



LeapSpace

快速使用指南



ELSEVIER

Advancing human progress together

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1. 开始检索

Discover *deeper insights*

Powered by Scopus data and ScienceDirect full-text

1

What would you like to learn more about?

Deep Research



1. 构思您的提问：只需用自然的对话语言提出您的问题或描述您的需求。

LeapSpace支持复杂的科研任务，涵盖跨学科领域。

2. 分析检索结果与可信度

The screenshot illustrates the LeapSpace AI interface through four numbered steps:

- Step 1:** The user asks, "How can seaweed cultivation contribute to global protein supply while capturing carbon?" The AI lists "Copilot steps" for processing:
 - Creating a plan to respond to your query
 - Performing keyword search on Scopus (seaweed OR macroalgae OR kelp) AND (cultivation OR farming OR aquaculture) AND (protein OR nutrition OR food supply) AND (carbon capture OR carbon sequestration OR climate mitigation)
 - Performing natural language search on Scopus
 - In what ways does seaweed cultivation help increase global protein supply and contribute to carbon capture?
 - Performing keyword search on ScienceDirect (seaweed OR macroalgae OR kelp) AND (cultivation OR farming OR aquaculture) AND (protein OR nutritional value OR food source) AND (carbon capture OR sequestration OR climate mitigation) AND (method* OR technique* OR protocol OR results OR discussion)
 - Performing keyword search on ScienceDirect
 - How does seaweed cultivation contribute to both global protein supply and carbon capture, including technical approaches and results?
- Step 2:** The AI provides a summary: "Seaweed cultivation offers a promising solution to two major global challenges: increasing the sustainable protein supply and capturing atmospheric carbon. Here's how seaweed farming contributes to both:"

Contribution to Global Protein Supply

 - Sustainable Protein Source:** Seaweed is rich in protein, containing all essential amino acids, and can be cultivated without the need for arable land, irrigation, or pesticides, making it a low-carbon alternative to traditional protein sources [1](#) [2](#)
 - High Biomass Yield:** Seaweed aquaculture can be conducted at large scales, yielding significant biomass that can be used for human food, animal feed, and other protein-rich products [2](#) [3](#) [4](#)
 - Year-Round Production:** Offshore and sea-based cultivation allows for continuous, year-round biomass production, further supporting a stable protein supply [4](#) [5](#)
 - Nutrient Recycling:** Using nutrient-rich wastewaters from aquaculture or food processing can enhance seaweed protein content and yield, supporting the so-called "protein-shift" towards more sustainable sources [6](#)
- Step 3:** A detailed reference card for a Scopus article titled "Cultivation in wastewater increases growth and nitrogen content of seaweeds: A meta-analysis" is shown. The card includes:
 - Scopus Article
 - Citation details: 15 citations, Open document details [↗](#)
 - Link to statement: "The reference states that seaweeds are rich in essential amino acids (EAAs) and have protein quality comparable to plant sources like peas and soy. It adds that combining different seaweed species yields complementary EAA profiles, making them nutritionally comparable to animal proteins such as milk and whey."
 - Excerpt: "Experimental evidence shows that seaweeds contain high concentrations of the essential amino acids (EAAs) necessary for human consumption... Seaweed proteins are similar in quality to common plant protein sources such as peas, soy, and tree nuts."
- Step 4:** The AI provides a follow-up question: "Ask a follow-up question" and "Deep research" button.

1. 随时查看回答步骤：LeapSpace 始终清晰展示回答您问题所采取的每一步骤。这种透明机制不仅有助于建立信任，也培养了AI时代的一项关键能力——计算思维，即学会如何拆解复杂问题，并逻辑化地逐一解决。

2. 快速浏览主题概述：通过结构化的主题概述，您可以迅速把握要点。“内容概要”部分整合了相关文献的核心信息，让您一目了然。

3. 利用参考文献“深入研究”：LeapSpace 的每一个回答都建立在经过同行评审、严格筛选的内容之上——既广泛依托于爱思唯尔旗下出版商中立的Scopus数据库，也深度汲取了来自爱思唯尔及其他出版商的全文研究成果。参考文献功能让您可以追溯任一论述背后的原始资料，点击任一文献即可展开信息面板，其中不仅包含完整的书目信息，还包含被称为“信任卡”的“关联段落”——清晰展示该论述与引用来源的吻合程度。这一透明机制让您在探索复杂研究时，既能增加可信度，更能助您直抵信息出处，节省宝贵时间。

4. 随时追问：您可以使用追问功能，就报告中的具体观点更进一步探讨，可调整检索方向以获取新视角，或聚焦某一特定兴趣领域深入挖掘。

3. 获取科研资助信息

How can seaweed cultivation contribute to global protein supply while capturing carbon?

Copilot steps >

Seaweed cultivation for protein and carbon capture

Seaweed cultivation can contribute to the **global protein supply** while also **capturing carbon** through its dual role as a nutrient-rich food source and a blue carbon ecosystem. Recent research highlights both opportunities and limitations in achieving these goals.

1. Contribution to Global Protein Supply

- High protein content:** Protein levels vary by species and cultivation conditions. For example, *Ulva fenestrata* grown in nutrient-rich herring production waters reached **37.37% dry weight protein**, the highest reported among reviewed species [1].
- Nutritional quality:** Seaweed proteins contain essential amino acids, though digestibility can be low (<60%). Processing innovations, such as fermentation into **seaweed-derived mycoprotein**, can raise protein content (~33%) and digestibility (~100%), with PDCAAS values approaching 0.89 [2].
- Cultivation methods:** Vegetative propagation in *Palmaria palmata* supports sustained growth and bioactive peptide production, enhancing both yield and functional food potential [3].
- Nutrient recycling:** Using nutrient-rich industrial effluents as cultivation media can boost protein biosynthesis while reducing waste [4].

2. Carbon Capture and Sequestration Potential

- Photosynthetic CO₂ uptake:** Seaweeds fix carbon during growth, with life-cycle sequestration for *Laminaria japonica* estimated at **97.73 g C m⁻² yr⁻¹**, most stored in biomass [5].
- Refractory carbon production:** *Porphyra* cultivation increases dissolved organic matter resistant to degradation, enhancing long-term carbon storage in coastal systems [6].
- Optimized cultivation:** Matching strain and depth in *Kappaphycus spp.* can improve biomass yield and carbon uptake efficiency [6].
- Sinking strategies:** Deliberate sinking of harvested seaweed can create additional sequestration, though ecological and governance risks remain [7] [8].

Which funding institutions are most likely to support this research?

1

2

3

Funding preview

Funding institutional Funding opportunity

AUS

Summary Eligibility details

This POC scholarship will support a broader project funded by the IDRC Canada as "Transforming women's seaweed businesses into nature based solutions for Fiji, Samoa, and Kiribati". As background, seaweed farming is widely used by women in the Pacific region for climate change mitigation and adaptation activities. In the Pacific, the seaweed business is women's business, especially in Fiji and Samoa where women are usually involved in farming and agriculture activities. The broader project will evaluate these solutions for scaling up and propose to integrate the environmental potential of seaweed production (the specific objective will be to identify opportunities for new business opportunities for seaweed enterprises, and synthesise lessons learned to inform replication and scaling up). The first phase of this POC scholarship project will begin by mapping the existing seaweed supply chains in Fiji, Samoa, and Kiribati. Through environmental and business analysis, the second phase of the project will evaluate production and processing interventions for the key species and their natural capital.

- 1. 查询科研资助信息：**如需了解某一研究主题的主要资助方，可使用“追问”功能进一步提问。
- 2. 查阅资助来源清单：**您可以查看该研究领域的主要资助方及核心资助来源列表。
- 3. 定位具体资助机会：**您可以深入查看每个资助方所提供的具体资助项目，这或许能成为您获取科研经费的来源。

说明：受数据公开政策所限，目前暂未纳入中国大陆地区的科研资助数据。

4. 开启深度研究报告

How can seaweed cultivation contribute to global protein supply while capturing carbon?

Copilot steps ▾ Processing for 5 seconds

Seaweed cultivation for protein and carbon capture

Seaweed cultivation offers a promising solution to two major global challenges: increasing the sustainable protein supply and capturing atmospheric carbon. Here's how seaweed farming contributes to both:

Contribution to Global Protein Supply

- **Sustainable Protein Source:** Seaweed is rich in protein, containing all essential amino acids, and can be cultivated without the need for arable land, irrigation, or pesticides, making it a low-carbon alternative to traditional protein sources [1](#) [2](#)
- **High Biomass Yield:** Seaweed aquaculture can be conducted at large scales, yielding significant biomass that can be used for human food, animal feed, and other protein-rich products [3](#) [4](#)
- **Year-Round Production:** Offshore and sea-based cultivation allows for continuous, year-round biomass production, further supporting a stable protein supply [4](#) [5](#)
- **Nutrient Recycling:** Using nutrient-rich wastewater from aquaculture or food processing can enhance seaweed protein content and yield, supporting the so-called "protein-shift"

Which seaweed species exhibit the highest protein yield under varying nutrient and light conditions, and what physiological or biochemical mechanisms regulate their carbon capture efficiency and amino acid synthesis?

Deep research 1 2 3 4 5

Discover deeper insights

Powered by Scopus data and ScienceDirect full-text

What would you like to learn more about?

Deep Research

2



1. 生成深度研究报告：“深度研究”功能将您的科研探索向前推进一步——它能在几分钟内生成全面且论证严谨的报告。当您提出问题后，深度研究不仅仅是对现有信息进行总结，它还会制定详细的研究计划，在LeapSpace精选文献库中进行广泛检索，并在获得新洞见时持续优化研究路径。

2. 开启深度研究查询：您可通过点击“追问”功能（图1）或从LeapSpace主界面（图2）启动此功能。无论何种方式，请确保已开启“深度研究”功能开关。

5. 查阅深度研究报告

This screenshot shows a 'Deep Research report' interface. At the top, there are buttons for 'Deep research report' and 'View as PDF'. A note says 'This deep research report may contain inaccuracies. Please verify the information independently.' Below this is the title 'Optimizing Protein Yield and Biochemical Mechanisms in Seaweed Species Under Variable Nutrient and Light Conditions' with a '2' icon. A 'Quick Reference' section contains a table titled 'Key findings table' with columns for Species, Protein Content (% DW), Key Mechanisms/Notes, and References. The table lists five seaweed species: *Psychiatric disorders*, *Palmaria palmata*, *Macrocystis pyrifera*, *Hypnea cervicornis*, and *Porphyra umbilicalis*. To the right, a vertical sidebar titled 'Deep Research steps' shows a numbered list of steps: 1. Analyzing the research topic to identify seaweed species with top protein yield under different nutrients and light levels. Evaluating physiological and biochemical factors governing carbon capture and amino acid production. 2. Analyzing the research plan to identify seaweed species with the highest protein yield under different nutrient and light conditions, while examining underlying physiological mechanisms. 3. Breaking down the research topic into specific questions and directions, while identifying targeted areas to investigate further. 4. Analyzing the research prompt to identify key questions. Evaluating seaweed species for protein yield under different nutrient and light conditions. Formulating a primary query focused on optimizing protein output. 5. Starting the initial research process and outlining objectives. Gathering relevant sources and identifying key topics for further analysis. Organizing findings for a coherent overview. Preparing for deeper investigation next steps. 6. Analyzing the topic of seaweed protein yield, exploring two levels of depth and two questions per level, to gather initial insights. 7. Searching for semantically relevant information about Which seaweed species exhibit the highest protein yield when subjected to varying nutrient

Species	Protein Content (% DW)	Key Mechanisms/Notes	References
Psychiatric disorders	20-25 (extract)	Efficient N assimilation (nitrate/ammonium), high protein recovery with pH-shift extraction	1 2 3
Palmaria palmata	28	High yield with enrichment, effective post-harvest processing	4
Macrocystis pyrifera	22.5	Cooler temps, balanced photoperiod optimize protein and amino acid synthesis	5 6
Hypnea cervicornis	21	Accumulates protein/ phycobiliproteins under balanced high nutrients	7
Porphyra umbilicalis	22.6 (extract)	High growth/protein at moderate temp, high light; pH-	8 9

Ask a follow-up question

Deep research

Researcher AI beta, is powered by Scopus and ScienceDirect. Expect variation in response quality. Share feedback

1. **查阅深度研究步骤:** 报告将完整展示生成过程中所采取的各项步骤, 以确保研究过程透明可信。

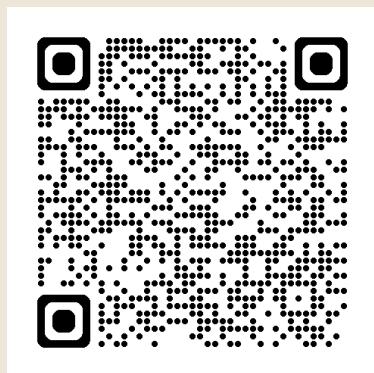
2. **分析报告概览:** 报告详细包含以下内容:

- 关键研究发现与引用概览
- 对您问题的直接解答
- 研究范围
- 前提假设与研究局限
- 延伸阅读建议
- 引言与综合论述
- 讨论与未来研究方向
- 结论与建议

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