

Request for Knowledge Partners (23/12/2021)

Project title: ODOR REmoval to improve indoor air quality by sustainable soluTIONs

Acronym: ODORRETION

Project ID	
Type	ICON
Period	2-3 years
Starting date	2022
Total project budget	TBD
Subsidy percentage	according to SBO and O&O regulations
Current industrial partners	Confidential
Catalisti contact	Aron Deneyer (adeneyer@catalisti.be)

Project description

Introduction

The World Health Organisation (WHO) lists indoor air quality as one of the most dangerous health threats. It can be five times more polluted than the outdoor air and bad indoor air quality was responsible for over 2.6 million premature deaths in 2016. We spend 90% of our time indoors. 50-80% of global consumers worry about air quality at home. Bad indoor air can contain toxic and malodorous compounds. These odors can originate from living organisms (e.g. sweat from humans, skin degradation, pets, and the presence of micro-organisms) and the release of chemicals related to the production process or usage of in-house materials (e.g. volatile organic compounds released after unpackaging).

Different technologies are already available to neutralize. Unfortunately, drawbacks are associated with these solutions:

- Adsorption-based techniques (e.g. zeolites, cyclodextrin, silica-based materials) are very selective and have restricted durability (rapidly saturated and frequent washing steps are required);
- UV-based solutions (e.g. based on TiO₂) are not an option indoors since they will not be exposed to sunlight;
- Chemocatalysts do not always give desirable results to eliminate odors;
- Biocides active against unwanted micro-organisms that cause malodor, are not sustainable and environmentally friendly.

Finally, a classical cleaning step is not always possible and/or desirable.

The **development of a sustainable and effective technology to prevent and eliminate unwanted odors, and thus improve the air quality in general**, is a key technology need across industrial sectors. The **application of bacteria with positive characteristics** to neutralize bad odors is envisioned as a valuable and sustainable bio-based alternative for the classical technologies. Odor removal based on biological solutions exists, but the industrial potential of good bacteria and microbial technologies is currently underused. A main innovation is to process the right bacterial strains for malodor prevention and elimination depending on the application domain. A main challenge is a possibly low activity to convert a complex mixture of odor compounds in a fast and selective manner. This project will tackle these major hurdles by the selection of the most beneficial micro-organisms as well as explore alternative and complementary technologies based on (bio)chemical solutions.

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Goals

In the first part, a **custom-made sampling and characterization protocol** to identify which (group of) compounds, typically leading to indoor bad odors, should be developed. Odors can be caused by environmental & human sources and can originate from materials. According to the identified (family) of odors, a **sustainable remediation solution** is required. The main objective is to develop a technology platform that can neutralize these compounds, thus minimizing the impact on indoor air quality. At the heart of the technology, we envision a sustainable solution based on **bacteria with positive characteristics or derivatives of them**. To increase the overall efficiency, complementary technologies such as entrapping and/or chemical agents will be investigated. The developed technology will be tested and **applied in three different scenarios**:

- textile application;
- home applications and areas where most bad air quality resides;
- home applications with a focus on bio-based renewable approaches.

To obtain a good insight in the technical feasibility, a **full validation process** (real life tests) is targeted in this project.

A positive environmental impact will be achieved by avoiding the usage of classical (chemical) techniques, and switching to a hybrid solution using bacteria-based technology. Moreover, this project frames in the **raising demand of customers for smart solutions for safeguarding a good air quality and the increasing possibilities of engineering sustainable microbial technologies in the developing bio-based economy**. By elaborating this project, a new technology platform based on biological solutions will be developed in Flanders.

Request

With this Request for Partners, we would like to invite universities/knowledge institutes that have expertise, technology or knowledge relevant to the project to respond to this request. **To reach the project goals, the consortium is particularly searching for the following (non-limitative) expertise:**

- Partner with expertise in **identifying odor compounds**. These odors should be characterized after sampling them with a custom made protocol;
- Partner with expertise in **microbiology and biotechnology for industrial applications, for example to eliminate volatiles and odor compounds**. This partner should be able to cultivate micro-organisms, screen and test for relevant biological activities. Moreover, this partner should perform the first processing steps;
- Partner with expertise in the development of **sustainable entrapping agents** to eliminate odor compounds;
- Partner with expertise in the development of **sustainable chemical agents** to eliminate odor compounds.

How to reply to this request

Please send your **proposal by email** before **25/01/2022 (12h00)** to Catalisti, **exclusively via your association representative** (see contact list below). An application (2-3 pages without attachments) should contain at least the following items:

1. Organisation and research group
2. Name and contact details of person submitting the proposal
3. Name and contact details of person(s) who will perform the actual tasks (if different from submitting person)
4. A proposal of your role in the project: for which expertise/assignments described above do you apply?

Provide a concrete proposal on:

- how you want to contribute to the required expertise/assignments and how you want to solve the (research) problem described above

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- how this fits in the (long-term) ambition of the research group/knowledge institute

If you consider your contribution to fit within fundamental basic research (SBO), please provide argumentation.

5. A description of your expertise/track record/experience in the specific topic of this RfP, for which you are applying (at the 3 organisational levels as mentioned above, i.e. for the organisation and/or research group, for the person submitting the proposal, as well as for the executing person(s)) (preferably give the resumes of submitting and executing persons attached)
6. A list of relevant funded projects (Catalisti, VLAIO, EU, ...) where you were a coordinator or partner
7. A commitment to prepare a full project proposal by Proposal deadline (30/04/2022) together with the other project partners.

Please contact your association representative for more details on how to write your application.

Contact List

- KU Leuven: Bert Lagrain (bert.lagrain@kuleuven.be);
- UAntwerpen: Ann Aerts (annfb.aerts@uantwerpen.be);
- UHasselt: Lieve De Doncker (lieve.dedoncker@uhasselt.be);
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- Centexbel: Isabel De Schrijver (ids@centexbel.be);
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- BBEU: Hendrik Waegeman (hendrik.waegeman@bbeu.org);
- Sirris: Benjamin Vandeputte (benjamin.vandeputte@sirris.be);
- IMEC: Kris Van De Voorde (kris.vandevoorde@imec.be);
- VKI: Peter Simkens (peter.simkens@vki.ac.be).

Evaluation

The industrial partners, together with Catalisti, will review all proposals obtained before the deadline mentioned above. The industrial partners will make a selection of the best proposals based on the following criteria:

- your expertise in the requested expertise domain (5pt)
- your experience in carrying out similar assignments (3pt)
- your experience in other relevant funded projects as a coordinator or partner (3pt)
- complementarity with the other executing project partners (4pt)

After submission of your proposal, you can be contacted by telephone or invited to an online or live meeting (if this is deemed necessary by the industrial partners) to further elaborate your offer. *Please note that the selection will be made primarily based on your written proposal, so be complete and thorough, without anticipating on a further elaboration of your proposal.*

The final decision will be communicated typically within 2 weeks after the deadline mentioned above, but could take longer depending on the number of proposals and selection of a balanced project consortium.

Contact

Please contact Aron Deneyer (adeneyer@catalisti.be, +32 472 375 260) or Linsey Garcia-Gonzalez (lgarciagonzalez@catalisti.be, +32 479 450 426) if you have any questions concerning this RfP or the Catalisti procedures in general.

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