



Research evaluation

EVALUATION REPORT OF THE UNIT
BBF - Biodiversité et Biotechnologie Fongiques

UNDER THE SUPERVISION OF THE
FOLLOWING ESTABLISHMENTS AND
ORGANISMS:

Aix-Marseille université - AMU

Institut national de recherche pour l'agriculture,
l'alimentation et l'environnement - INRAE

EVALUATION CAMPAIGN 2022-2023
GROUP C

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High Council for evaluation of research and higher education



In the name of the expert committee¹ :

Gabrielle Veronese, Chairwoman of the committee

For the Hcéres² :

Thierry Coulhon, President

Under the decree n° 2021-1536 of 29th November 2021:

¹ The evaluation reports "are signed by the chairperson of the expert committee". (Article 11, paragraph 2);

² The president of the Hcéres "countersigns the evaluation reports established by the expert committee and signed by their chairperson." (Article 8, paragraph 5).

This report is the result of the unit's evaluation by the expert committee, the composition of which is specified below. The appreciations it contains are the expression of the independent and collegial deliberation of this committee. The numbers in this report are the certified exact data extracted from the deposited files by the supervising body on behalf of the unit.

MEMBERS OF THE EXPERT COMMITTEE

Chairperson: Ms Gabrielle Veronese, INRAE, Toulouse

Experts : Ms Valérie Gautier, Université Paris Cité (supporting personnel)
Ms Guillermina Hernandez-Raquet, INRAE, Toulouse (representative of CSS INRAE)
Mr Philippe Jacques, Université de Liège, Belgium
Ms Carole Molina Jouve, INSA Toulouse (representative of CNU)

HCÉRES REPRESENTATIVE

Mr Christophe D'Hulst

CHARACTERISATION OF THE UNIT

- Name: Biodiversité et Biotechnologie Fongiques
- Acronym: BBF
- Label and number: UMR1163
- Composition of the executive team: Mr Craig B. Faulds (2015-2021), Ms Marie-Noëlle Rosso (2022-2023)

SCIENTIFIC PANELS OF THE UNIT

SVE2 Productions végétales et animales (agronomie), biologie végétale et animale, biotechnologie et ingénierie des biosystèmes

THEMES OF THE UNIT

The Joint Research Unit INRAE-AMU "Biodiversity and Biotechnology of Fungi "(BBF) was organized as one single team, mainly dedicated to the production of knowledge on the degradation of lignocellulosic biomass by fungi, contributing to the development of bioeconomy.

The research themes are focused on i) the adaptation of fungi to lignocellulosic biomass of different compositions (theme 1), ii) the discovery and characterization of fungal enzymes involved in the breakdown of recalcitrant polysaccharides (theme 2) and the use or the modification of aromatic compounds (theme 3).

The scientific and technological expertise of BBF combines enzymology, microbiology, and microbial genomics and post-genomics. During the period of evaluation, the unit organization was matricial, with most persons contributing to the different themes depending on the focus of the projects they were involved in. In 2021, the direction staff launched a restructuration of the unit, in order to improve external visibility of the various expertise and mutualization of the financial resources per research theme. The restructuration process was based on a very democratic and collective brainstorming to define the contours of the new teams. Since September 2021, the unit is structured as a three-teams configuration, each team involving between 4 and 5 permanent researchers, professors / assistant professors, and technical staff: theme 1 is now led by the RESPONSES team, with a new focus on oxidative post-translational modifications of fungal proteins and the production of secondary metabolites in response to biotic and abiotic stress during lignocellulose decomposition ; theme 2 is led by the BOOST team, and theme 3 by the AROmass team. In addition, seven permanent technical staff (of which six are also involved in the research groups) provide common technical support to the research groups. Besides, BBF includes the platform *Pichia pastoris* Protein Express (3PE), involving a two permanent technical staff (also involved in the BOOST group). Importantly, BBF also hosts the Biological Resources Centre (BRC) CIRM-CF, involving a five permanent staff (one being also involved in the RESPONSE group), for maintaining a very original collection of more than 3000 fungal strains, which is highly recognized and exploited at the international level. Finally, a two person staff is in charge of administration and management, one in supply management and four persons contribute part-time to the quality, environment, health & safety, and operational data management of the unit.

HISTORIC AND GEOGRAPHICAL LOCATION OF THE UNIT

The unit is located in the Polytech Building on the Luminy Campus of Aix-Marseille University. It was established in 1993 under the name "Biotechnology of Filamentous Fungi" which was changed in 2014 in "Biodiversity and Biotechnology of Fungi".

RESEARCH ENVIRONMENT OF THE UNIT

BBF is affiliated both to AMU and to the TRANSFORM and MICA departments of INRAE. The three present research groups involve persons of both INRAE and AMU, which contributes to the good interactions between the two institutions, in particular through the involvement of lecturers, researchers and engineers of the BBF unit in teaching and training at AMU, in particular at the master level.

The BBF unit is very well integrated in the local network. It is a member of the AMIDEX Institute of Microbiology for Bio-energy and Microbiology (IM2B) and of the Federative Research Institute ECCOREV (Continental Ecosystems and Environmental Risks). Interactions of BBF with industrial partners are promoted through its membership of the Regional Competitiveness Cluster Capénergies, of the "Cellule de Diffusion Technologique" Novachim, on Chemistry and Materials, to the Pôle Innov'Alliance on Food for Health, and of the Sud-Est Technology Transfer Accelerator Society (SATT). Besides, both the CIRM-CF and the 3PE platforms are labelled "Aix-Marseille Site Technology Platforms", and 3PE complement the service offers of the Protein Expression Facility of the "Institut de Microbiologie de la Méditerranée" (CNRS-AMU).

BBF makes important contributions to the national technological network in microbiology and biotechnology, CIRM-CF being a member of the national research infrastructure "Ressources Agronomiques pour la Recherche" (AgroBRC-RARE), and 3PE a member of the "infrastructure INRAE Transform" and integrated in technological network IBISBA-FR.

At the international level, BBF mainly contributes through its CIRM-CF component, which is a member of the MIRRI (Microbial Resources Research Infrastructure) pan-European Research Infrastructure for the preservation, systematic investigation, provision and valorisation of microbial resources and biodiversity. CIRM-CF thus makes important contributions to the international visibility of the unit, also since BBF coordinated an US Department of Energy_Joint Genome Institute project to sequence the genomes of fungal strains of its collection. BBF contributes to scientific exchanges in the Mediterranean area, with student exchange projects through the PHC Utique, and a "Collaboration Scientifique Inter-Universitaire" (PCSI) of the "Agence Universitaire de la Francophonie" that includes the Lebanese University, the "École Nationale d'Ingénieurs de Sfax" (Tunisia), and an AMU Master course.

UNIT WORKFORCE: in physical persons at 31/12/2021

Permanent personnel in active employment	
Professors and associate professors	1
Lecturer and associate lecturer	5
Senior scientist (Directeur de recherche, DR) and associate	3
Scientist (Chargé de recherche, CR) and associate	3
Other scientists (Chercheurs des EPIC et autres organismes, fondations ou entreprises privées)	0
Research supporting personnel (PAR)	12
Subtotal permanent personnel in active employment	24
Non-permanent teacher-researchers, researchers and associates	1
Non-permanent research supporting personnel (PAR)	3
Post-docs	3
PhD Students	6
Subtotal non-permanent personnel	13
Total	37

DISTRIBUTION OF THE UNIT'S PERMANENTS BY EMPLOYER: NON-TUTORSHIP EMPLOYERS ARE GROUPED UNDER THE HEADING "OTHERS".

Employer	EC	C	PAR
Inrae	0	6	12
Aix-Marseille Université	6	0	0
Ifpen	0	0	0
Total	6	6	12

UNIT BUDGET

Recurrent budget excluding wage bill allocated by parent institutions (total over 6 years)	512
Own resources obtained from regional calls for projects (total over 6 years of sums obtained from AAP idex, i-site, CPER, territorial authorities, etc.)	176
Own resources obtained from national calls for projects (total over 6 years of sums obtained on AAP ONR, PIA, ANR, FRM, INCa, etc.)	1 525

Own resources obtained from international call for projects (total over 6 years of sums obtained)	825
Own resources issued from the valorisation, transfer and industrial collaboration (total over 6 years of sums obtained through contracts, patents, service activities, services, etc.)	674
Total in euros (k €)	3 712

GLOBAL ASSESSMENT

The Joint Research Unit of INRAE and Aix-Marseille University "Biodiversity and Biotechnology of Fungi (Biodiversité et Biotechnologie Fongiques; BBF)" focuses its research on fungal degradation of lignocelluloses. With a panel of expertises covering mycology, enzymology, multi-omics, as well as structural biology, BBF addresses very efficiently research questions on i) fungal adaptation and response to biotic and abiotic stress during lignocellulose decomposition, ii) enzymatic breakdown of polysaccharides, and iii) utilization and modification of aromatic compounds by fungi. In addition, the unit hosts the CIRM-CF and 3PE platforms, of which the unique microbial collection and technological expertise, contribute, respectively, to the excellent visibility of the unit.

Over the period of evaluation, the research activities of BBF are globally excellent. The unit ensures its missions with a very good balance and is internationally, nationally and regionally recognized for the quality and the originality of its research.

The committee appreciated the transversal functioning of the unit and its matrix organisation, in a single team, which has favored mutualization of expertise, equipment and human resources. During the period of evaluation, this organisation evolved to a 3-team structure, which was effective in September 2021. This restructuration was decided based on collective brainstorming and vote sessions, which is excellent. The new structure will allow the unit to gain in visibility and financial mutualization, although special attention should be paid to maintain transversality.

The ability of BBF to attract funding, in particular from national and international academic agencies, is excellent. Over the period of evaluation, the unit participated in or coordinated several international projects, and despite several submission of ERC projects, none was funded.

Both the quality and quantity of the BBF scientific production are excellent to outstanding. The contribution of BBF staff as first, last or corresponding author is very good to excellent. BBF published more than one third of its papers in collaboration with researchers from highly recognized foreign institutes, which is excellent.

The visibility and attractiveness of the unit are excellent at the regional and national levels, and very good at the international level, in particular thanks to a high international visibility of some researchers, their efforts in conference organization and participation in some large international projects, but not as coordinators.

The ability of the unit to build collaborations with industrial partners and to valorize research results is excellent, based on i) the relevance and originality of several of the BBF research themes in regards to the development of bioeconomy, ii) its scientific and technological expertise, iii) its unique collection of fungal strains, that are very well genotypically and phenotypically characterized.

The number of PhD students supervised over the period of evaluation is very good, and their involvement in the scientific production of the unit and their employability are excellent.

Finally, the contribution of the unit to scientific integrity and to Open Science is excellent. Activities of dissemination of scientific advances to the general public are very good.

DETAILED EVALUATION OF THE UNIT

A - CONSIDERATION OF THE RECOMMENDATIONS IN THE PREVIOUS REPORT

Recommendation 1 has been taken into account with the significant increase in the activity of the International Microbial Resource Centre (CIRM-CF) hosted by the unit. This Centre enables the unit to benefit today from a leading position in France, together with an international visibility by generating large quantities of data to feed the research activities organised in three independent and complementary themes. The analysis of the results in the Web of Sciences reveals the significant increase in the number and quality of published articles, with a very broad international partnership in projects. In addition, by recruiting four permanent scientists and one lecturer, the unit has strengthened its expertise in the structure-function relationships of enzymes, in the regulation of oxidative mechanisms of enzymes, on metalloenzymes, in the characterisation of fungal cell walls, and in mycology. The unit's expertise in bioinformatics remains to be strengthened, as the unit has associated the skills of different external partners and recruited one permanent engineer and two non-permanent researchers.

Recommendation 2 has been taken into account, with a leading position in the coordination of 5 projects at local level - via the reinforced participation of BBF in the different committees of the Institute of Microbiology for BioEnergy and Biotechnology - 3 ANR projects and 10 "3BCarnot" projects at national level. At the international level, the unit participated in the EU projects Zelcor, Index and Evofun, as well as in the 1000 Fungal Genome Project of the Joint Genome Institute, Department of Energy (US), and recently, in the Novo Nordisk Foundation OXYMIST project. These actions have increased the visibility and strengthened the scientific leadership of the unit.

Recommendation 3 has been taken into account, with (i) a strategy focusing on LPMOs, laccases and peroxidases, enzymes prominent in polysaccharides/lignin degradation or modification (ii) increasing collaborations with industry with five Cifre grants addressing more fundamental aspects of research.

Recommendation 4 has been taken into account as (i) the unit has successfully developed a strategy to increase its expertise in mycology, redox enzymology, protein biochemistry and crystallography, bio-informatics through training and recruitments of permanent and non-permanent staff; (ii) each theme has also leaders devoted 90 to 100% of their research time to the theme; (iii) the use of English has been generalised within the laboratory; (iv) project group discussions were made more systematic. The unit argues about their choice to keep biodiversity in the name.

Recommendation 5 has been taken into account as the unit's efforts have already led to an increase in the number of Cifre grants, to the establishment of new collaborations with industry and the participation in two unsuccessful ITN projects.

Recommendation 6 has been taken into account for each theme, with elements to demonstrate the balance between basic research and applications.

B - EVALUATION AREAS

EVALUATION AREA 1: PROFILE, RESOURCES AND ORGANISATION OF THE UNIT

Assessment on the unit's resources

The Unit's research activities are devoted to the production of scientific knowledge (55%) on three main themes of biomass deconstruction by fungi.

The ratio between the number of tenured scientists/lecturers (12) and PARs (10 dedicated to research) is excellent and ensures appropriate technical support for each scientist at all times. In addition, one member of the technical staff is dedicated to quality control and brings their expertise in mycology to the unit. One of the main assets of the unit is its internationally recognized in-house collection of filamentous fungi (CIRM-CF collection). The unit's activities are supported by a platform for medium throughput heterologous expression of proteins (3PE). The diversity and complementarity of scientific expertise are excellent, despite the need for an increased permanent staff in bioinformatics and chemical analysis to support the different themes of the unit.

The number of PhD students and post-doctoral scientists is rather low compared to the number of permanent scientists. This is partly due to the lack of available space, but also to the few number of HDR.

The reduction of permanent staff with expertise in industrial biotechnology, due to retirement and mobility, has changed the strategy of the unit with regards to high TRLs research, which is now carried out in collaboration with external partners.

The unit has an excellent strategy and is successful in finding financial resources, and has obtained several grants from national and international agencies to develop high quality research with key collaborators from academia and industry. The unit's resources were globally assessed as excellent.

Assessment on the scientific objectives of the unit

The definition of the unit's objectives is outstanding. The unit's strategy to prioritize them is very clear, resulting in a very precise and pertinent definition of them, considering the latest development in the field of biomass degradation, the unit's expertise, the available human resources, infrastructures/equipments and funding to avoid dispersion. The unit has defined a very well-thought-out strategy to answer specific research questions that focus on a limited number of topics. The scientific strategy takes into account the societal and industrial impact of the unit's research in an excellent way, being oriented to the production of, for instance, biocatalysts for an efficient/zero-waste biorefinery and the production of biotechnological product for various applications. The unit's objectives are perfectly in line with European priorities in the field of biorefinery, as evidenced by the unit's participation in two European projects (INDOX and ZELCOR), and recently, in a Novo Nordisk Foundation project (OXYMIST). These objectives are perfectly in line with the scientific priorities of INRAE's 2030 strategy and, of the MICA and TRANSFORM departments to develop a bioeconomy and a circular use of resources.

Locally, the scientific objectives also respond to the expectations of the AMU.

The unit has built an excellent network of academic and industrial collaborations in France and abroad, in line with the defined scientific objectives.

Assessment on the functioning of the unit

Global functioning of the unit is excellent. Following the recommendations of the previous Hcéres assessment, the BBF unit was organized until 2021 as a mono-team unit, with three thematic axes, where projects emerge in one, two or three of these axes. Researchers, lecturers and technical support staff have had the choice of integrating and developing the science of a particular theme while retaining the possibility of participating in the research work of other themes. Doctoral students, post-doctoral scientists and non-permanent appointments were allocated to the themes as per their supervisor's choices. Over the period of evaluation, the unit organized regular meetings with the members of the laboratory during which the organization and the strategy of the unit were democratically discussed. This inclusive and democratic approach was in particular used for defining, in 2021, the new structure of the laboratory, which is now composed of three independent teams. This new organization, effective in 2022, allows the unit and its various expertise to gain in visibility, and to better mutualize financial resources.

Finally, there is a very good atmosphere in the unit, which is recognized by all the staff categories. Training and supervision of PhD students are excellent.

1/ The unit has resources that are suited to its activity profile and research environment.

Strengths and possibilities linked to the context

The scientific objectives of the unit concern the improvement of generic knowledge on lignocellulose-degrading fungi and their enzymes to improve the transformation of lignocellulosic biomass and then contributes to the challenges of bioeconomy.

The unit has successfully strengthened its expertise during the evaluation period through the recruitment of permanent and non-permanent staff: four scientists in mycology, redox enzymology, protein biochemistry and cristallography have joined the unit. In addition, three technical staff reinforced the unit in science, project management and quality control.

The profile of people recruited reveals an inflection in the scientific strategy: the deficit created in the field of fermentation linked to the departure of one professor is compensated by external collaborations when needed. The unit's involvement in research supervision is strong, as 14 PhD students, 5 ATER scientists and 13 post docs were hosted during the evaluation period. This involvement is based on a ratio of HDRs among scientists of 7 to 12.

The unit's resources, after a decline in 2019 and 2020, exceeds in 2021 the highest level reached in 2018.

The local research environment is well-suited for collaborations and financial supports (via the AMidex initiative of excellence, IM2B, ECCOREV research federation, competitive clusters CapEnergies and Innov Alliances). The unit has been successful in coordinating regional and national projects, and in participating to international projects. Its position as a European and International leader in its research fields has been remarkably strengthened during the period. The dynamic is excellent, with three applications for ERC grants (albeit unsuccessful), the participation in an international program with JGI in a long-term collaboration and the participation to ambitious European projects.

The unit has achieved excellent results in its activities for industrial transfer, as shown by the number of invention declarations and patents filed (7), the increase in Cifre grants (5), its 3BCarnot's successful calls for projects (10), the number of projects with companies via bipartite contracts (18 contracts with 12 different industrial partners), ANR projects with technical centers and transfer accelerators (SATT, TWB). The unit's resources from industries or valorisation represent 18% in 2021 of the total amount of own resources, with a very good balance of funding from national and international projects (30% each).

Weaknesses and risks linked to the context

Only 5% of the total amount of resources were provided from regional calls of projects to explore new concepts. However, opportunities do exist that could help to acquire new equipment and the unit could further benefit from these regional calls by increasing its participation in regional institutions.

The unit's staff have spread their efforts to contribute to national and international committees. However, the participation in AMU committees seems to be limited, which may reduce the visibility of the lecturers' activities by their supervising institution.

No HDR was defended during the period.

2/ The unit has set itself scientific objectives, including the forward-looking aspect of its policy.

Strengths and possibilities linked to the context

The research objectives of the unit are to (i) determine how fungi adapt their enzymatic machinery to degrade different lignocellulosic feedstocks (ii) understand the mechanisms used by fungi to transform recalcitrant polymers (crystalline cellulose, lignin and industrial molecules, including dyes and plastics) and (iii) decipher the fungal metabolism of lignin-derived aromatics. The unit focuses its efforts in the development of fundamental research on a small number of enzyme families (LPMO, metalloenzymes/oxidoreductases, enzymes active on lignin and lignin-derived aromatics), and their implementation in the form of enzyme cocktails.

The objectives of the unit are perfectly in line with European priorities in the field of biorefinery, to develop new biocatalysts for use in an industrial context, as evidenced by the unit's participation in two European projects (INDOX and ZELCOR) and in a Novo Nordisk Foundation project (OXYMIST).

The unit's objectives are also in line with the scientific priorities of INRAE, MICA and Transform departments to develop a bioeconomy and circular use of resources. The compliance with these objectives is actively monitored through regular discussions with the Head of the departments MICA and Transform and through participation in the annual meetings of these departments as well as by maintaining a dialogue with the INRAE PACA Centre. The scientific objectives of the Unit respond to GOS1 of Transform and GOS2 of MICA to generate knowledge so as to develop sustainable bioeconomy systems and to understand and optimize these biological systems for biotechnological applications. Locally, the scientific objectives of the unit are in line with the expectations of the AMU and the unit is involved in the creation of the Institute of Microbiology for Bioenergy and Biotechnology.

The unit has clearly defined its scientific objectives through a well-thought-out strategy to answer specific research questions, focusing its efforts on the development of fundamental research on a reduced number of enzyme families (LPMO, metalloenzymes/oxidoreductases, enzymes active on lignin and lignin-derived aromatics) and their implementation as enzyme cocktails. This strategy is in agreement with the human resources, expertise, infrastructure/equipment and funding available. It allows avoiding dispersion while keeping excellent visibility on the targeted enzyme families and their exploitation for a wide range of biotechnological applications.

The scientific objectives of the projects in which the unit plans to be involved are discussed in the Steering Committee on a monthly basis, which allows everyone to contribute their expertise to the projects and to maintain collaboration between the thematic groups and now, between the three teams. The unit encourages the involvement of technical staff in the design and development of projects; this information is shared with all members of the unit.

The unit has built a strong network of collaborators in France and abroad, in line with the defined scientific objectives. Thus, the unit has a strong interaction with internationally recognized groups in the field of biomass bioconversion. For example, the unit works with the Joint Genome Institute on the genomic characterization of the in-house fungi collection and with the IJPB (Institut Jean Pierre Bourgin) and the BIA (Biopolymères,

Interactions, Assemblages) on aspects related to the characterization of lignin and lignocellulosic biomass respectively.

The unit has developed a significant number of industrial collaborations (direct contracts or Cifre doctoral funding) to address the more applied aspects of its research.

Weaknesses and risks linked to the context

The unit, which is a rather small research group (12 scientists and 12 technicians), is involved in the very competitive field of lignocellulosic biomass conversion. Its strategy of selecting study topics and building a strong network of collaborations (26 institutions around the world in addition to the national network of collaborations) is very relevant, but the risk of being less innovative and being overtaken by larger research groups remains.

Regarding the applied aspects of the research, the unit has mainly developed them in collaboration with industrial partners (18 bi-partner contracts including the five Cifre grants, one PRCI project, the OleoInnov start-up, Institute Terres Inovia and Terres Univia) which is very positive. However, greater collaboration with academic research groups in France and Europe, particularly in the field of bioprocess engineering and scaling-up, could help to develop and strengthen these aspects more independently. This is particularly important in view of the loss of this expertise due to staff mobility/retirement. Similarly, regarding the unit's important activity on genomic, transcriptomic and proteomic data analysis, the permanent staff in bioinformatics is undersized, with, presently, less than one FTE of technical staff dedicated to bioinformatics.

3/ The functioning of the unit complies with the regulations on human resources management, safety, the environment and the protection of scientific assets.

Strengths and possibilities linked to the context

The Unit complies with the human resource management of INRAE (AFNOR label for Diversity and professional equality) and Aix-Marseille University. Democratic management allows researchers/lecturers and scientific support staff of the unit's three themes and now, teams, to develop their respective projects and collaborate with each other. Each technician chooses a permanent research scientist called "referent". This referent, in conjunction with the director of the unit, ensures the annual reviews of activities. This organization is optimal to stimulate creativity on integrated projects and to ensure the participation of each individual. The management of human resources allows the scientific support staff to evolve in their careers and helps with financial support for training (four of them obtained a promotion and one a D.U. (Diplôme d'Université) in mycology during the period of evaluation).

Management is carried out by a PR and the three groups by 2 DR (ARomass and BOOST groups) and 1 CR (RESPONSES group). There is an excellent ratio of nearly 1/1 researchers / PAR. The quality of support for supervising PhD (11 on 31/12/2021) and post-doctoral students (1 on 31/12/2021) is very good, and well balanced among the supervising researchers.

Regular meetings at different levels (projects, steering committee and unit council) allow everyone to be involved in the life of the laboratory and the evolution of projects. The steering committee includes all researchers, lecturers, the DU and DUAs. It meets monthly and the report of this committee is shared with the whole unit. The use of English in all these lab meetings, for the scientific presentations, for the technical procedures (besides French) allows foreign students and researchers to be easily included in the unit's life.

The organization of risk prevention is based on several systems: support for new arrivals, an up-to-date occupational risk assessment document, accessible Occupational Health and Safety register, official exchanges between the management staff, the quality assistant, and the prevention assistants.

Two BBF staff are committed to the "Sustainable Development Cell" and a recycling collection network has been set up for cardboard, plastic and aluminum.

In compliance with the INRAE rules, the procedures and results obtained in the unit are recorded in dedicated lab books to guarantee the traceability of the work. For the exchange of information, the documents are shared on an internal server, which is only accessible via login and password, or on the tools for shared files provided by the University or INRAE. The contractual staff and students have only access to the internal network during the period of their stay. The internal informatics network is maintained by a sub-contractor company expert in informatics security (Cyberwings), under the supervision of the Informatics services of the PACA INRAE Centre.

Weaknesses and risks linked to the context

Mycology is considered by the MESRI as a "fragile" field, the unit placing fungal biodiversity at the heart of its research activities and must remain vigilant to maintain expertise in this sector. A lecturer and a technician have been recruited. To preserve mycology, BBF trains PhD students in mycology and experts from the associative world.

Over the evaluation period, the unit has grown (seven contractual researchers, post-docs and technicians, and eleven PhD and master students on 31/12/2021), and acquired new equipment to stand at the forefront of technological skills, but the surface allocated to the unit has not evolved accordingly. The office surface allocated to the unit is 203 m² and the technical surface is 398 m², for a total of 23 permanent staff and 18 contractual employees and students on 31/12/2021. The increase in attractiveness has created a momentum of enthusiasm within the unit. The technical staff is highly motivated to move forward and actively contributes to the progress of the projects. It will therefore be necessary to remain vigilant that the increase in size and activity does not add pressure on the staff in office (technical and management). The permanent or contractual staff recruitment and the gain in surface of the premises are points of vigilance to be maintained.

EVALUATION AREA 2: ATTRACTIVENESS

Assessment on the attractiveness of the unit

The attractiveness evolved from very good to excellent over the evaluation period, due to the quality of the scientific works, the improvement of the visibility at both national and international level - BBF being coordinator or partner of three ANR projects, ten 3BCAR projects, three European projects and one Joint Genome Institute project - and the quality of the equipment on the platforms. The new organization into three teams is also an important step: it contributes in a very important way to the improvement of its attractiveness by clearly revealing BBF competences and activities with an efficient structure to meet its challenges.

The points for improvement are that junior researchers should gain visibility, that administrative procedures should be simplified for foreign scientists and that the surface area should be adapted to the needs of the unit to support its development.

1/ The unit has an attractive scientific reputation and contributes to the construction of the European research area.

Strengths and possibilities linked to the context

The unit was a partner of three different European projects: the FP7 INDOX project (2013-2018, 496 kEuros), with 17 partners (8 industrial partners), the BBI European ZELCOR project (2016-2020, 225 kEuros), with 16 partners (13 industrial partners), and more recently the Novo Nordisk Foundation OXYMIST project (2021-2027, 1782 kEuros), with 3 partners. These projects are managed by three different senior researchers in the laboratory. They are involved in an ERC synergy grant which was selected for the second round. An INRAE researcher applied twice for an ERC starting grant and was twice selected for the second round. The members of the unit are invited in several international conferences (LPMO Symposium 2016 Copenhagen, Gordon "CAZymes" 2017 Boston, Symposium of innovative Bioproduction 2018 Kobe, Symposium of Advanced Energy Science 2019 Kyoto, Mikrobiokosmos 2021 Athens...).

Weaknesses and risks linked to the context

Despite important efforts, the unit did not yet succeed in an ERC project. The unit is not involved in the coordination of a European project.

2/ The unit is attractive for the quality of its staff hosting policy.

Strengths and possibilities linked to the context

The supervision of doctoral and post-doctoral students is excellent, with regular committees and meetings. They are successfully involved in the daily life of the lab. All doctoral students and postdoctoral fellows are part of the Laboratory Council, one of them being a representative in the Scientific Committee of the unit. Their research work is very well suited to job finding in public and private institutions, in France and all over the world. The average duration of PhD is very reasonable (39 months).

Weaknesses and risks linked to the context

The number of visiting researchers remains modest (7). There is no mention that the unit attracted senior researchers. Hosting guest researchers seems to be rather complicated due to administrative complexity; the unit hopes that the AMU and INRAE will be able to provide tools in order to increase its number of incomers. The professional follow-up of all young researchers hosted in the lab could be useful to create a network.

3/ The unit is attractive because of the recognition gained through its success in competitive calls for projects.

Strengths and possibilities linked to the context

The unit has been involved in three ANR projects: Funtune (2014-2019, 158 kEuros), Funlock (2013-2018, 254 kEuros) and FunCLIPRO (2019-2023, 144 kEuros) and ten Carnot 3BCAR projects as coordinator. The unit also participated to the International ANR project Funtastic (2017-2022), to an international program of the Joint Genome Institute (1000 Fungal Genome Project) and to two EU projects and one Novo Nordisk foundation project. It attracted two researchers thanks to an H2020 AgreenskillsPlus incoming mobility and to a Marie-Curie grant.

Weaknesses and risks linked to the context

Only three of the numerous projects of the unit are managed by young scientists (less than 45 years).

4/ The unit is attractive for the quality of its major equipment and technological skills.

Strengths and possibilities linked to the context

By the quality of expertise of its staff and the development of its platforms, the unit has been able to make itself attractive at the both academic and industrial levels.

The ambition of the unit to strengthen its expertise in enzyme structure-function relationships led to the recruitment in 2015 of a post-doctoral crystallographer in the frame of an ANR project (Funlock 2013-2017), and subsequently as a permanent INRAE researcher assigned to the TRANSFORM Department; in 2019, an INRAE permanent researcher arrived, with a strong experience in the oxidative modification of enzymes as a way of controlling their activity, a topic which has already been funded in the unit.

The unit is attractive for the quality of its unique resources and technological skills, detailed hereafter. BBF has technical staff who are qualified in managing its two platforms, which reinforce the visibility of the unit:

- CRB CIRM-CF: this Biological Resource Centre is dedicated to saprotrophic filamentous fungi. The 3000 strains of the collection are available to the academic and industrial scientific communities. CRB CIRM-CF is collaborating in the construction of a Microbial Resources Research Infrastructure at European level for the preservation of biodiversity by making its collection available. CIRM-CF has acquired the Biologics management software in order to develop a catalog of strains compliant with ISO 9001 certification, which will allow CIRM-CF to request registration in the European Register of Genetic Resource Collections for better visibility.

- 3PE: this platform offers tailor-made services for the production of recombinant proteins in yeast at different scales. The quality of the services offered internally and externally has enabled the 3PE platform to obtain various labels: "Aix-Marseille Technological Platform", IM2B Platform, 3BCar Platform and "INRAE TRANSFORM Infrastructure" and was integrated in the IBISBA-FR network in 2022. During the evaluation period, through the publication of 23 articles and its participation in seven different projects of the unit, the 3PE platform greatly contributed to the notoriety of the BBF unit. An increase in the throughput capacity and the expansion of the services offered by this platform is envisaged, in coordination with the protein expression platform available at the Mediterranean Institute of Microbiology (CNRS-Aix-Marseille University).

Weaknesses and risks linked to the context

The development of the unit risks being greatly slowed down by the lack of laboratory space (398 m²) and allocated offices (203 m²) for 41 permanent and non-permanent staff. In 2021, a discussion was initiated with Aix-Marseille University and Polytech Marseille but a possible solution is only proposed for 2024. The recruitment of administrative staff in April 2022, an INRAE technician (September 2022) and a lecturer from Aix-Marseille University (January 2023) will put further pressure on the sharing of space. This lack of space forced the unit to give up the recruitment of an ATER, hosting foreign researchers on collaborative projects, and students from Aix-Marseille University. Regarding the CRB CIRM-CF platform, the small size of the team (three FTE spread over five staff) and the small size of the dedicated premises, does not allow the safe installation of new equipment (especially for cryopreservation). In this context, this space limitation hinders the projection into the future of the BBF unit.

EVALUATION AREA 3 : SCIENTIFIC PRODUCTION

Assessment on the scientific production of the unit

The scientific production of the unit is very original, in a fairly confidential field at the international level, that is mycology. It is qualified as excellent on a qualitative level, with 72% of publications were made in well-respected journals of their discipline, and 19% the highest reputation journals of the field. It covers all the themes of the unit, includes a dozen articles referenced as frequently cited articles, as well as review and vision papers in excellent journals, which contributes to its excellent visibility at international levels.

Given its excellent quality, the scientific production of BBF on a quantitative basis is excellent to outstanding, with an average of 2.0-3.5 publications per year and per FTE of permanent scientists, although this number is not equivalent between the scientists. Nevertheless, all the permanent staff, including technicians, contribute to the scientific production of the unit, which is exceptional.

Doctoral students are pretty well involved in the scientific production of BBF, with 30% of the unit's publications involving a doctoral student.

BBF respects very well the principles of scientific integrity, ethics and open science. In particular, the methods used by the unit to guarantee instrumental reliability, scientific rigor and transparency are remarkable. BBF data are excellently managed, but could be valorized in the form of data papers.

1/ The scientific production of the unit meets quality criteria.

Strengths and possibilities linked to the context

72% of the publications of BBF appear in journals ranked in the highest reputation journals in their discipline, including a number of papers published in the prestigious journals *Nature Chemical Biology*, *Nature communications*, *Genome Biology*, *ISME*, *Mol. Biol. Evol.*, and *New Phytol*. These results are excellent, exceeding the objectives of INRAE, which aims to publish 70% of papers in journals of the highest possible journals of the discipline. In terms of citations, 21% of the BBF publications are in the top 10 cited papers for their discipline, and 5% in the top 1%, which is a marker of the high visibility of the BBF work in the world.

Besides, BBF published 18 review articles over the period of evaluation, with not less than 11 in exceptional journals, such as *Fungal diversity*, *Renewable and Sustainable Energy Reviews*, *Trends in Biochemical sciences*, *Biotechnology Advances*, *Bioresource Technology*, *Journal of Cleaner Production* and *New Phytologist*. These facts highlight the world leadership of BBF in its three research themes.

The BBF members appear as first, last or corresponding author in nearly half of the unit publications, which is very good. Nearly one fourth of the publications involve co-authors from world leading research institutions, which is excellent. PhD students are co-authors of 30% of the BBF's publications, while their staff represents only 13% of the total staff hosted by BBF over the period of evaluation. This indicates that PhD students play a critical role in BBF activities.

Besides, 78% of the papers are published in Open Access journals, which contributes to the visibility of the BBF expertise.

Weaknesses and risks linked to the context

There is no important weakness regarding BBF scientific production. The two minor points that could be found are : i) Multi-omic, structural and functional data are properly stored in public FAIR repositories and a fungal database has been created over the evaluation period; rapid exploration and exploitation of these data should be ensured; ii) Editorial activity relies on only two researchers, who have been chief editors or members of the editorial boards of well-respected journals of the field such as *Biotechnology for Biofuels*, *Fungal Biology and Biotechnology*, *Journal of fungi*.

2/ Scientific production is proportionate to the research potential of the unit and shared out between its personnel.

Strengths and possibilities linked to the context

All the tenured researchers, lecturers and scientific support staff contribute to the scientific production of the unit (17 with AMU staff only, 54 with INRAE staff only and 34 with both tenured AMU and INRAE staff as co-authors). All PhD students have at least one original science publication. The unit encourages students and their supervisor submitting their introduction as a review article (four reviews have been published through this policy).

The articles are often first or last authored or a member of the unit signs as corresponding author (66 out of 141 publications).

Quantitatively, the scientific production of BBF is very good to excellent, corresponding to 2 to 3.5 publications per FTE per year which is a very good level of publication, especially considering the excellent quality of the unit's publications.

Most publications are co-authored by more than two members of the unit, frequently involving INRAE and AMU staff (24%). This reflects the positive collaborative dynamics between the members of the unit and between the people involved in the different themes addressed in the unit. The unit has shown a very good valorization of the work of young researchers (PhD students: 21 papers and post-docs: 22 papers) who frequently sign as first author (33%). PhD students are encouraged to publish the "state of the art" section of their manuscript (5 articles). A significant number of publications are co-authored with collaborators from prestigious international institutions, notably from the USA (32 papers), Spain (15 papers), Brazil (14 papers) and Canada (12 papers). The unit has co-authored papers with leading institutions in the field of fungal biomass conversion or the study of global biodiversity through various omics technologies, e.g. the Department of Chemistry at the University of York, the Mycotheque at the Catholic University of Louvain, the Department of Chemistry at the University of Copenhagen, the Joint Genome Institute and the Lawrence Berkeley National Laboratory at Berkeley and the Centro de Investigaciones Biológicas Margarita Salas, CIB-CSIC. This also reflects the unit's dynamic of building an important national and international network of collaborations with internationally renowned institutions.

Weaknesses and risks linked to the context

The policy of the "Sciences de la vie et de la santé" and "ABIES" doctoral schools make it mandatory to publish at least one article for PhD students. Although it is better than other French doctoral schools, this rule does not encourage reaching the EU standards of publication for PhD students.

The strong collaboration with industrial partners for applied research might limit the possibilities for publication of part of the applied research work.

3/ The scientific production of the unit complies with the principles of research integrity, ethics and open science.

Strengths and possibilities linked to the context

The scientific production of the unit complies with the principles of research integrity, ethics and open science. All experimental data are recorded in laboratory notebooks (paper or electronic). The project leaders and supervisors of technical support staff, students and post-doctoral scientists regularly check this data individually or during project meetings. All experimental data belong to the unit and lab books are kept within the laboratory. Notes of where samples are kept in the laboratory notebook to ensure traceability. The laboratory protocols are followed, and when there is deviation, this could be recorded in the lab book. These procedures guarantee the traceability, transparency and indisputability of the data. Regarding exchange of information, documents are shared on an internal server, which is only accessible via login and password, or on the tools for shared files provided by the AMU or INRAE. The non-permanent staff and students have only access to the internal network during the period of their stay. The internal informatics network is maintained by a sub-contractor company expert in informatics security (Cyberwings), under the supervision of the Informatics services of the PACA INRAE Centre.

The CIRM-CF being certified ISO 9001, labelled by IBISA and labelled Technology Platform Aix-Marseille University. The management software Biolomics® is used for the management, analysis, traceability and publication of biological data. The structuring of the database, which complies with the "Access and Benefit Sharing from the Use of Genetic Resources and Associated Traditional Knowledge (ABS)" regulation, will allow CIRM-CF to apply for inclusion in the European Register of Genetic Resources Collections.

The publications of the unit are made available on the HAL-AMU/INRAE portal and on the unit's website, in accordance with the editorial rights.

There is nothing claimed in the SED regarding ethics, except that PhD students follow the mandatory course on scientific integrity and ethics.

Weaknesses and risks linked to the context

No risk is identified regarding the contribution of the unit to scientific integrity, ethics and Open Science.

In particular, the open science strategy of the unit is in line with those of the supervising institutions (AMU and INRAE) and Europe committed to Open Science. A large choice of Open Access journals is available, but the unit mentions that the cost associated with the publication of results in Open Access journals can be quite high (1,000-5,000 euros).

EVALUATION AREA 4: CONTRIBUTION OF RESEARCH ACTIVITIES TO SOCIETY

Assessment on the inclusion of the unit's research in society

The inclusion of the unit in society, while mainly centred around two of the three themes, is excellent regarding its interactions with industrial partners and stakeholders. The unit was strongly involved in 3BCAR Carnot Institute and has developed collaborations with 7 technical centres and 7 companies covering a lot of industrial sectors such as paper, construction, agriculture, agro-food and energy industries. It was also involved in the creation of a start-up (Oleolnnov). In addition, five PhD students were granted by the Cifre initiative instead of one during the previous evaluation period, and the unit has promoted the interactions between academic and industrial worlds through the formation of young researchers. The unit was also involved in the organization of international conferences and workshops recognized for their role in favouring interactions between public and private sectors. While it could be increased, the licensing of two of the eight patents deposited by the unit confirms the concrete impact of the research results on industry. The unit develops various but limited in time, public outreach activities as well as different tools to disseminate the results of its research to the general public (participation in Salon, TV interviews, press release, school visits, twitter accounts...) which are assessed as very good.

1/ The unit stands out by the quality of its non-academic interactions.

Strengths and possibilities linked to the context

The unit has developed cooperation with 7 different Technical Centres: the Technical Centre of Paper, Cardboard and Cellulose (CTP), the Institut Technologique Forêt Cellulose Bois-construction Ameublement (FCBA), the Terres Inovia and Terres Univia, the French Technical Centre for Oilseed Crops, Grain Legumes and industrial Hemp, the French Inter-branch Organization for Vegetable Oils and Proteins, the Institut Français du Pétrole Energies Nouvelles (IFPEN) and the French Institute of Beverages, Brewing and Maltings. These interactions led to the production of new green adhesives, the scaling-up of bioprocesses for enzyme production, the creation of a start-up company "Oleolnnov" dedicated to oleaginous meal products, the production and study of fungal enzymes to understand and better predict beer gushing. The unit was also involved in collaborative contracts with many industries: Adisseo, Mane & Fils, Izinnovation, Kerry, WeTruff, Gene and Green TK, Novozymes and Genencor. The collaborations with IFPEN and Adisseo have led to a framework agreement. In addition, the unit got five Cifre-funded PhDs. Its implication in Carnot Institute 3BCAR led to ten different projects (total amount of about 390 kEuros).

Weaknesses and risks linked to the context

As mentioned by the unit, there is still a gap between the proofs of concept they are developing in the lab and their transfer at industrial scale.

2/ The unit develops products for the socio-economic world.

Strengths and possibilities linked to the context

The BBF activity in collaboration with industrial partners or institutions dedicated to research valuation and transfer evolved from very good to excellent over the evaluation period, with a total budget of 674 k€ (18 % of the own resources of BBF). The unit involved a quite diversified panel of industrial partners (12) over the evaluation period.

The technical and scientific expertise of BBF was rendered visible to the industrial actors of biomass biotransformation, thanks to the organization or participation in major events in this field. Indeed, the unit and CIRM-CF co-organized with members of the French Alliance for Energy Research Coordination (ANCRE) the 2020 European Biomass Conference (EUBCE), which is a major international conference and exhibition on biomass, with over 2 000 experts from academia, industry and stakeholders. The unit also participated to INRAE workshops dedicated to building common strategies for the development of Bioeconomy or bioenergies with CEA, CNRS and IFPEN. In addition, the unit hosts the 3PE (labelled AMU platform in 2021) and CIRM-CF platforms, of which the resources are accessible both to academic and industrial partners.

Regarding intellectual property, 8 patents have been filed and 11 invention disclosures have been submitted over the period of evaluation, which is excellent for a staff of this relatively small size. Several of these patents are the results of the 5 Cifre grants in collaboration with 4 different companies or technical centres, of competitive projects with industrial partners, and of the first maturation project involving INRAE and SATT Sud-Est

in the Region. Three of these patents were filed with collaborators from industry or technical center, and two have already been licenced to companies aiming at producing a laccase and vinylphenolics. This highlights the efforts of the unit, in synergy with the institutions dedicated to research transfer and innovation, to build fruitful collaborations with industry over the evaluation period. In comparison, only 1 Cifre grant was obtained over the previous evaluation period.

In addition, the Oleolnnov start-up has been launched during the evaluation period, thanks to a long-term collaboration with the Institute Terres Inovia. Oleolnnov, which was one of the winners of the i-Lab innovation competition operated by Bpifrance, aims at commercializing oilseed cake derived products. BBF hosts the Technical Director and the co-founder / scientific advisor of the company, which facilitates cooperation and benefited to the unit over the evaluation period, in particular through the obtaining of two research contracts. Finally, 15 publications have been written with industrial collaborators, with some in journals with outstanding notoriety.

Overall, these facts indicate the excellent efficiency of the BBF strategy for IP and innovation.

Weaknesses and risks linked to the context

Except the creation of the Oleolnnov start-up and related contracts, the industrial partnership of BBF involves exclusively theme 2 (now led by the BOOST group), and relies on only one researcher, who leads all the industrial projects. In agreement with this fact, 7 of the 8 patents were filed on theme 2, while the two other themes of BBF are also of great interest for valorization and transfer to industry.

Besides, there was no book chapter or technical article published in journals dedicated to the industrial sector, despite the collective efforts made at the end of the period of evaluation to write a review on the treatment of technological lignocellulosic residues and wastes by fungal enzymes in order to optimize their use (review published in 2022).

3/ The unit shares its knowledge with the general public and takes part in debates in society.

Strengths and possibilities linked to the context

The BBF unit is very active in sharing knowledge with the general public, through participation, in particular in 2018, in:

- Events: Salon National de l'Agriculture (in 2018, communication by the deputy director, Marie-Noelle Rosso (DR2), of the unit BBF in the presence of the INRAE president), Fête de la Science, Polytech days.
- Television interview: the deputy director of the CIRM-CF platform, David Navarro (IEHC) was invited by the channel France 24. He has communicated on these results and has advertise the CIRM-CF and the Unit research lines.
- Press releases are written following publications in the best multidisciplinary journals via the INRAE national website.
- Social media: the unit created a Twitter account (@BBF_lab) in 2018, with 245 followers on this day. The CIRM-CF platform also has a Twitter account (@CirmFungi). Members of the unit are active on various social media (Twitter, LinkedIn, Facebook) with "professional accounts", which increase the visibility of the Unit. Accepted publications and other highlights from the unit are shared through these social media. A complete restructuring of the unit website is in progress.
- Awareness-raising action on research among young people, through school visits: one PhD student set up simple experiments in classes of elementary schools and a researcher participated in open days in middle school.
- Welcoming middle and high school students, for a week to discover the world of research in a laboratory.

Weaknesses and risks linked to the context

No major negative point is to be noted with regard to the involvement of the BBF unit in sharing their knowledge and their investment in communicating with the general public, except that the communication actions slowed down after 2018.

C - RECOMMENDATIONS TO THE UNIT

Recommendations regarding the Evaluation Area 1: Profile, resources and organisation of the unit

The committee encourages the unit in its effort to valorize its rich internal collection of CIRM-CF fungi and strengthen its leading position in biomass conversion and continue to exploit this collection. This could possibly be done by taking advantage of the already established collaboration network with industry and academia. Particular attention should be paid to possible changes in EU policy for the valorisation of biomass; the unit should continue to strengthen the study of other applications of fungal enzymes (e.g., environment, health, pharmaceuticals).

The unit should be very careful to maintain transversal collaborations between the members involved in the three recently defined teams. The establishment of a shared budget for the development of specific cross-cutting topics (for M2 inter-team internships) could allow progress in this direction.

In order to strengthen the specific expertise currently covered by collaborations or the recruitment of non-permanent staff, the unit should explore all possibilities (INRAE, AMU, chaires d'excellence) to hire permanent staff in key areas (e.g., bioinformatics).

The unit should ensure that it has the possibility of expanding to welcome visiting scientists to strengthen their collaborations and to increase the rate of PhD students and postdoc scientists supervised by permanent researchers. In this respect, the unit should encourage young researchers to prepare the HDR.

Recommendations regarding the Evaluation Area 2: Attractiveness

The committee recommends pursuing efforts to increase the attractiveness of the unit by applying for ERCs and by submitting EU projects as coordinator. The management should also encourage young researchers to manage projects, gain visibility at international level and take scientific leaderships in their respective fields.

As the new organisation is also a recent strong factor of BBF's attractiveness and visibility, we recommend to consolidate it and ensure that the 3 teams remain attractive at the best international level, in a balanced way between them.

The committee is well aware that the space dedicated to laboratories, platforms and offices slows down the scientific, technological and human developments of the unit, and limits its ambitions and recommends that the unit works with its supervising bodies to solve this problem of space and thus increases its possibilities of welcoming researchers and PhD students and developing its research activity.

The unit must also ensure that the number of visiting researchers will increase, using new tools provided by AMU and INRAE.

Recommendations regarding Evaluation Area 3: Scientific Production

The unit is recognized for the excellence of its scientific production, its contribution to Open Science and the involvement of the PhD students in the unit's publications.

Special attention should be paid to maintain a high scientific quality and a homogeneous publication rate between the newly created teams.

Given the positioning of BBF in the acquisition of omics and functional data, we recommend considering further the exploitation of these data in open databases. Besides, we recommend the publication in HAL of pre-prints or post-prints (in agreement with the embargo policy of the publishers for the latter).

Recommendations regarding Evaluation Area 4: Contribution of Research Activities to Society

The committee recommends to the unit to maintain its strong interactions with the industrial sectors (especially through doctoral Cifre grants). This strategy has to be extended to the three teams of the unit. This activity has to be well balanced with and continuously fed by a more fundamental research. The researchers have to avoid subcontracting tasks without added value for the unit.

Besides, the committee encourages the unit to reactivate its efforts in communication to the general public.

CONDUCT OF THE INTERVIEWS

Date

Start: 13 December 2022 at 08:30

End: 13 December 2022 at 18:45

Interview conducted: online

INTERVIEW SCHEDULE

Date: December 13, 2022

Start	Duration	End	Status
Part 1: Presentations BBF			
08h30	00:15	08h45	Open
Introduction (Hcéres Scientific Advisor)			
08h45	00:30	09h15	Open
General presentation of the Unit: organization and scientific policy (Craig Faulds + Marie-Noëlle Rosso)			
09h15	00:15	09h30	Open
Discussion with the committee			
09h30	00:20	09h50	Open
Fungal adaptation and response to lignocellulose (Marie-Noëlle Rosso)			
09h50	00:10	10h00	Open
Discussion with the committee			
10h00	00:20	10h20	Open
Enzymatic degradation and modification of recalcitrant polysaccharides (Jean-Guy Berrin)			
10h20	00:10	10h30	Open
Discussion with the committee			
10h30 00:20 10h50 BREAK			
10h50	00:20	11h10	Open
Enzymatic modification of aromatics (Eric Record)			
11h10	00:10	11h20	Open
Discussion with the committee			
11h20	01:10	12h30	Closed
First closed Hcéres panel meeting			
12h30 01:00 13h30 LUNCH BREAK			
Part 2: Meetings with lab members			
13h30	00:30	14h00	Closed
Meeting of the committee with (Associate) Professors and permanent researchers (except direction)			
14h00	00:30	14h30	Closed
Meeting of the committee with the technical & administrative staff (in French)			
14h30	00:30	15h00	Closed
Meeting of the committee with PhD students & Post-docs			
15h00	00:30	15h30	Closed
Second closed Hcéres panel meeting			
15h30 00:15 15h45 BREAK			
Part 3: Meetings with University representatives and Unit Head			
15h45	00:30	16h15	Closed
Meeting of the committee with the AMU & INRAe representatives Sophie Chauvet (AMU), Sylvie Dequin (INRAE MICA), Michaël O'Donohue (INRAE TRANSFORM)			
16h15	00:30	16h45	Closed
Meeting of the committee with the Research Unit Director (Craig Faulds + Marie-Noëlle Rosso + Anne Favel)			
Part 4: Committee final debriefing			
16h45	02:00	18h45	Closed
Final Hcéres panel meeting			

GENERAL OBSERVATIONS OF THE SUPERVISORS

Le Président de l'université

au

Département d'Évaluation de la recherche -
Hcéres

Objet : Observations de l'unité relatives au
rapport d'évaluation des experts Hcéres
N/Réf. : VPR/LS/AMS/CM – 23-06

Dossier suivi par : Cécile Merle
Tél : 04 13 94 95 90
cecile.merle@univ-amu.fr

Vos réf :
DER-PUR230022974 - BBF - Biodiversité et biotechnologie fongiques

Marseille, le jeudi 15 juin 2023

Madame, Monsieur,

Je fais suite à votre mail du 16/05 dans lequel vous me communiquez le rapport d'évaluation Hcéres de l'Unité de Recherche BBF - Biodiversité et biotechnologie fongiques.

Comme demandé dans ledit mail, je vous indique que les tutelles du BBF, Aix-Marseille Université et l'INRAE, n'ont pas d'observation à formuler.

Vous souhaitant bonne réception des présentes,

Je vous prie de croire, Madame, Monsieur, l'expression de mes respectueuses salutations.



Eric BERTON



The Hcéres' evaluation reports are available online:
www.hceres.fr

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