

ScienceDirect AI

Quick Reference Guide



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Starting your ScienceDirect AI journey

Start your journey at [sciencedirect.com/ai](https://www.sciencedirect.com/ai)

Why ScienceDirect AI?

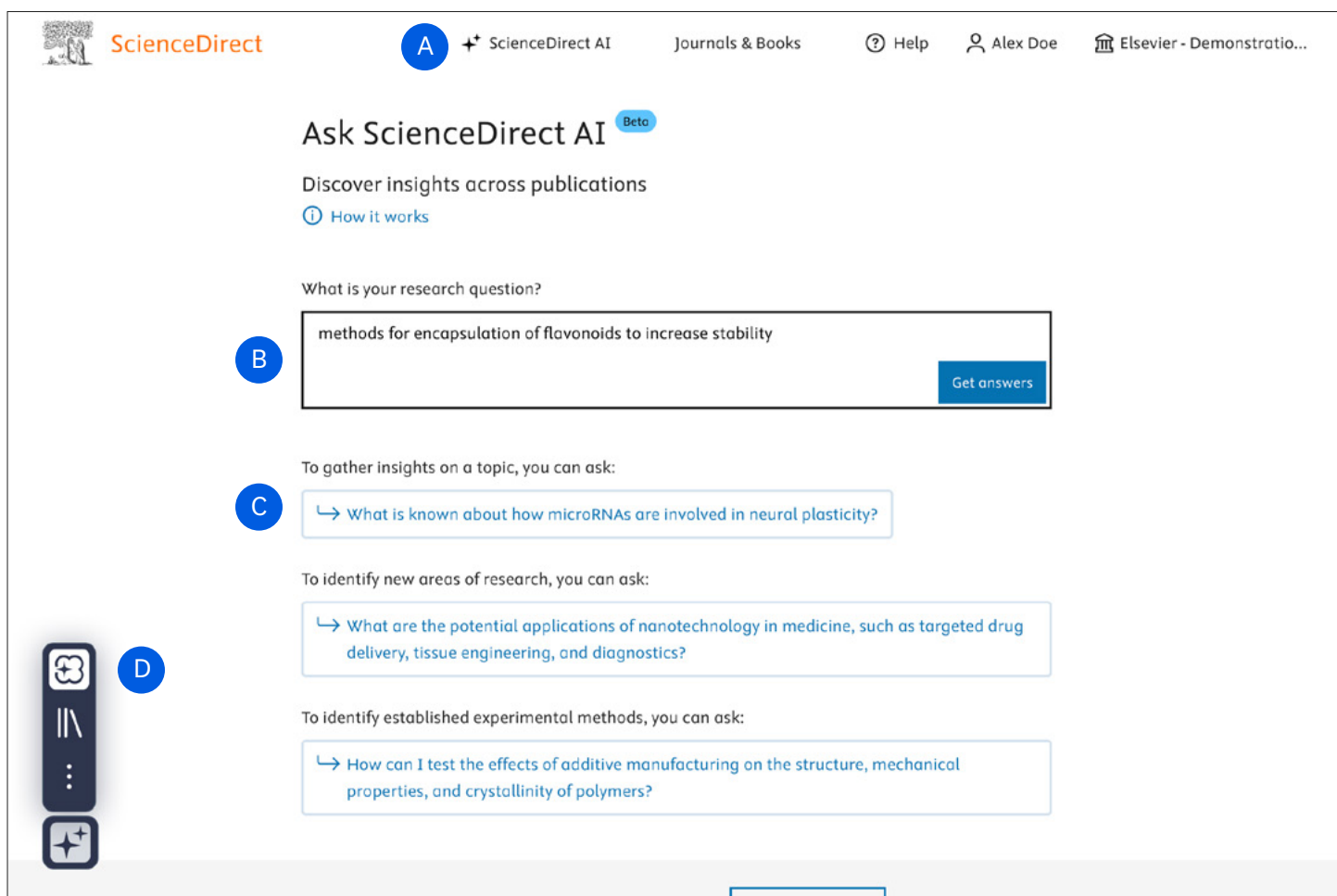
- More insights, less noise
- Seamless integration with ScienceDirect
- Built with and for researchers



Ask ScienceDirect AI

Ask ScienceDirect AI can provide insights across the underlying corpus of full-text, peer-reviewed scientific papers and book chapters.

Start at sciencedirect.com/ai by asking your research question in your own words.

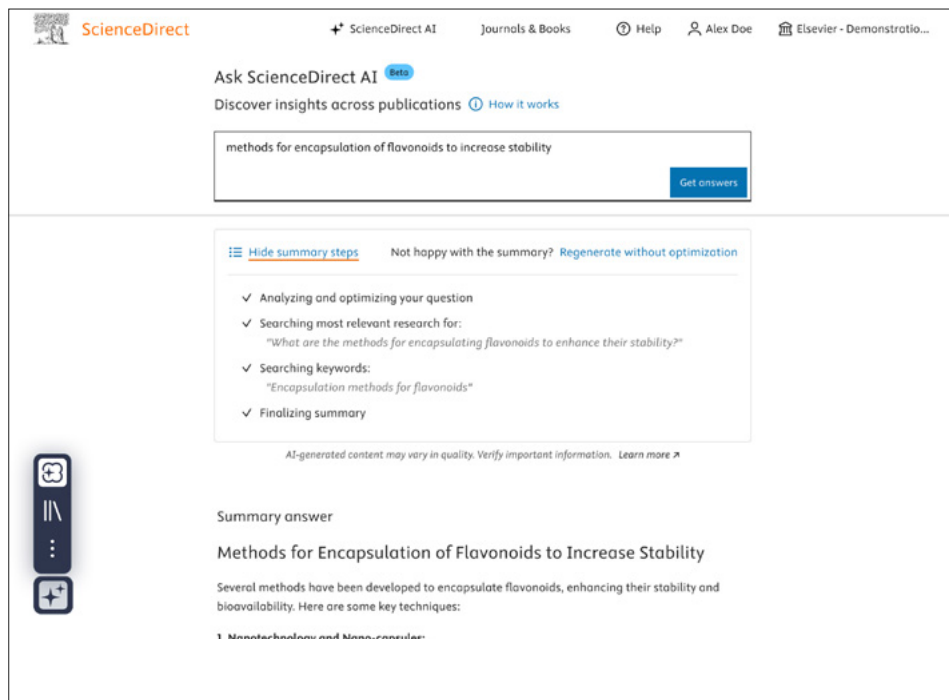


- A.** Access Ask ScienceDirect AI via the URL or by selecting the ScienceDirect AI symbol in the header.
- B.** Natural language search - start your journey by describing what you are looking for in your own words, in any language.
- C.** Explore Ask ScienceDirect AI through pre-selected questions.
- D.** Navigate to other ScienceDirect AI features or learn more.

Search tip

Don't worry about crafting precise keyword queries. The system will optimize your query to return the most relevant results.

Agentic Approach and Hybrid Search



The screenshot displays the ScienceDirect AI interface. At the top, the ScienceDirect logo is on the left, and navigation links for ScienceDirect AI, Journals & Books, Help, Alex Doe, and Elsevier - Demonstratio... are on the right. Below the header, the text "Ask ScienceDirect AI" is followed by a "Beta" badge and the phrase "Discover insights across publications" with a "How it works" link. A search input field contains the query "methods for encapsulation of flavonoids to increase stability", and a "Get answers" button is to its right. Below the search bar, a section titled "Hide summary steps" (with a link) and "Not happy with the summary? Regenerate without optimization" (with a link) contains a list of steps: "Analyzing and optimizing your question", "Searching most relevant research for: 'What are the methods for encapsulating flavonoids to enhance their stability?'" (with a checkmark), "Searching keywords: 'Encapsulation methods for flavonoids'" (with a checkmark), and "Finalizing summary" (with a checkmark). Below this list, a disclaimer states "AI-generated content may vary in quality. Verify important information. Learn more". The "Summary answer" section is titled "Methods for Encapsulation of Flavonoids to Increase Stability" and contains the text "Several methods have been developed to encapsulate flavonoids, enhancing their stability and bioavailability. Here are some key techniques:". A partially visible list item "1. Nanotechnology and Nano-encapsula..." is shown at the bottom.

Agentic Approach

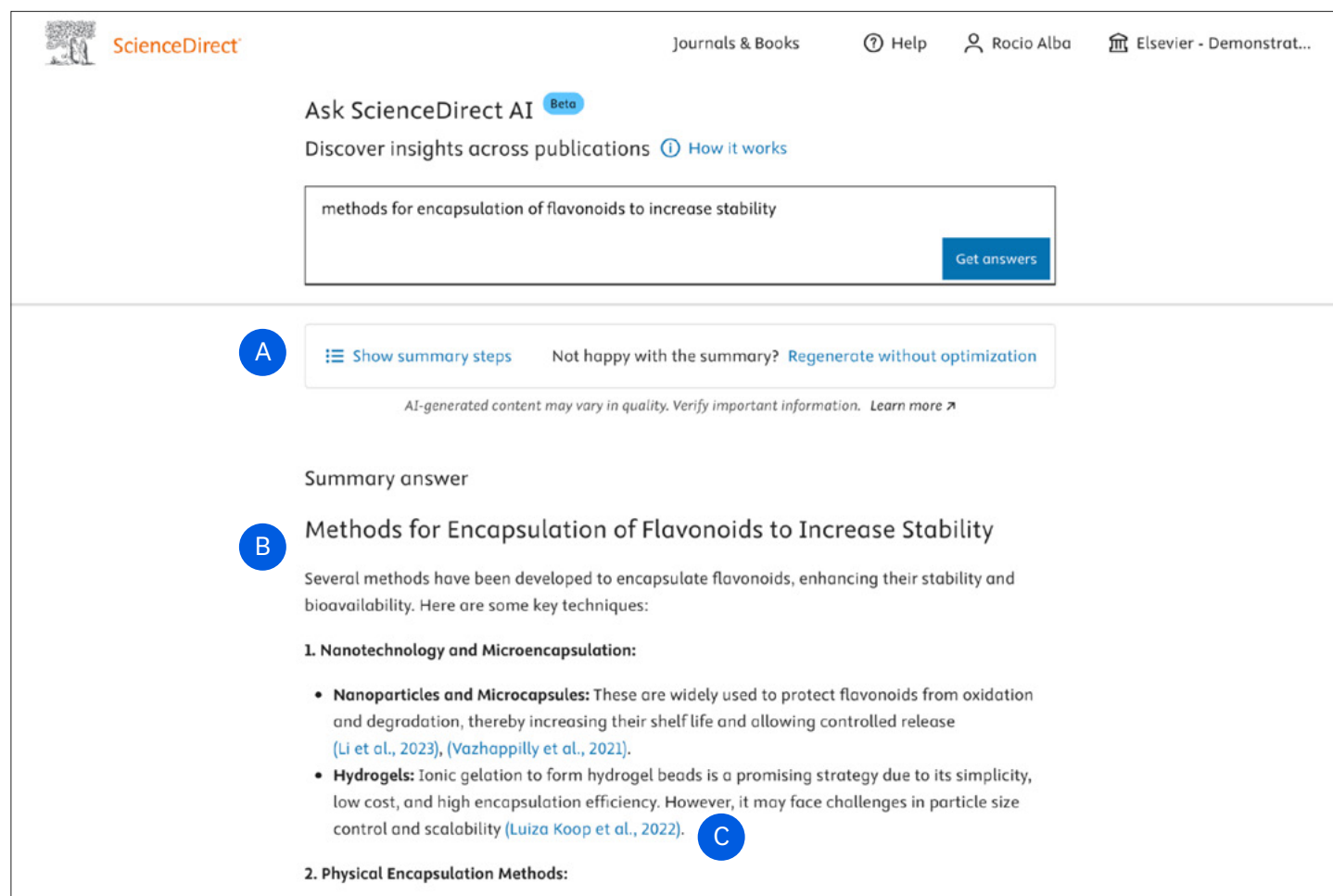
ScienceDirect AI uses a query optimization tool to ensure you get the expected results, e.g. by fixing any typos, expanding abbreviations, translating and rephrasing where necessary.

Hybrid Search

The tool then decides whether to use a natural language version of the query, a keyword version, or both, to retrieve the most relevant content to generate a summary answer.

You can always choose to regenerate the answer without optimizations.

Understanding your search results



The screenshot displays the Ask ScienceDirect AI interface. At the top, the ScienceDirect logo is on the left, and navigation links for 'Journals & Books', 'Help', 'Rocio Alba', and 'Elsevier - Demonstrat...' are on the right. The main heading is 'Ask ScienceDirect AI' with a 'Beta' badge. Below it, a subheading reads 'Discover insights across publications' with a 'How it works' link. A search input box contains the query 'methods for encapsulation of flavonoids to increase stability', and a 'Get answers' button is to its right. Below the search bar, a section labeled 'A' contains a 'Show summary steps' link, a 'Not happy with the summary? Regenerate without optimization' link, and a disclaimer: 'AI-generated content may vary in quality. Verify important information. Learn more'. The 'Summary answer' section, labeled 'B', is titled 'Methods for Encapsulation of Flavonoids to Increase Stability'. It states that several methods have been developed to encapsulate flavonoids, enhancing their stability and bioavailability. It lists two key techniques: 1. Nanotechnology and Microencapsulation, which includes nanoparticles and microcapsules (citing Li et al., 2023 and Vazhappilly et al., 2021) and hydrogels (citing Luiza Koop et al., 2022); and 2. Physical Encapsulation Methods. A circular label 'C' is placed next to the citation '(Luiza Koop et al., 2022)'.

- A.** See the steps Ask ScienceDirect AI took to answer your query.
- B.** Summary answer of your query.
- C.** References to the articles that were used to create the summary answer.

References from summary

References from summary (8)

A	Oral delivery of hydrophobic flavonoids and their incorporation into functional foods: Opportunities and challenges Ruwanthi Premathilaka, Ali Rashidinejad, ... Jaspreet Singh <i>Food Hydrocolloids</i> • 2022 + Add to My Library Copy	Recent encapsulation techniques for hydrophobic flavonoids utilize wall materials like lipids, polysaccharides, and proteins. The document discusses various aspects of encapsulation systems that improve bioavailability and stability. How relevant is this answer? ☆☆☆
	Towards innovative food processing of flavonoid compounds: Insights into stability and bioactivity Yu Fu, Wanning Liu, Olugbenga P. Soladoye <i>LWT</i> • 2021 + Add to My Library Copy	Hydroxyl group modification and physical encapsulation using liposomes can enhance flavonoid stability. The presence of certain food components may negatively impact bioavailability, while others can improve it. How relevant is this answer? ☆☆☆
B	Preparation and characterization of zein–lecithin–total flavonoids from <i>Smilax glabra</i> complex nanoparticles and the study of their antioxidant activity on HepG2 cells Jing Li, Yingxiu Zhang, ... Zhigang Yan <i>Food Chemistry: X</i> • 2023 + Add to My Library Copy	Chemical modification of flavonoids can improve stability, but safety concerns exist. Nanomaterials like nanoparticles and microcapsules are often used for effective flavonoid delivery. How relevant is this answer? ☆☆☆ C

- A bespoke summary from each reference about your specific question or query. Understand how specific insights in the document relate to what you need to know.
- Add references to your library to read later or copy the citation information.
- Rate how relevant each reference is to your query.

Related insights and other actions

Related insights (2)

A	Flavonoids Lingchao Miao, Haolin Zhang, ... Jianbo Xiao <i>Antioxidants Effects in Health</i> • 2022 + Add to My Library Copy	Various methods to enhance flavonoid stability include low temperature, ascorbic acid addition, cocrystallization, solid dispersion, nanotechnology, microemulsion, inclusion complexes, and chemical or enzymatic acylation. How relevant is this answer? ☆☆☆
	Recent advances in chitosan-based active and intelligent packaging films incorporated with flavonoids Xuanzhuo Liu, Fengfeng Xu, ... Jun Liu <i>Food Chemistry: X</i> • 2025 + Add to My Library Copy	Effective stabilization techniques for flavonoids include encapsulation and structural modification. The properties of encapsulating materials and their effects on stability need further investigation. How relevant is this answer? ☆☆☆

Other actions:

B

[Compare experiments ↗](#)

Ask another question:

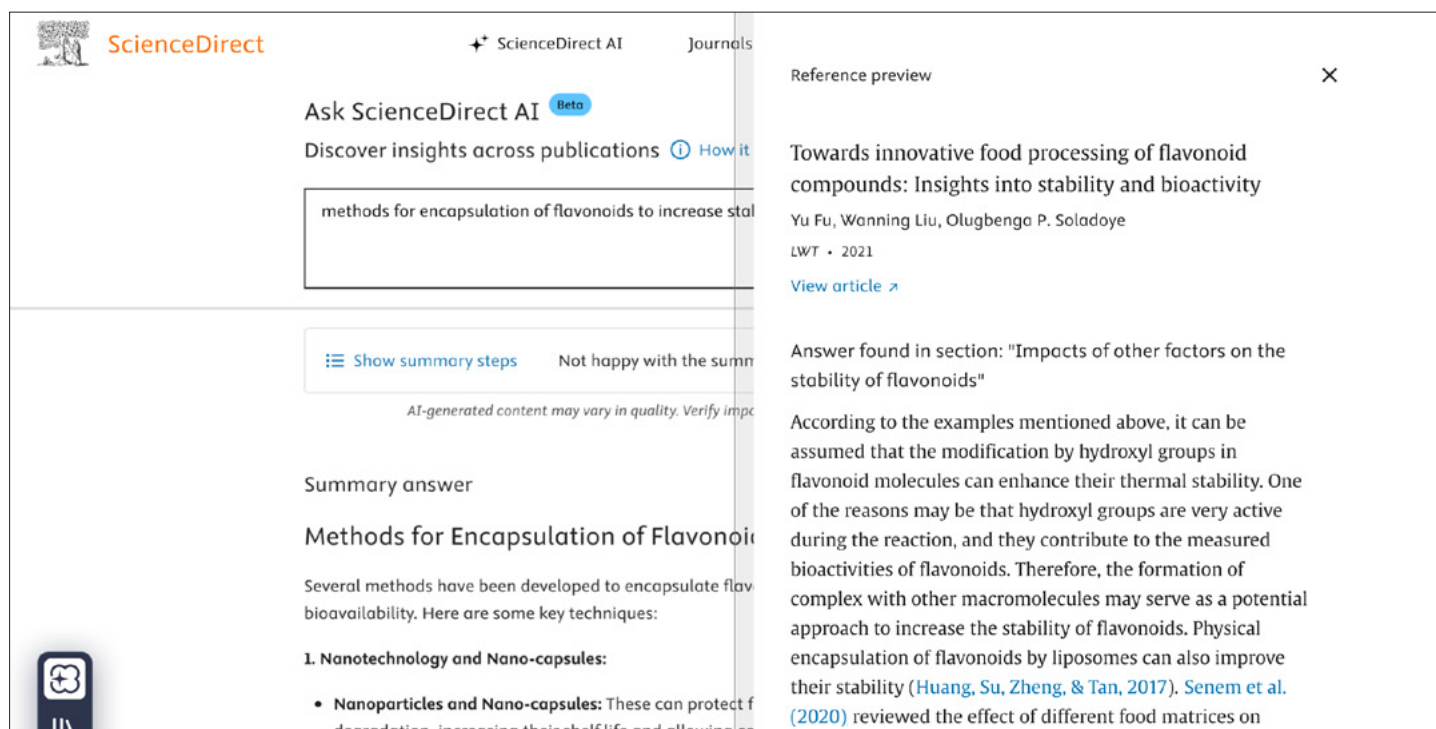
↳ techniques for flavonoid encapsulation to enhance stability ↗

↳ what are the roles of different encapsulation materials for flavonoids? ↗ **C**

↳ how does microencapsulation affect the bioavailability of flavonoids? ↗

- See related articles with bespoke summaries describing their link to your query.
- Link to Compare Experiments of the references from the summary answer.
- Suggestions for further questions based on your initial query.

Reference preview



ScienceDirect AI **Beta**

Discover insights across publications [How it works](#)

methods for encapsulation of flavonoids to increase stability

[Show summary steps](#) Not happy with the summary? [Feedback](#)

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Summary answer

Methods for Encapsulation of Flavonoids

Several methods have been developed to encapsulate flavonoids to improve their bioavailability. Here are some key techniques:

- 1. Nanotechnology and Nano-capsules:**
 - **Nanoparticles and Nano-capsules:** These can protect flavonoids from degradation, increasing their shelf life and allowing for targeted delivery.

Reference preview

Towards innovative food processing of flavonoid compounds: Insights into stability and bioactivity

Yu Fu, Wanning Liu, Olugbenga P. Soladoye

LWT • 2021

[View article](#)

Answer found in section: "Impacts of other factors on the stability of flavonoids"

According to the examples mentioned above, it can be assumed that the modification by hydroxyl groups in flavonoid molecules can enhance their thermal stability. One of the reasons may be that hydroxyl groups are very active during the reaction, and they contribute to the measured bioactivities of flavonoids. Therefore, the formation of complex with other macromolecules may serve as a potential approach to increase the stability of flavonoids. Physical encapsulation of flavonoids by liposomes can also improve their stability (Huang, Su, Zheng, & Tan, 2017). Senem et al. (2020) reviewed the effect of different food matrices on

Summarized responses

Select any reference in your results to view a summarized response. ScienceDirect AI will read and distill insights from the underlying content returned from your search. Every assertion references one or more specific passages from source documents.

Source snippets

See the specific source passage from the content used to create the GenAI summary.

Reading assistant

The Reading Assistant is a versatile tool designed for question answering, analysis, or summarization of individual articles.

It is available on all full-text articles and book chapters on ScienceDirect that you have entitlement to via a subscription, open access, open archive or promotional access.

The screenshot shows the ScienceDirect interface for an article titled "Towards innovative food processing of flavonoid compounds: Insights into stability and bioactivity" by Yu Fu, Wanning Liu, and Olugbenga P. Soladoye. The article is from the journal LWT, Volume 150, October 2021, 111968. The Reading Assistant sidebar on the right provides interactive options:

- A:** Suggested questions to ask about the article, such as "What impacts do non-thermal treatments have on flavonoid compounds from various food sources?"
- B:** Actions you could take, including "Summarize this article" and "Summarize experiments".
- C:** A link to "Summarize experiments in this article".
- D:** A text input field to "Ask about this article".

- A.** Suggested questions to ask about the article - Research questions derived from the full-text article to help you begin interacting with the tool.
- B.** Prompt to summarize the article.
- C.** Link to Summarize experiments in this article.
- D.** Ask a question to this article in your own words and your own language (answers in English).

Tool tip

Gain more insights from the article by having a conversation with the Reading Assistant.

Coming from search

When clicking "View Article" from a reference in Ask ScienceDirect AI, if you have entitlement to the full text, your question will accompany the article and generate a longer summary answer within the 'Reading Assistant' for the specific article being viewed.

Source references

The generated answers include in-text references as evidence to support the claims. When you click on the numbered references, they will highlight the information snippets that were used to answer the question in the text.

Surfacing previous queries

Easily view your past queries and their corresponding answers.

Asking follow-up questions

Ask follow-up questions without needing to repeat the terms or information referenced in earlier queries.

Journals & Books ? Help 🔍 Search

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 **Materials Science and Engineering: C**
Volume 123, April 2021, 111945

Structure-function assessment of 3D-printed porous scaffolds by a low-cost/open source fused filament fabrication printer

Raúl Vallejos Baier ^{a1}✉, José I. Contreras Raggio ^{a1}✉, Carlos Toro Arancibia ^{a1}✉, Miguel Bustamante ^{b2}✉, Luis Pérez ^{c3}✉, Iurii Burda ^d✉, Ameet Aiyangar ^{d,e4}✉, Juan F. Vivanco ^{a1}✉

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Reading Assistant

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- The in-house printer achieved higher resolution and better fit to the designed pore sizes compared to the commercial printer. [2](#) [3](#)
- The in-house printer could achieve pore sizes as small as 100-200 μm by varying the infill percentage. [3](#)

Biological Assessment

- Preliminary cell adhesion tests on scaffolds printed with the in-house printer showed adhesion efficiencies around 50% compared to controls. [4](#)

Chemical Characterization

- FTIR-ATR analysis showed no substantial chemical changes in the PLA material after printing in either printer. [5](#)

The results demonstrate the in-house FFF printer's capability to manufacture tissue engineering scaffolds with controlled microarchitecture, mechanical properties, and biological performance, making it a cost-effective approach for related research.

Compare Experiments

The “Compare” links on the Search and Summarize page and the regular ScienceDirect Search page will pull out the facts that matter, from each study within and across eligible full text papers in the results list.

Search tip

When looking to compare experiments within search results, simply select the papers you want to use before selecting Compare Experiments.

Ask ScienceDirect AI Beta

Discover insights across publications [How it works](#)

methods for encapsulation of flavonoids to increase stability

Get answers

Related insights (2)

Other actions:

[Compare experiments](#)

Ask another question:

[techniques for flavonoid encapsulation to enhance stability](#)

[what are the roles of different polymers in flavonoid encapsulation?](#)

[how does microencapsulation affect the bioavailability of flavonoids?](#)

Find articles with these terms

sleep exercise impact brain atrophy

Advanced search

Ask ScienceDirect AI

Ask questions about “sleep exercise impact brain atrophy” and get answers with AI summaries from relevant research

Try it out

Download 2 articles Export [Compare Experiments](#) sorted by relevance | date

Review article Full text access

1 The alterations of sleep and frontal functions in chronic hemodialysis: Pathogenesis and therapeutic perspectives

Behavioural Brain Research, 26 February 2025

Giulia Belluardo, Concetto Sessa, Walter Marale

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Research article Open access

2 Impact of mind-body interventions in older adults with mild cognitive impairment: a systematic review

International Psychogeriatrics, May 2019

Maryam Farhang, Claudia Miranda-Castillo, ... Guilherme Furtado

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ScienceDirect ScienceDirect AI Journals & Books Help Alex Doe Elsevier - Demonstratio...

[Compare experiments](#) Beta

AI-summarized research experiments or studies for:
“methods for encapsulation of flavonoids to increase stability”

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[Export table to CSV](#)

ARTICLE	EXPERIMENT / STUDY	GOAL	MATERIALS	METHODS
Article Towards innovative food processing of flavonoid compounds: Insights into stability and bioactivity Yu Fu, Wanning Liu, Olugbenga P. Soladoye LWT • Volume 150 • 2021 Export article as CSV	Review of existing literature	To discuss the impacts of structure on the stability of flavonoids	Flavonoids, hydroxyl groups, glycosyl groups, methyl groups, acyl groups, lecithin, Tween-20, metal ions, proteins, dietary fiber, carbohydrates	Reviewed the existing literature on the impacts of different structural features of flavonoids on their stability, including the effects of hydroxyl groups, glycosyl groups, methyl groups, acyl groups, and the influence of external factors like colloidal structures, metal ions, proteins, dietary fiber, and carbohydrates.
	Review of existing literature	To summarize the impacts of different thermal processing methods on the stability and bioactivity of flavonoids	Flavonoids, microwave, radio frequency, ohmic heating	Reviewed the existing literature on the effects of different thermal processing methods like microwave heating, radio frequency heating, and ohmic heating on the retention of flavonoid contents and antioxidant activities in various food sources.

My Library

The My library page on ScienceDirect is your personal reference space, designed to streamline your reference management. Save and view your cited papers in one convenient place.


ScienceDirect AI
Journals & Books
Help
Search
Alex Doe
Elsevier - Demonstratio...

My Library – All your references in one place

Brought to you by [Mendeley](#) [How it works](#)

Get started with My Library

My Library is brought to you by Mendeley. Activate your account to get started.

[+ Activate My Library](#)

Your personal reference management space

My Library is your personal reference management space on ScienceDirect, in collaboration with Mendeley.

Here you can:

- add references directly from [ScienceDirect AI](#).
- view all your references and collections in one unified library.
- seamlessly access Mendeley Reference Manager.

Your ScienceDirect and Mendeley accounts will be linked under the same email, giving you access to your personal library on both platforms.


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Navigation

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- A Ask ScienceDirect AI
- B My Library
- C Information, Help, and Frequently Asked Questions
- D Minimize navigation widget

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