



LeapSpace

Quick Reference Guide



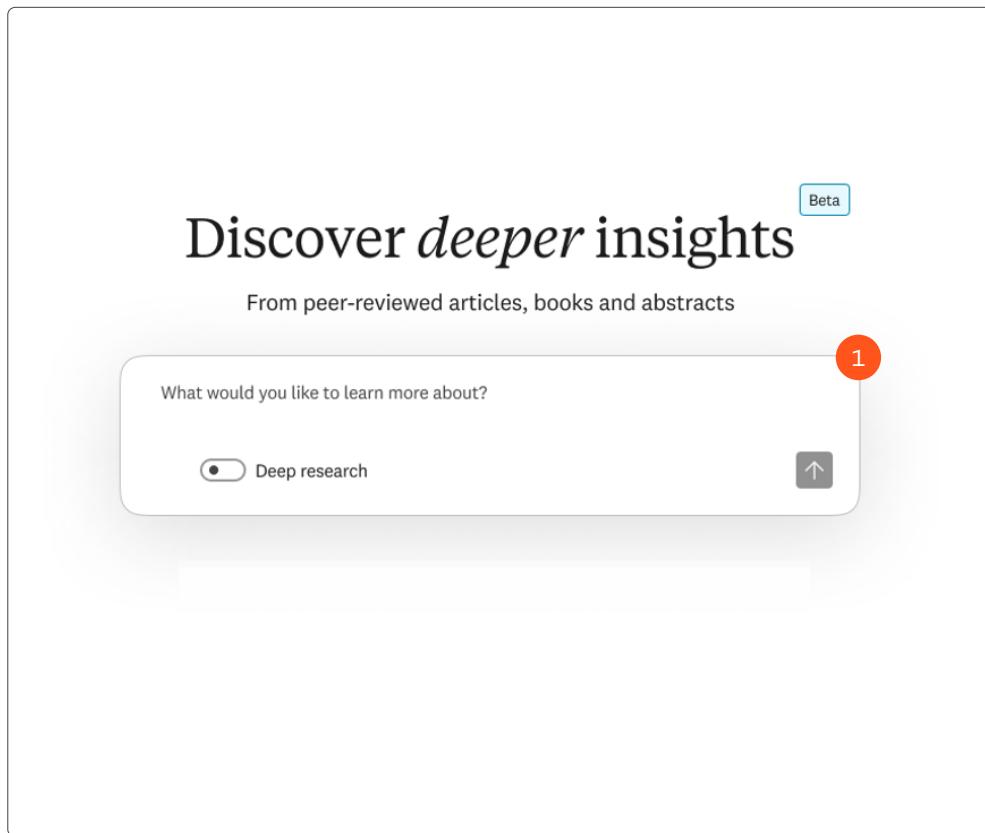
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1. Begin your search



- 1. Formulate your query:** Simply ask your question or describe your request in a natural, conversational manner. The tool supports complex research, including interdisciplinary fields.

2. Analyzing search results and reliability

The image consists of four screenshots of the LeapSpace interface, arranged in a 2x2 grid. Each screenshot shows a different stage of the search and analysis process.

- Screenshot 1:** Shows the initial search query: "How can seaweed cultivation contribute to global protein supply while capturing carbon?". Below the query, a list of "Capitol steps" is shown, including creating a plan, performing keyword searches on Scopus and ScienceDirect, and asking a follow-up question. A red circle with the number "1" is in the top right corner.
- Screenshot 2:** Shows the search results for "Seaweed cultivation for protein and carbon capture". It includes a summary, a section on "Contribution to Global Protein Supply" with bullet points, and a follow-up question section. A red circle with the number "2" is in the top right corner.
- Screenshot 3:** Shows a detailed view of a research article titled "Cultivation in wastewater increases growth and nitrogen content of seaweeds: A meta-analysis". It includes a "Reference details" panel with the source (Scopus Article), citation count (15), and a "Link to statement" panel with a quote from the reference. A red circle with the number "3" is in the top right corner.
- Screenshot 4:** Shows a detailed view of the research article with the "Link to statement" panel expanded, showing a quote about seaweeds being rich in essential amino acids. A red circle with the number "4" is in the top right corner.

- 1. Review the answer steps:** LeapSpace always displays the steps it takes to answer your question. This transparency builds trust and supports an essential skill in the age of AI—computational thinking or breaking a problem into parts and solving each step logically.
- 2. Examine the topic overview:** Review the structured topic overview to see the main points quickly. The Summary synthesizes content from relevant documents.
- 3. Utilize References to "Dig In":** Each LeapSpace response is grounded in peer-reviewed, curated content—drawing on the breadth of Elsevier's publisher-neutral Scopus database and the depth of full-text research from Elsevier and other publishers. References let you explore the source material behind any statement, and clicking one opens a panel with bibliographic details and a "Link to statement" paragraph—known as a Trust Card—showing how closely the claim aligns with the cited source. This transparency builds trust and saves time when navigating dense research.
- 4. Ask a follow-up question:** You can use the follow-up feature to elaborate on specific points from the report, refocus your query to explore new perspectives, or zoom in on a particular area of interest.

3. Funding

The screenshot shows the LeapSpace platform interface. At the top, a blue bar asks, "How can seaweed cultivation contribute to global protein supply while capturing carbon?". Below this, a "Copilot steps" section leads to the "Seaweed cultivation for protein and carbon capture" page. This page discusses the dual role of seaweed as a protein source and a carbon capture mechanism, mentioning species like *Ulva* and *Palmaria palmata*, and various cultivation methods and recycling strategies. A "Key Funding Institutions" table lists several organizations, their focus areas, funding types, amounts, and geographies. A "Funding preview" section on the right shows a detailed funding opportunity for a PhD scholarship, including a summary, eligibility details, and a full description. Red circles with numbers 1, 2, and 3 highlight specific features: 1 points to the funding institutions table, 2 points to the funding preview section, and 3 points to the "Ask a follow-up question" button.

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* fenerata 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 POCAsS 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 **9779 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 [\[7\]](#).
- Sinking strategies:** Deliberate sinking of harvested seaweed can create additional sequestration, though ecological and governance risks remain [\[8\]](#).

Which funding institutions are most likely to support this research?

1

2

3

LeapSpace is powered by Scopus. Expect variation in response quality. Share feedback

Key Funding Institutions

Funder	Relevant Focus Area	Funding Type / Amount	Geographic Scope	Other
PhD scholarship in seaweed nature based solutions, climate change mitigation, and adaptation [1] [2]	PhD scholarship - up to \$60,000 USD	Australia	[3]	
Oceanic climate change mitigation/sequestration; marine biodiversity; innovative mariculture (blue) [4] [5]	Cooperative research - up to \$200,000 USD	Turkey + international partners	[6] [7]	
Seaweed processing research in science, biopolymer chemistry, and applications for food and pharmaceutical development [8] [9]	Research grants	USA-inland	[10] [11]	
Aquaculture research innovation, sustainable protein production [12] [13]	Training	USA	[14] [15]	
Nature-based climate action: carbon farming, ecosystem restoration (0.0-0.1-1%) [16] [17]	Research grants - up to \$500,000 USD	USA (inland focus)	[18] [19] [20]	
Blue carbon ecosystems resilience, scalability, carbon fluxes [21] [22]	Cooperative research - up to \$200,000 USD	Indonesia + international partners	[23] [24]	
Bioprocessing lab fellowship, protein production technologies [25]	Fellowship	USA	[26]	

Ask a follow-up question

LeapSpace is powered by Scopus. Expect variation in response quality. Share feedback

Funding preview

2

3

This PhD scholarship will sit within a broader project funded by the IOC/Canada as "Transforming women's & girls' seaweed farming in the Pacific Islands (Fiji, Samoa, and Kiribati)". As background, seaweed farming is widely recognized as a potential key industry for climate resilience and adaptation in the Pacific Islands. In the Pacific, the seaweed business is women's business, with women being the primary farmers who are usually involved in farming and agriculture activities. The project will support the development of women in scaling seaweed production, integrate the environmental potential of seaweed products, the specific objective will be to support the development of women's business opportunities for seaweed enterprises, and support the development of a value chain for scaling up across the Pacific and Asia. The broader project will begin by mapping the existing seaweed supply chains for the three countries involved, and through monitoring of production sites, the project will evaluate production and processing interventions for the key species and their natural capital.

AUS

Apply for funding [\[27\]](#)

Summary Eligibility details

- 1. Inquire about funding:** To find out who is funding research in this topic, use the 'Ask a follow-up question' feature.
- 2. Review funding sources:** You can see a list of the key funding institutions and major funding sources for this area of research.
- 3. Identify specific funding opportunities:** You can drill down into specific funding opportunities that are behind each funder, which may be a source of funding for you.

4. Beginning a Deep research report

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](#) [5](#)
- 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"

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 Up

Beta

Discover deeper insights

From peer-reviewed articles, books and abstracts

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 2 Up

- 1. Generate a Deep research report:** Deep research takes your exploration a step further—producing comprehensive, well-reasoned reports in minutes. When you pose a question, Deep research goes beyond summarizing existing information—it develops a detailed research plan, conducts extensive searches across the curated literature in LeapSpace, and refines its approach as new insights emerge.
- 2. Start a Deep research query:** Begin by using “Ask a follow-up question” (see figure 1) or from the LeapSpace home screen. In both cases, ensure the Deep research toggle is switched on

5. Reviewing a Deep research report

The 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' in a red circle. A 'Quick Reference' section follows. A 'Key findings table' is displayed with columns for Species, Protein Content (% DW), Key Mechanisms/Notes, and References. The table includes data for five species: *Psychiatric disorders* (20-25 (extract)), *Palmaria palmata* (28), *Macrocystis pyrifera* (22.5), *Hypnea cervicornis* (21), and *Porphyra umbilicalis* (22.6 (extract)). Each entry has a numbered reference link (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9). Below the table is a 'Ask a follow-up question' section with a 'Deep research' toggle and a 'Share feedback' link. On the right, a 'Deep Research steps' section is shown with a '1' in a red circle. A list of steps is provided, each with a numbered link (1-9) in a blue box:

- 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.
- Analyzing the research plan to identify seaweed species with the highest protein yield under different nutrient and light conditions, while examining underlying physiological mechanisms.
- Breaking down the research topic into specific questions and directions, while identifying targeted areas to investigate further.
- 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.
- 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.
- Analyzing the topic of seaweed protein yield, exploring two levels of depth and two questions per level, to gather initial insights.
- Searching for semantically relevant information about Which seaweed species exhibit the highest protein yield when subjected to varying nutrient

1. Review Deep research steps: The report displays exactly what steps have been taken to generate the report, aiding transparency.

2. Analyze the report overview: The report details the following:

- Referenced overview of key findings
- Direct answer to query
- Study scope
- Assumptions & limitations
- Suggested further reading
- Introduction and synthesis paragraph
- Discussion and future research directions
- Conclusions and recommendations



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