

# Ciências ULisboa

Faculdade  
de Ciências  
da Universidade  
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**Eng Energy & Environment**



# **Research methods & Dissertation Project**



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**Professor: Carla Silva ([camsilva@ciencias.ulisboa.pt](mailto:camsilva@ciencias.ulisboa.pt))**

## **Assignments**

Important dates

**4 November**– Connection to ODS

Research objective and research questions

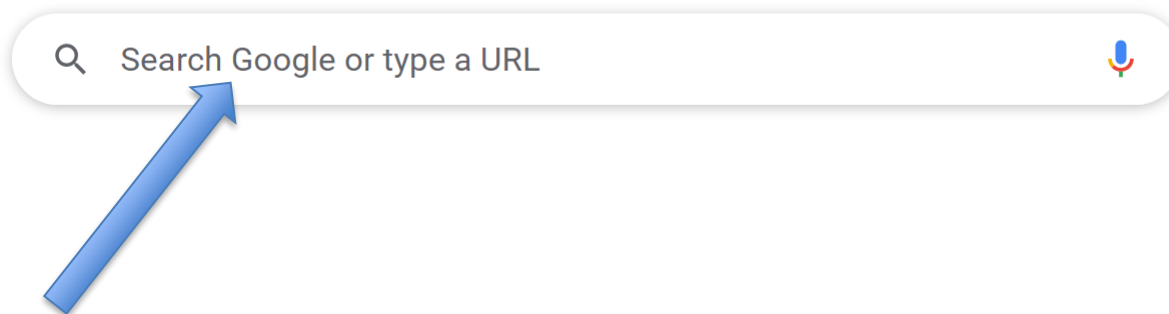
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**15 December** – Literature review w/ references + 10 minutes presentation

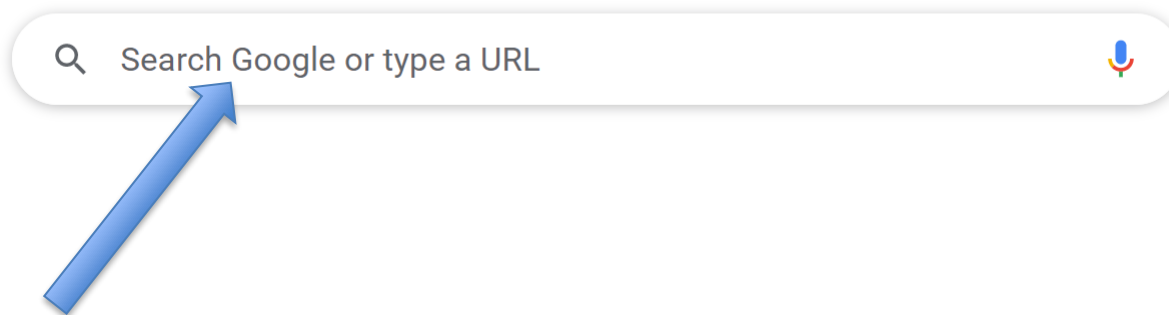
OR

**9 February** + 10 minutes presentation

<b>Module 1</b>	<b>“My experience”</b> <b>former students of Eng. Energy and Environment</b>  <b>EDP company</b> <b>Private bank</b> <b>Audit and consulting</b> <b>PhD “Sustainable Energy Systems”</b>
Module 2	“Dissertation offers” Research Professors & Companies
Module 3	What is the research? What is the generic research methodology? Research objectives and research questions Methodology and method
Module 4	Literature review
Module 5	Reference manager
Module 6	Plagiarism & copyright
Module 7	Examples, assignments and doubts
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### Life cycle assessment of microalgae-based aviation fuel

by F Guo · 2016 · Cited by 21 — The aim of this work is to compare the life cycle assessments of low-N and ... Current research shows bio-jet fuel from microalgae **can** reduce life cycle ...

<https://biotechnologyforbiofuels.biomedcentral.com> > a... 


### Life-cycle analysis of greenhouse gas emissions from ...

by S de Jong · 2017 · Cited by 198 — A **life-cycle analysis (LCA)** framework can be used to assess the environmental impact across the entire product life-cycle.  
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### Life-Cycle Assessment of Bio-Jet Fuel Production from Waste ...

Sep 9, 2022 — This study aimed to evaluate the sustainability and find out the bottleneck restricting the development of WCO-based **jet fuel** production.

<https://www.researchgate.net> > publication > 26042322... 

### Life cycle assessment of bio-jet fuel from ... - ResearchGate

Jul 5, 2022 — This type of **analysis** is necessary to ensure that the **fuel** produced with **microalgae** does not generate more environmental impacts, ...


## [Global warming potential analysis of bio-jet fuel based on life ...](#)

by X Zhu · 2022 — Life cycle assessment (LCA) is a **powerful tool to assess the environmental performance of products, processes and production systems** [8], and ...

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## [Lifecycle Assessment of Microalgae to Biofuel - OSTI.GOV](#)

by EP Bennion · 2015 · Cited by 240 — **Microalgae** is being investigated as a renewable transportation **fuel** feedstock ... Key works: **Biofuel**; Hydrothermal liquefaction; **Life Cycle**... You've visited this page 2 times. Last visit: 4/25/22

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## [Life Cycle Assessment of Biofuels from Algae Hydrothermal ...](#)

by EB Connelly · 2015 · Cited by 54 — This paper identifies important factors in the quantification of LC-GHG of algae-derived diesel, **jet fuel**, and gasoline, using hydrothermal ...

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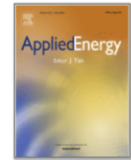
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Volume 122, 1 June 2014, Pages 73-82



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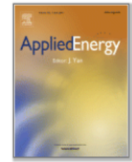
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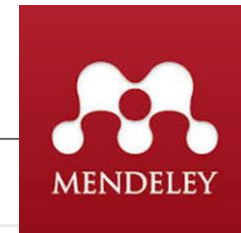
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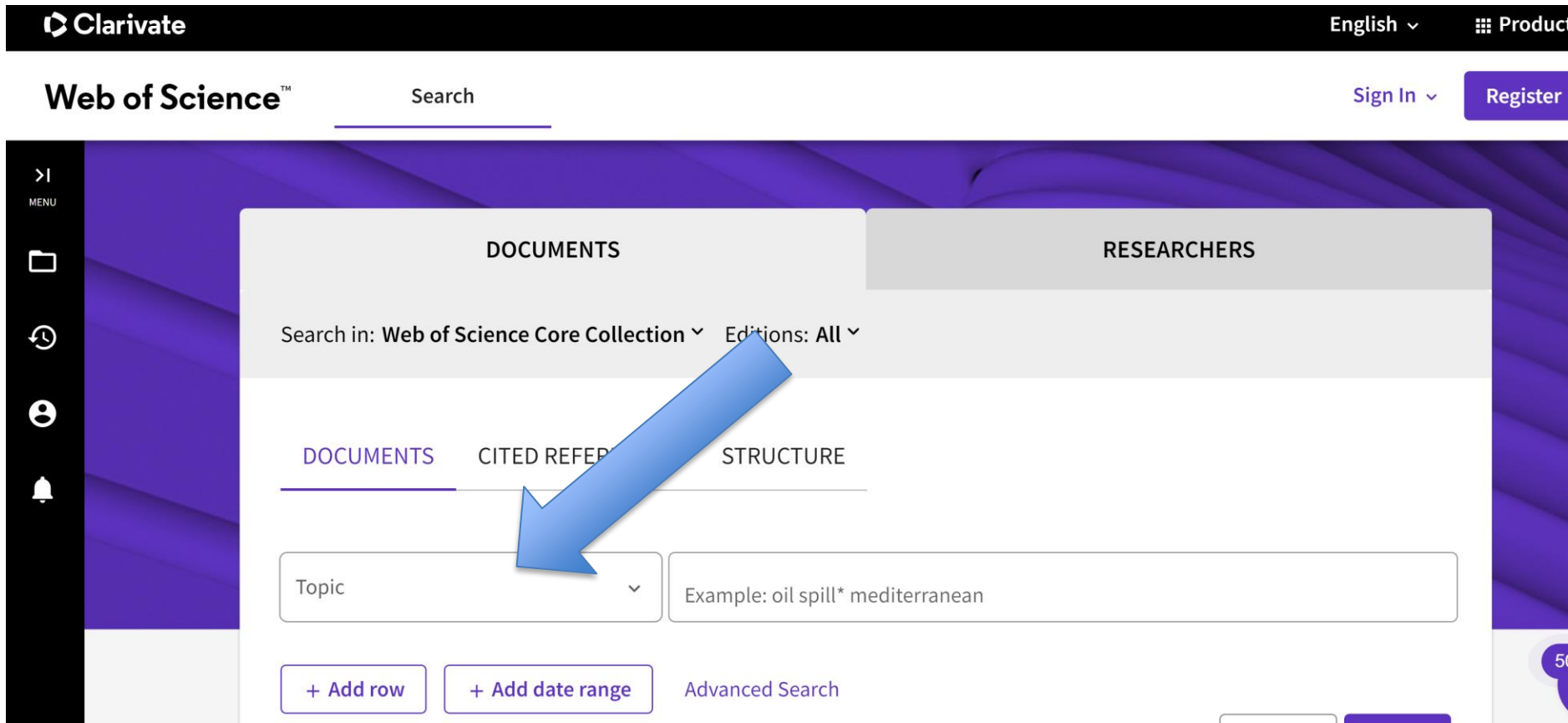
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Microalgal biomass is a renewable energy source and is considered as a crucial solution in the increasing energy demand and greenhouse gas emissions. Through various thermochemical conversion processes such as torrefaction, pyrolysis, liquefaction, and gasification, biomass

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2 **Life-cycle analysis of drop-in biojet fuel produced from British Columbia forest residues and wood pellets via fast-pyrolysis** 4 Citations

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A well-to-wake life-cycle analysis of biojet fuel produced from pyrolysis-derived biocrudes upgraded via hydrotreatment was carried out and compared to petroleum-derived jet fuel. The life-cycle analysis model compared a 100 million liter-per-year upgraded pyrolysis oil facility at three locations in British Columbia, Canada using British Columbia pellet and forest residue feedstocks. The carbo ... [Show more](#)

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This study uses life cycle assessment to quantify and compare the greenhouse gas emissions and fossil fuel depletion impacts of a theoretical mallee jet fuel value chain, operating in the Great Southern region of Western Australia, with those of fossil-based jet fuel. Relative to fossil-based jet fuel, the mallee jet fuel was found to reduce greenhouse gas emissions by 40% and result in a net f ... [Show more](#)

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A life-cycle assessment of bio-jet fuel from waste cooking oil (WCO) produced by hydrotreatment was performed and compared with petroleum-derived jet fuel. This study aimed to evaluate the sustainability and find out the bottleneck restricting the development of WCO-based jet fuel production. The carbon intensity of the WCO-based bio-jet fuel was 63.7% lower compared to the conventional jet fuel ... [Show more](#)

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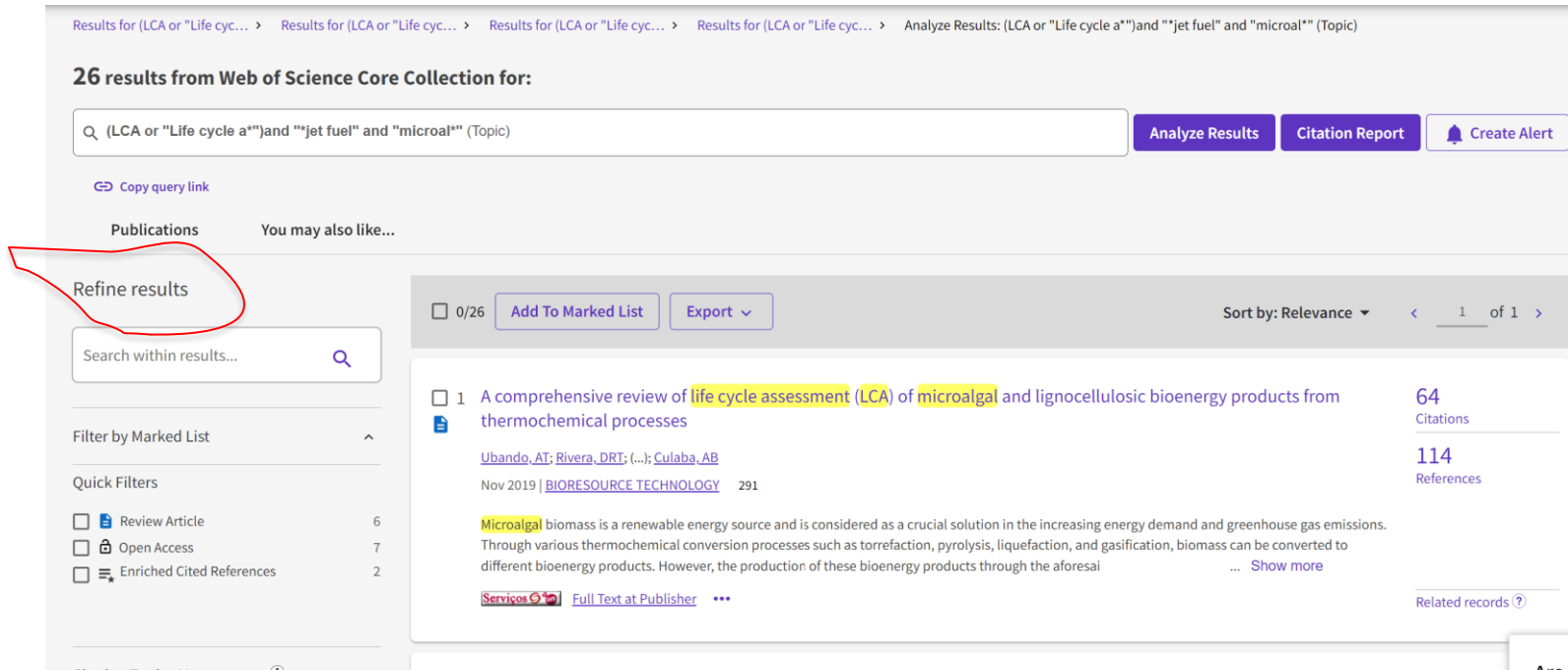
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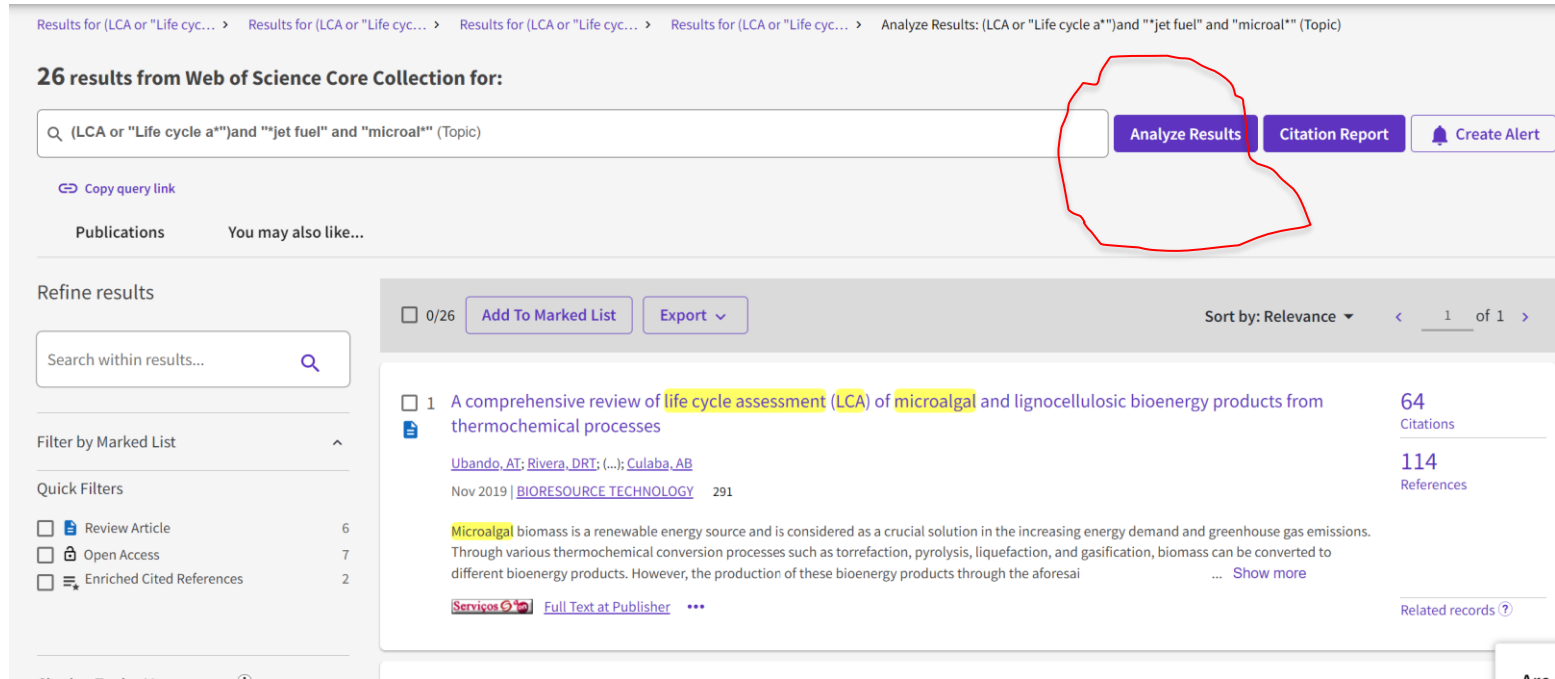
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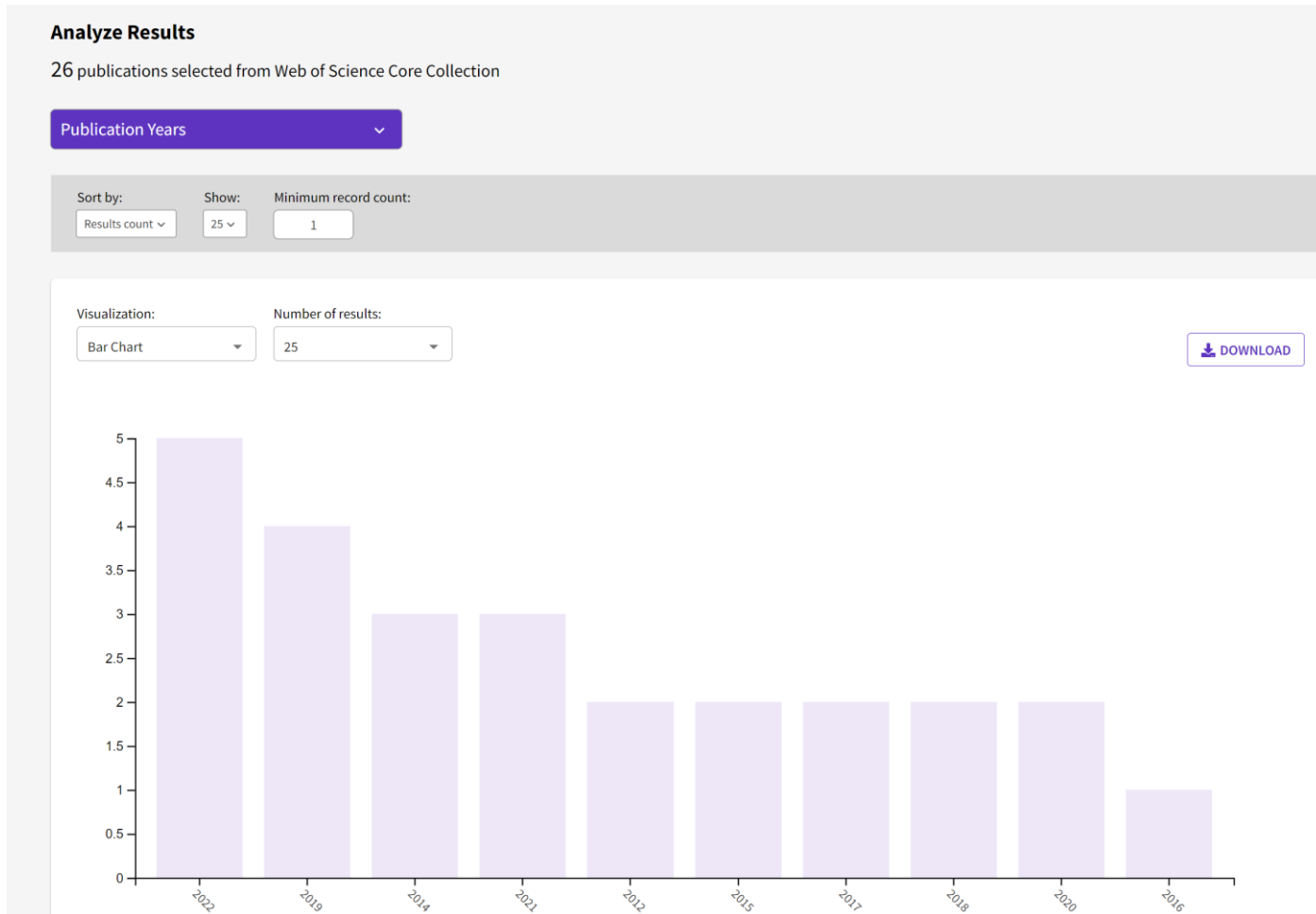
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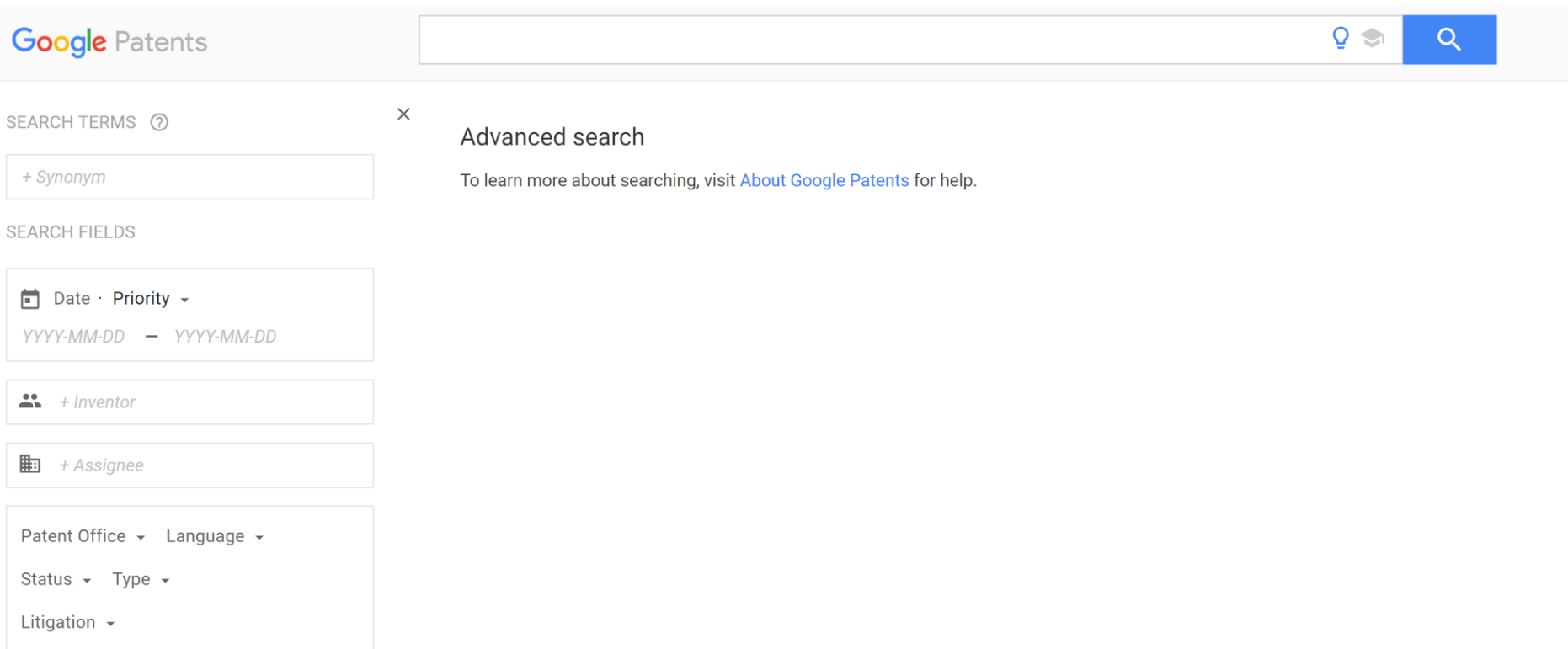
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On the right side of the interface, there is a section titled "Advanced search" (with a close icon) containing the text: "To learn more about searching, visit [About Google Patents](#) for help."



Search patents (if you are developing a new sensor....equipment...new technology)

The image shows a screenshot of the Google Patents search interface. At the top, the Google Patents logo is on the left, and a search bar with a magnifying glass icon is on the right. Below the search bar, there are several filter sections. The 'SEARCH TERMS' section has a dropdown menu with '+ Synonym'. The 'SEARCH FIELDS' section includes: 'Date · Priority' with a calendar icon and a date range 'YYYY-MM-DD - YYYY-MM-DD'; '+ Inventor' with a person icon; '+ Assignee' with a calendar icon; 'Patent Office' and 'Language' with dropdown arrows; 'Status' and 'Type' with dropdown arrows; and 'Litigation' with a dropdown arrow. Annotations with blue arrows point to specific parts: 'After 1900...' points to the date range field; 'Language: "English"' points to the language dropdown; and '"Biojet fuel"' points to the search bar. An 'Advanced search' panel is also visible, with a link to 'About Google Patents' for help.

## Search patents (if you are developing a new sensor....equipment...new technology)....

SEARCH TERMS ⓘ

biojet fuel × or + *Synonym*

+ *Synonym*

SEARCH FIELDS

📅 Date · Publication ▾

1900-01-01 — YYYY-MM-DD

👤 + *Inventor*

📄 + *Assignee*

Patent Office ▾

Language · English ▾

Status · Grant ▾ Type · Patent ▾

Litigation · No Known Litigation ▾

✕ About 328 results

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  Side-by-side

Sort by · Relevance ▾ Group by · None ▾ Deduplicate by · Family ▾ Results / page · 10 ▾

### Method for cold stable biojet fuel

[WO](#) [EP](#) [US](#) [JP](#) [AU](#) [BR](#) [CA](#) [IL](#) [MX](#) · [CA2691612C](#) · Wayne Seames · University Of North Dakota

Priority 2006-06-30 · Filed 2007-07-02 · Granted 2016-05-03 · Published 2016-05-03

0016] Figure 1 is a diagram illustrating formation of free radicals from a single molecule. [0017] Figure 2 is a simplified block flow diagram of a **biojet fuel** process. [0018] Figure 3 shows a gas chromatographic comparison of JP-8 aviation **fuel** and **biojet fuel** produced from canola methyl ester.

### Biojet fuel manufacturing method

[WO](#) [EP](#) [US](#) [CN](#) [JP](#) [KR](#) [BR](#) [PH](#) [SG](#) · [JP6635362B1](#) · 薰藤元 · 一般社団法人H i B D研究所

Priority 2018-05-18 · Filed 2019-05-17 · Granted 2020-01-22 · Published 2020-01-22

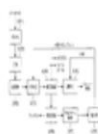
The particle size of the hydrogenation catalyst, wherein the powdering smaller than the particle size of the isomerization catalyst, in any one of claims 2-7, characterized in that it is deposited or supported on the surface of the isomerization catalyst A method for producing the **biojet fuel** ...

### Biojet fuel manufacturing method and manufacturing equipment

[JP](#) · [JP6635594B2](#) · 富明上妻 · 三菱日立パワーシステムズ株式会社

Priority 2016-02-18 · Filed 2016-02-18 · Granted 2020-01-29 · Published 2020-01-29

And before the FT synthesis step after the gasification step, characterized in that it comprises a decarboxylation process for removing carbon dioxide component from the generated gas by the gasification process of claim 1-5 A method for producing a **biojet fuel** according to any one of the preceding ...




### Multimetallic Bifunctional Hydrocracking Catalyst and Method of Preparing Biojet

Search patents (if you are developing a new sensor....equipment...new technology)....

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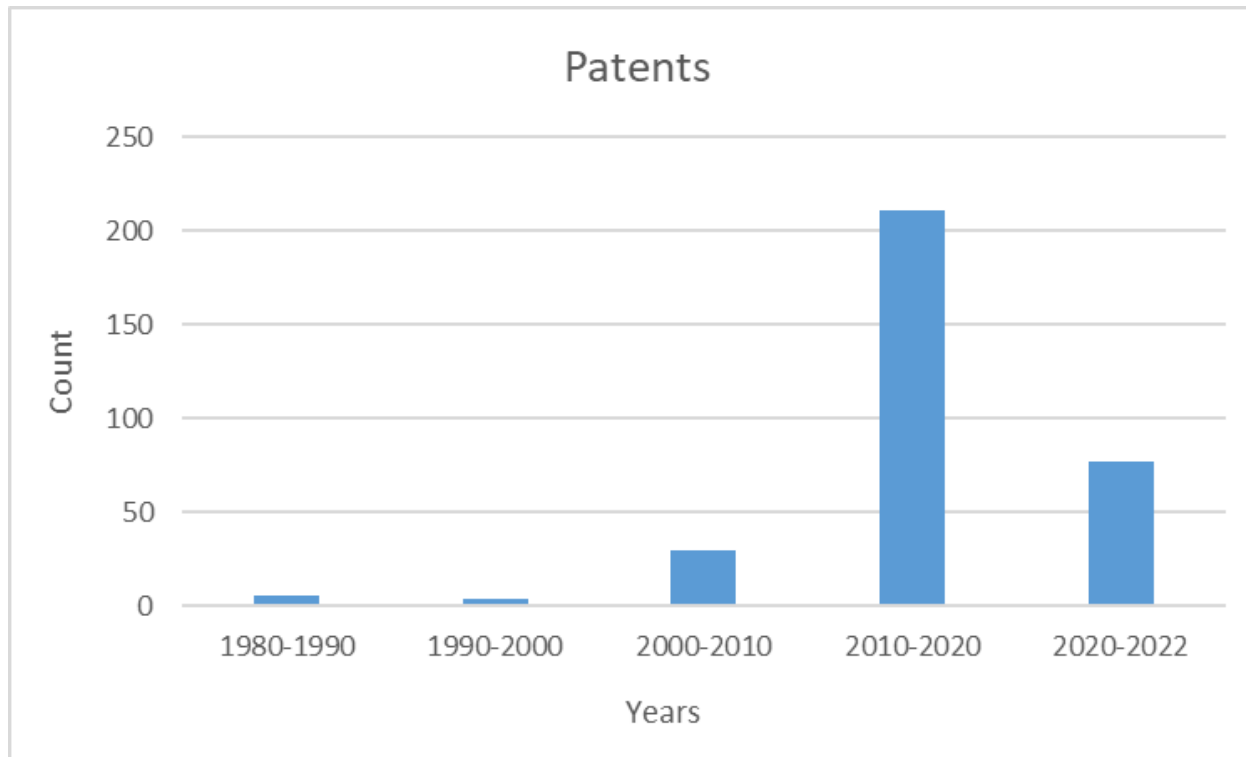
 Download (CSV) with  
Concepts

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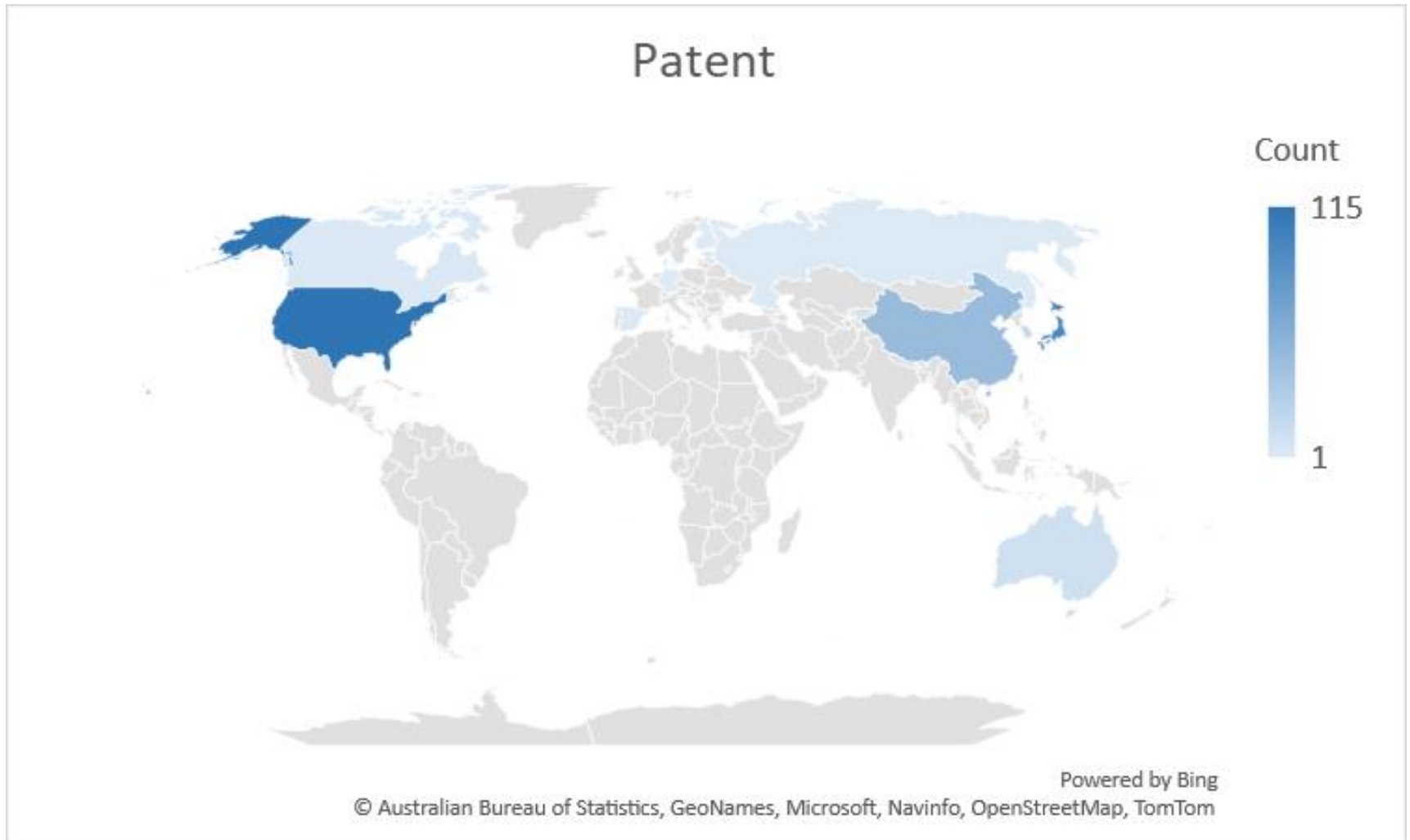
mpli  
avia

Search patents (if you are developing a new sensor....equipment...new technology)....



Interpretation:

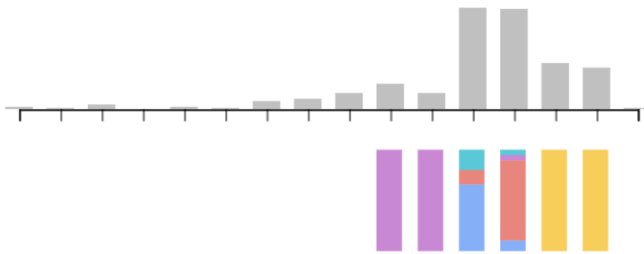
The number of patents has been increasing steeply in the last decade, and in 2020-2022 the number of granted patents is higher than 2000-2009 timeframe and already amounts to 1/3 of the granted patents in 2010-2019.



## Interpretation:

Most patents are granted in US and JP countries. Top 5 applicants with filled patents:

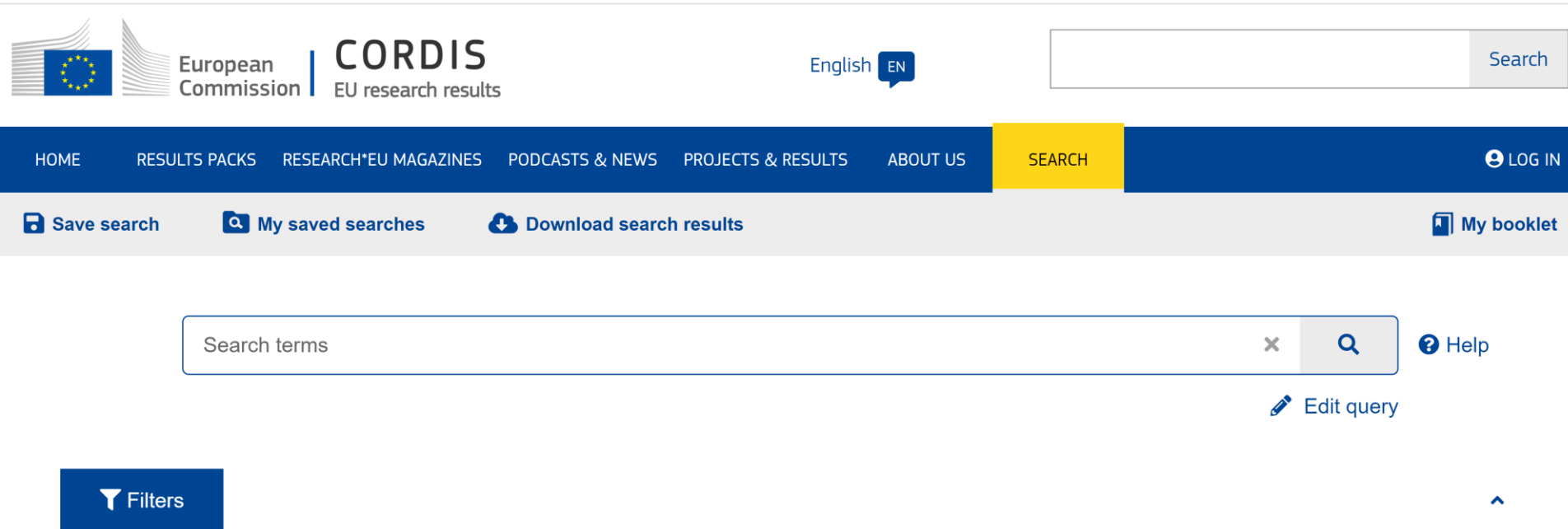
Top 1000 results by filing date



Relative count of top 5 values

Assignees	Inventors	CPCs
<ul style="list-style-type: none"> <li>— J x 日鉱日石エネルギー株式会社 7.6%</li> <li>— 京セラ株式会社 6%</li> <li>— Nuseed Global Innovation Ltd. 3.6%</li> <li>— デンカ生研株式会社 2.7%</li> <li>— 清华大学深圳研究生院 2.4%</li> </ul>		

## Other possible search engines:

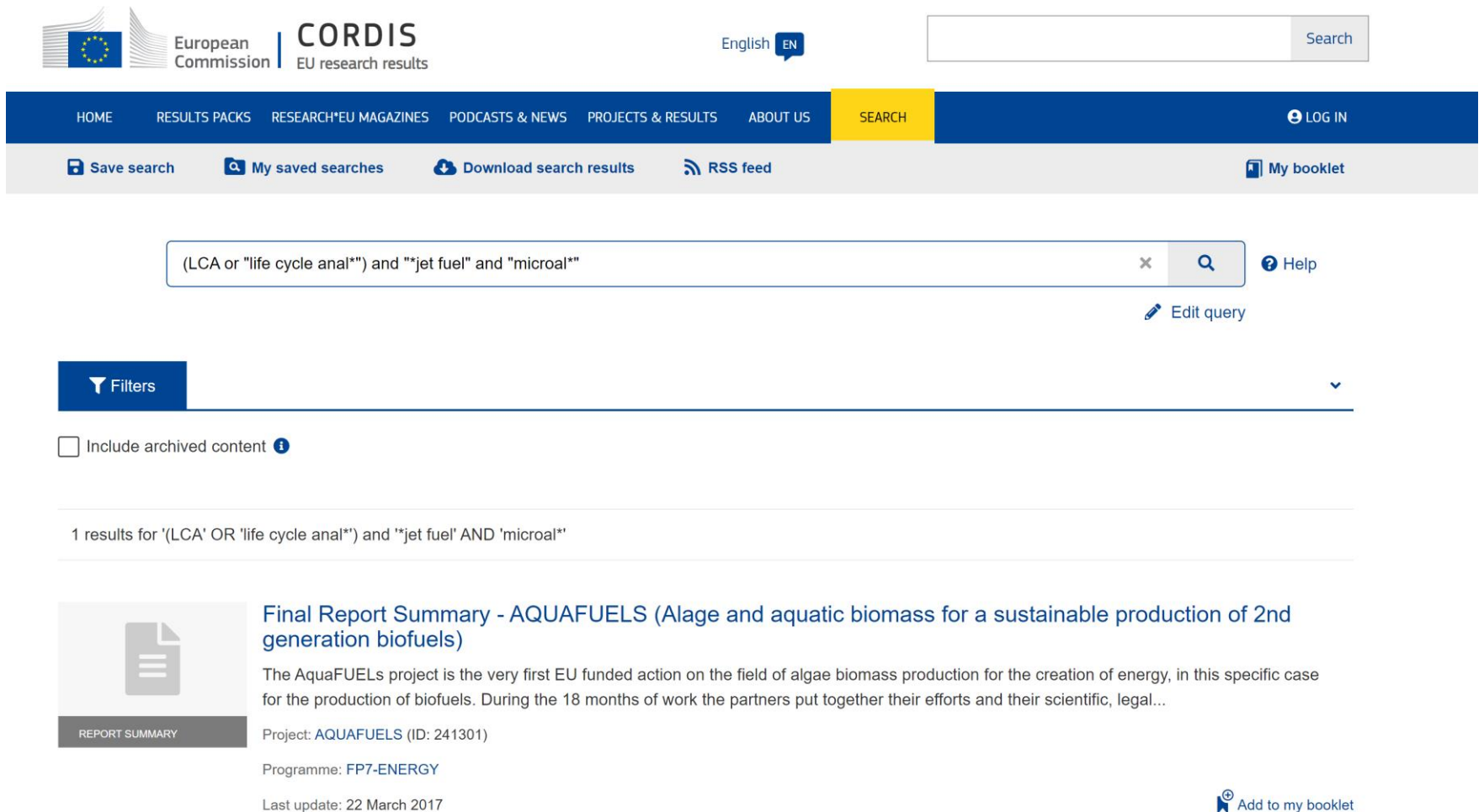


The screenshot shows the CORDIS search interface. At the top left, there is the European Commission logo and the text "European Commission | CORDIS EU research results". To the right, there is a language selector set to "English EN" and a search input field with a "Search" button. Below this is a navigation bar with links: HOME, RESULTS PACKS, RESEARCH\*EU MAGAZINES, PODCASTS & NEWS, PROJECTS & RESULTS, ABOUT US, and SEARCH (highlighted in yellow). On the far right of the navigation bar is a "LOG IN" button. Below the navigation bar, there are three utility links: "Save search", "My saved searches", and "Download search results". On the far right of this bar is a "My booklet" button. The main search area features a large search input field with the placeholder text "Search terms". To the right of the input field are a clear button (x), a search button (magnifying glass), and a "Help" button. Below the search input field is an "Edit query" button. At the bottom left, there is a "Filters" button. At the bottom right, there is an upward-pointing arrow.

<https://cordis.europa.eu/about/search/en>



## Other possible search engines:



The screenshot shows the CORDIS search engine interface. At the top, there is the European Commission logo and the text "CORDIS EU research results". A search bar contains the query "(LCA or 'life cycle anal\*') and '\*jet fuel' and 'microal\*'". Below the search bar, there is a navigation menu with options like "HOME", "RESULTS PACKS", "RESEARCH\*EU MAGAZINES", "PODCASTS & NEWS", "PROJECTS & RESULTS", "ABOUT US", and "SEARCH". A "LOG IN" button is also visible. Below the navigation menu, there are links for "Save search", "My saved searches", "Download search results", "RSS feed", and "My booklet". The search results section shows 1 result for the query. The result is titled "Final Report Summary - AQUAFUELS (Algae and aquatic biomass for a sustainable production of 2nd generation biofuels)". The description states: "The AquaFUELS project is the very first EU funded action on the field of algae biomass production for the creation of energy, in this specific case for the production of biofuels. During the 18 months of work the partners put together their efforts and their scientific, legal...". The project ID is 241301, the programme is FP7-ENERGY, and the last update date is 22 March 2017. There is an "Add to my booklet" button at the bottom right of the result.

European Commission | **CORDIS**  
EU research results

English EN

Search

HOME RESULTS PACKS RESEARCH\*EU MAGAZINES PODCASTS & NEWS PROJECTS & RESULTS ABOUT US **SEARCH** LOG IN

Save search My saved searches Download search results RSS feed My booklet


(LCA or "life cycle anal\*") and "\*jet fuel" and "microal\*" × 🔍 ? Help

✎ Edit query

**Filters** ▼

Include archived content ?

1 results for '(LCA' OR 'life cycle anal\*') and '\*jet fuel' AND 'microal\*'

 **Final Report Summary - AQUAFUELS (Algae and aquatic biomass for a sustainable production of 2nd generation biofuels)**

The AquaFUELS project is the very first EU funded action on the field of algae biomass production for the creation of energy, in this specific case for the production of biofuels. During the 18 months of work the partners put together their efforts and their scientific, legal...

REPORT SUMMARY

Project: AQUAFUELS (ID: 241301)

Programme: FP7-ENERGY

Last update: 22 March 2017

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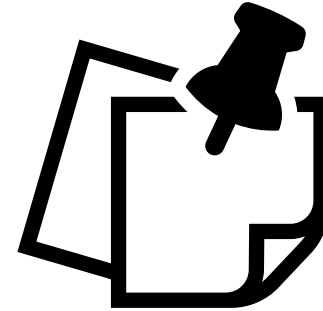
## LOOK INSIDE!!

Its really relevant to your work? If no, then you have to change the keywords....

If yes, you nail it!!

When doing your Literature Review:

Include in the Literature review:



At least two graph with interpretation

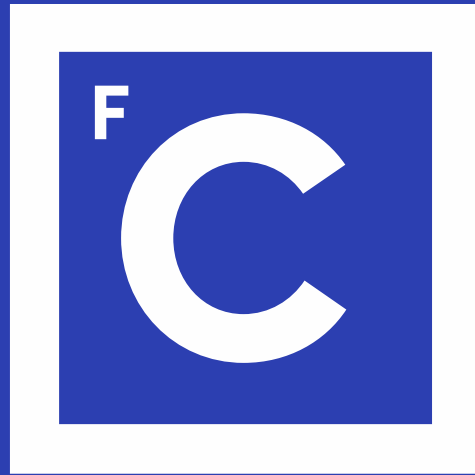
- ✓ mention to the search engine and query
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Literature  
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Results

**Thanks**



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