full.

**Artwork**

**Electronic artwork**

**General points**
- Make sure you use uniform lettering and sizing of your original artwork.
- Embed the used fonts if the application provides that option.
- Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files.
• Size the illustrations close to the desired dimensions of the published version.
• Submit each illustration as a separate file.
• Ensure that color images are accessible to all, including those with impaired color vision.

A detailed guide on electronic artwork is available. 
You are urged to visit this site; some excerpts from the detailed information are given here.

Formats
If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format. Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):
EPS (or PDF): Vector drawings, embed all used fonts.
TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.
TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.
TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

Please do not:
• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
• Supply files that are too low in resolution;
• Submit graphics that are disproportionately large for the content.

Color artwork
Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF) or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites). Further information on the preparation of electronic artwork.

Illustration services
Elsevier's Author Services offers Illustration Services to authors preparing to submit a manuscript but concerned about the quality of the images accompanying their article. Elsevier's expert illustrators can produce scientific, technical and medical-style images, as well as a full range of charts, tables and graphs. Image 'polishing' is also available, where our illustrators take your image(s) and improve them to a professional standard. Please visit the website to find out more.

Figure Captions
Ensure that each illustration has a caption. A caption should comprise a brief title (not on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

Tables
Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

References
Citation in text
Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.
**Reference links**

Increased discoverability of research and high quality peer review are ensured by online links to the sources cited. In order to allow us to create links to abstracting and indexing services, such as Scopus, CrossRef and PubMed, please ensure that data provided in the references are correct. Please note that incorrect surnames, journal/book titles, publication year and pagination may prevent link creation. When copying references, please be careful as they may already contain errors. Use of the DOI is highly encouraged.

A DOI is guaranteed never to change, so you can use it as a permanent link to any electronic article. An example of a citation using DOI for an article not yet in an issue is: VanDecar J.C., Russo R.M., James D.E., Ambeh W.B., Franke M. (2003). Aseismic continuation of the Lesser Antilles slab beneath northeastern Venezuela. Journal of Geophysical Research,https://doi.org/10.1029/2001JB000884. Please note the format of such citations should be in the same style as all other references in the paper.

**Web references**

As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

**Data references**

This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

**References in a special issue**

Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

**Reference management software**

Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support Citation Style Language styles, such as Mendeley. Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. More information on how to remove field codes from different reference management software.

**Reference style**

**Text:** Citations in the text should follow the referencing style used by the American Psychological Association. You are referred to the Publication Manual of the American Psychological Association, Seventh Edition, ISBN 978-1-4338-3215-4, copies of which may be ordered online.

**List:** references should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication.

**Examples:**

Reference to a journal publication:

Reference to a journal publication with an article number:

Reference to a book:

Reference to a chapter in an edited book:

Reference to a website:

Reference to a dataset:

Reference to a conference paper or poster presentation:

Reference to software:

Journal abbreviations source
Journal names should be abbreviated according to the List of Title Word Abbreviations.

Video
Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect. Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our video instruction pages. Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

Data visualization
Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions here to find out about available data visualization options and how to include them with your article.

Supplementary material
Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

Research data
This journal encourages and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.
Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. If you are sharing data in one of these ways, you are encouraged to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the research data page.

**Data linking**

If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the database linking page.

For supported data repositories a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

**Mendeley Data**

This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to Mendeley Data. The datasets will be listed and directly accessible to readers next to your published article online.

For more information, visit the Mendeley Data for journals page.

**After Submission**

Click HERE to see what happens to your manuscript once it is submitted.

**AFTER ACCEPTANCE**

**Online proof correction**

To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors. If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF. We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

**Offprints**

The corresponding author will be notified and receive a link to the published version of the open access article on ScienceDirect. This link is in the form of an article DOI link which can be shared via email and social networks. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Both corresponding and co-authors may order offprints at any time via Elsevier's Author Services.

**AUTHOR INQUIRIES**

Visit the Elsevier Support Center to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch.
You can also check the status of your submitted article or find out when your accepted article will be published.