Biodiversité et biotechnologie fongiques

Rapport Hcéres

agence d'évaluation de la recherche
et de l'enseignement supérieur

Section des Unités de recherche

AERES report on the research unit

Biotechnologie des Champignons Filamenteux

From the

Université Aix Marseille 1

Université Aix Marseille 2

INRA

March 2011

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et de l'enseignement supérieur

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Le Président de l'AERES

Didier Houssin

Section des unités de recherche

Le Directeur

Pierre Glorieux

March 2011

Research Unit

Name of the research unit: Biotechnologie des Champignons Filamenteux

Requested label: UMR_A

N° in the case of renewal: 1163

Name of the director: M. Jean-Claude SIGOILLOT

Members of the review committee

Committee chairman:

M. Nicholas LINDLEY, CNRS LISBP, Toulouse, France

Other committee members:

Mrs Florence FORGET, INRA MYCSA, Bordeaux, France

Ms Monique GARDES, Université Toulouse III, Toulouse, France

M. Jean-Jaques GODON, INRA LBE, Narbonne, France

M. Thierry HEULIN, CNRS BVME, Cadarache, France

Mrs Elisabeth LAVILLE, INRA LISBP, Toulouse, France

M. Roland MARMEISSE, CNRS EM, Lyon, France

Mrs Hélène ROUX-de BALMANN, CNRS LGC, Toulouse, INRA CSS representative

Observers

AERES scientific advisor:

M. Claude MARANGES

University, School and Research Organization representatives

M. DenisBERTIN, Université Aix Marseille 1

M. Jacques DERRIEN, Université Aix Marseille 2

M. Michael O'DONOHUE, INRA

Mrs Monique AXELOS, INRA

Mrs Emmanuelle MAGUIN, INRA

The CNU member was not available for this committee.

Report

1 • Introduction

- **Date and execution of the visit**

The visit took place on site at Luminy the 10th and 11th March 2011 with full presentations of the research findings of the last five years and a proposition of the project for the coming years, followed by meetings with the various categories of personnel and the hierarchies of each University and INRA. This dispositive was completed by a visit of the facilities of the Unit and a meeting with the Unit's current direction. Finally the committee met alone to discuss the perception each member had obtained during the visit and to plan the report's content. The organisation of the visit was entirely satisfactory and all the necessary information was made available to the evaluation committee.

- **History and geographical localization of the research unit, and brief presentation of its field and scientific activities**

The Unit structured as an UMR involving INRA (CEPIA and MICA), Université de Provence and the Université de la Méditerranée. The Unit is located in the Luminy Engineering School (ESIL) within the Campus at Luminy, close to Marseille and has existed for approximately 20 years, with a research goal linked to the biotechnological applications which can be attained from the use of the ligno-cellulosic degradation capacities of filamentous fungi and their applications in biotechnology.

- **Management team**

M. Jean-Claude SIGOILLOT (ESIL) assures the direction of the unit assisted by M. Eric RECORD (INRA) and Mrs Laurence LESAGE-MEERSEN (INRA).

- **Staff members (on the basis of the application file submitted to the AERES)**

	Past	Future
N1: Number of researchers with teaching duties (Form 2.1 of the application file)	4	5
N2: Number of full time researchers from research organizations (Form 2.3 of the application file)	4	4
N3: Number of other researchers including postdoctoral fellows (Form 2.2 and 2.4 of the application file)	3	0
N4: Number of engineers, technicians and administrative staff with a tenured position (Form 2.5 of the application file)	8	8
N5: Number engineers, technicians and administrative staff without a tenured position (Form 2.6 of the application file)	5	
N6: Number of Ph.D. students (Form 2.7 of the application file)	5	
N7: Number of staff members with a HDR or a similar grade	5	5

2 • Overall appreciation on the research unit

- **Summary**

The Unit has evolved positively in recent years with high profile recruitments which complement the existing expertise and have driven the Unit forwards as regards the scientific output. A critical period has been handled with a certain level of dexterity and a good equilibria obtained between fundamental and applied aspects of the research. The general atmosphere within the Unit is good and facilities are more than satisfactory. This progress has led to a scientific development which is now reaching a point in which further progress requires some strategic choices. The potential to further improve is high but the current vision of the future direction of the unit remains poorly defined. The size of the Unit is such that the strategy needs to be focused to avoid detrimental dispersion in future years. Concentrating specifically on the fungal enzyme activities involved in lignin degradation, exploiting the biodiversity of a functionally characterised collection offers unique opportunities for future development but the Unit has to believe in this opportunity and transform this into a functional objective which can compete at an international level. The reinforcement of molecular approaches in recent years should enable this to be achieved if a dynamic leadership of such an objective can be brought to light.

- **Strengths and opportunities**

~ The Unit's scientific goals linked to the destructuration of biomass and biotechnological applications is a theme currently enjoying extensive interest both from a scientific and economic viewpoint opening a wide range of potential scientific developments and widespread funding opportunities. The link to biodiversity via the fungal collection offers promising perspectives for future development.

~ The Unit has established a number of interesting scientific collaborations with local, national and international groups of reknown and complementary expertise. This network is reinforced by a strong commitment to graduate teaching programmes including a UNESCO international Masters course involving four overseas countries, as well as local initiatives.

~ The Unit houses a unique collection of filamentous fungi whose ligno-cellulosic degradation capacities offer a potential platform for scientific development of a high degree of originality.

~ The recent recruitment of dynamic junior research scientists has significantly advanced the expertise of the Unit and has led to a reinforced basic research input thereby strenthening the scientific output in recent years.

~ The Unit has a good publication output in appropriate journals as well as patents which have been exploited in the form of licences and transfer of know-how.

~ Unit facilities and general atmosphere is good and the ratio of HDR to PhD students is such that close supervision can be ensured.

~ The recent restructuring of the Unit as a single team calling on the specific expertise of the staff on a project basis rather than the multiple teams and themes has led to an improved lisibility of current objectives.

- **Weaknesses and threats**

~ The scientific strategy currently lacks focus, making important questions concerning future priority orientations difficult to perceive. The Unit is at a critical point in its development and needs clearly to decide along which lines the research is to be focused.

~ Individual initiatives are strong but lack an overall thematic structure tending to dispersion rather than consolidation of major objectives.

~ The Unit appears to lack confidence in its own position within the domain of activity and while frequently a partner in multi-laboratory projects, seldom assumes a coordinating role.

~ The longterm direction of the Unit is not clearly planified with the current director retiring midway through the next contract and no internal replacement planned. Indeed, the opinion of the laboratory is that this role of Director would best be met by external recruitment.

~ Future strategy needs to take into account the realistic manpower requirements which can be mobilised to meet new challenges.

- **Recommendations**

The Unit is aware of its own strengths and weaknesses but has so far been unable to convert their internal assessment into a coherent plan of action. The AERES committee strongly recommends that the research effort has to be centered around the enzymes of lignin degradation and that the organisation of the strain collection and its classification is planned to enable the functional characteristics of the strains to be identified rapidly, feeding the central thrust of the Unit with novel enzymes. The phylogenetic characterisation, if maintained at a high level needs to switch to full genome-scale techniques which are currently emerging in the literature rather than specific traits. The decision as to whether the effective human ressources can meet this challenge has to be carefully assessed and the alternative strategy via partnerships with other laboratories examined. The effort made as regards bioinformatics and molecular analysis are seen as being largely successful and should be further developed, but centered specifically on lignolytic activity. In general the Unit has already shifted its research to a knowledge base rather than being application driven and this also was seen as a positive movement, ensuring longterm perennity of the research. In light of this the Unit might consider changing its name to clearly signal the central theme around the enzymatic biodiversity of lignin degradation amongst fungi.

While the current director has stepped in to fill the gap left by the unusual and tragic events which the Unit has been faced with, the effort has been made predominantly to maintain the existant and restructure the internal organisation of the Unit. This has been succesfully achieved, but to date this reflexion has not sufficiently advanced as regards which scientific objectives are to be further persued in a domain in which various possibilities exist, each of which will require substantial restructuring of the available resources. The strategic choice essential for a Unit of modest size has been left aside with potentially detrimental consequences for the longterm position of the Unit in a highly competitive international context. Their own assessment of the situation is that the future director should be recruted from the exterior. While the AERES committee shares this assessment, it is absolutely essential that the Unit clearly defines a profile in consultation with the hierarchy (Universities and INRA). Automatically this means facing up to choices which will influence priorities within the Unit for the coming years. In this context it is suggested that the Unit is closely accompanied in this reflection.

The Unit possesses a good range of expertise and unique ressources whose capacity to undertake top level research is well established. This does not translate into a leadership position as they are frequently partners rather than coordinators of large projects. The Unit has to become more ambitious in this respect and take on this role which will ensure a more legitimate visibility at a national and international level.

In the past the Unit was strongly oriented towards application driven research with a high number of industrial and institutional contracts. The outlook over the next evaluation period is less promising from a financial viewpoint. While this may reflect a shift towards more fundamental scientific questions, which is in itself a worthwhile shift, the financial situation is rather fragile for the close future. Funding possibilities are currently extremely open in the domain of agricultural biomass exploitation for non-food applications and the possibility to couple financial support for the Unit is high. This potential needs to translate into action to maintain the good laboratory facilities and work conditions at their current level. The Unit has to address this aspect with a more aggressive attitude to grant applications as direct INRA/University funding cannot maintain the existing research effort without a substantial renewal of contract resources in the coming two year period.

- **Production results**

(cf. http://www.aeres-evaluation.fr/IMG/pdf/Criteres_Identification_Ensgts-Chercheurs.pdf)

A1: Number of permanent researchers with teaching duties (recorded in N1) who are active in research	8
A2: Number of permanent researchers without teaching duties (recorded in N2) who are active in research	0
A3: Ratio of members who are active in research among staff members [(A1 + A2)/(N1 + N2)]	100%
A4: Number of HDR granted during the past 4 years	2
A5: Number of PhD granted during the past 4 years	8

3 • Specific comments

- **Appreciation on the results**

The Unit has maintained a good level of scientific output over the reporting period with a shift from application driven output with the associated use of specialist but relatively low profile journals to a more generic research and a shift towards outputs which can, by classical bibliometric indicators, be considered to be improved, with notably a high impact paper reporting the genome sequence of Schizophyllum commune in Nature Biotechnology. The overall output however can be considered to be pertinent rather than exceptionally original.

Considerable effort has been spent in establishing a culture collection which is not yet sufficiently structured to enable this resource to be fully exploited. The potential for the future is however extremely high though the existence of this resource also poses questions as to how this potential could best be integrated into the strategic plan for the Unit's future. The outlook for the future is therefore one which should see a continued increase in the quality of the scientific output if appropriate orientations are put in place. In the view of the committee, it is possible to construct a strategy in which generic research linked both to the enzymes of lignin degradation and the genomic exploration of such functions throughout the fungal world can be reconciled with a biotechnological exploitation of this biodiversity, thereby exploiting the actual setup and competence of the laboratory, and ensuring a continued increase in the quality of the scientific outputs. To achieve this certain choices have to be made and the ambition placed at the forefront of the scientific possibilities currently available.

The quality of the scientific publications is good and the impact of the journals used is probably posed at the right level in view of the thematic, though future orientations should enable this level to be further upgraded. The AERES committee counted 39 publications coming directly from the laboratory (signed under the address of the laboratory), which remains, in light of the number of scientists in the structure, a correct output. The listing also includes papers over the evaluation period from authors' previous research activities elsewhere indicating that these recent recruitments have a history of good publications. The majority of the papers are in the top half of the journals within their domain and approximately half the papers are in journals in the 1st quarter.

Participation in international conferences has been quite important but it should be noted that participation via keynote or invited speaker status is rather low and undersells the position of the Unit. One of the strong points of the Unit has been its capacity to translate research initiatives into patent applications and moreover, patents which penetrate into real applications. This activity remains important with 2 additional patents and 4 exploitation agreements with private companies. As regards thesis output the Unit has a good record and furthermore the doctoral students are finding employment.

The contract status has been extremely good over the reporting period with a financial budget in which permanent personnel costs represent approximately 50% of the consolidated budget. At the moment of preparing the evaluation, this budget was in decline, though 4 ANR contracts and a European initiative are currently being assessed. If unsuccessful, contract resources will diminish as only three ongoing contracts exist, finishing in 2012, 2013 and 2014.

- **Appreciation on the impact, the attractiveness of the research unit and of the quality of its links with international, national and local partners**

The Unit is in a rather contradictory position as it has quite a lot of international and national collaborations with leading laboratories suggesting that the reputation of the Unit is good. The strategy of partnerships has been extremely effective and this is translated into an extremely high number of scientific papers co-authored with external groups, indicating that the collaborations are real and productive. This does not however translate into invitations to speak frequently at top international conferences, nor in dominant position in the author hierarchy. The Unit is therefore an important element in collaborative research, with an acknowledged expertise but is not a dominant leading partner as confirmed by the lack of role as coordinators in these collaborations.

Recruitment has been at an excellent level in recent years and the Unit clearly attracts good quality candidates. Likewise, doctoral students wishing to find post-doctoral positions in top international laboratories are successful, as witnessed by placements in a renowned Californian laboratory, but also at Utrecht University (The Netherlands). To date, incoming post-docs are predominantly from the local or national level, though recruitment of doctoral students is more international, notably via the UNESCO chair. This UNESCO Masters training has led to good image boosting in the associated partners. In light of the good link to Brazilian universities, effort could be made to increase this input as the theme of the Unit is coherent with major objectives in this country.

The Unit has traditionally stimulated longstanding collaboration with top European laboratories (VTT, Madrid, etc) as well as a judicious collaboration at a local level as regards bioinformatics data-base (Foly, CaSy: UMR CNRS AFMB P. Coutinho et B. Henrissat (Marseille), EA EBM P. Pontarotti (Marseille), Genopole Toulouse), and enjoys an excellent interface with industry, notably with the pulp and paper industry. This industrial link is suffering actually due to the decline in the paper industry and while this has been to a large extent replaced with biofuels activity, the long-term position of the Unit will depend on whether it can instore equally good contacts with the chemical industry. In this respect the Unit will have to re-assess its partnership strategy though a number of good contacts exist already. Potential for renewal is excellent if the Unit can decide on its strategy. In both academic and industrial contexts the indicators are good as many papers are co-authored (>25% with international co-authors) and patents are being deposited and exploited. Technology transfer is therefore more than satisfactory with patent licensing to four different industrial groups (Proteus, CTP, Yves Rocher, Jungbunzlauer). As the fungal collection is characterized functionally this potential both at scientific and technological levels should logically increase further.

- **Appreciation on the management and life of the research unit**

The context of the Unit over the reporting period is rather unusual with a dramatic incident perturbing its normal functional management. In light of this incident the management has clearly succeeded in maintaining a good atmosphere and if anything a better overall ambiance. This crisis at the midterm of the Unit has led to restructuring of the previous organization as a three teams with four transversal themes into a single team retaining the transversal interactions between laboratory members. The Unit is now functioning in a project mode in which the complimentary expertise can be mobilized for specific projects; system which is generally appreciated by the members of the unit at all levels.

Internal scientific meetings are held twice per month which are also the forum in which important news is transferred to the Unit and this is complemented by an additional initiative involving a coffee club presentation ("biblio coffee") of key outside papers. These are good initiatives and contribute to the generally good atmosphere within the Unit. Considerably less effort is made to introduce external seminars or to encourage the younger members of the Unit to assist in the seminars held elsewhere in Marseille, though it should be mentioned that all doctoral students are encouraged to participate in international conferences during their thesis period. The scientific animation of the Unit is therefore somewhat turned inwards and could benefit from external links with a larger community involving guest speakers for example. In light of the important number of collaborations, relatively little effort would be necessary to achieve this. As yet most of the doctoral students do not have external tutors which would also facilitate this exchange. More general organizational aspects appear to be less structured with no 'Conseil du Laboratoire" (CL) and

a lack of regular meetings planned throughout the year. This is not a major cause for concern as the generally good ambiance allows many of the minor details to be settled less formally though the ITA in particular would appreciate such a structure. Likewise the internal scientific animation is oriented towards day to day progress and little effort is being spent to project into the future. This is apparent in the project (see below) and probably contributes to the justified impression that the unit lacks a long-term perspective.

The Unit has a financial structure which is generally appreciated by all the members with a common pool of money which is then distributed to meet the overall needs of the Unit. It was not entirely clear how such decisions were made but the overall opinion is that this is a satisfactory arrangement in which the overall requirements of the Unit are satisfied.

Although the Unit is predominantly staffed with INRA personnel, it makes an important contribution to the teaching of undergraduates and is seen as a corner stone of the ESIL formation, notably as regards industrial biotechnology. This effort is not restricted to the university staff as significant contributions, notably for the UNESCO chair initiative are made via the INRA staff. This contribution involves the classical teaching commitments but also via the in-house training via practical project supervision at Masters level. Their role is appreciated both by the students and the University authorities who pledge unconditional support for this Unit, as seen by the creation of a lecturer position in fermentation for later this year. Somewhat surprising is the absence of ITA personnel financed by the Universities within the Unit.

The Unit functions well and is structured intelligently to meet the thematic requirements but could be improved by more regular organizational meetings (CL), visiting seminars and a structured internal analysis of how the laboratory needs to evolve.

- **Appreciation on the scientific strategy and the project**

The scientific project is a direct prolongation of the existing scientific input taking into account the reinforced competence of the staff recently recruited. Under certain circumstances this would be OK, but it is clear that the degree of dispersion and the manner in which many of the topics will need to evolve in light of scientific progress elsewhere imposes a requirement for this Unit to fix clear objectives. This has not been done and the project is rather unsatisfactory. In the view of the committee, the Unit has considerable potential and unique access to a growing fungal collection which enable the Unit to project with confidence into the future. To fully exploit this potential the project needs to be focused on shared objectives in which the various options open for development have been hierarchically assessed and prioritized. The tendency, in part passively encouraged by the hierarchy, has been to further extend the portfolio of projects rather than focusing effort on those areas in which the Unit can make a clear contribution. This is clearly seen as regards the extension of the enzymes being characterized for cellulose degradation (research active elsewhere) rather than concentrating on the ligninolytic enzymes. The FOLy database is an essential aspect of the research thrust but requires that the fungal collection is rapidly characterized and that the full genome sequencing effort is strongly reinforced. Concentrating effort on lignin while reinforcing the collaboration of the other activities in strategically intelligent collaborations would appear to be the best solution. Actually the fungal collection is being characterized using phylogenetic techniques which enable the entire collection to be rapidly assessed on the basis of a relatively small number of markers which is appropriate for a primary assessment of the collection. Thought must be given as to how to extend this approach as full genome sequence data becomes more routinely available, notably as regards the consequences for phylogenetic analysis and more specifically to assess the evolution and biodiversity of genes involved in lignin degradation. Again it is essential that the laboratory assesses whether it can meet this challenge or whether they should achieve this objective via partnerships.

The potential for development is extremely high at a fundamental level and the same potential probably exists also at the application level. The shift to a science-driven approach rather than an application driven strategy is a good move but this should not exclude meaningful collaboration with industry to exploit the derived knowledge. Again concentrating on lignin will narrow the field of possible applications but will reinforce the focus. Green chemistry/white biotechnology and the bioraffinery concept involving controlled destructuring of the lignin offers considerable scope for application and would reinforce the general objectives by creating a linear work plan in which the enzymatic and fungal characterization would lead to logical and associated applications. Previous experience in other domains of application would be rapidly operational in such a concept and experience gained in the pulp and paper industry useful for future developments.

Opportunities are rich and the problem faced by the Unit is one of making judicious choices to create overall coherence. In this respect one of the elements which is a major cause for concern is the apparent absence of any long-term planning for the management of the Unit. The current Director will continue his function but will reach retirement age halfway through the next contract. As yet no plausible internal replacement is visible and the overriding internal consensus is to bring in an external director who can redefine the future objectives of the Unit. In the view of the AERES evaluation committee this plan is probably the best solution but requires some initial conceptual brainstorming. A number of the choices being faced cannot be offset to a future date as the shift is important, any delay will compromise the situation beyond recovery. It would appear logical that discussions both internally and with the hierarchy should determine a profile and planning for such recruitment and that an alternative solution is also envisaged. This should not exclude a realistic focus of the project objectives. The shared financial resources make any readjustment of the research thrust easier to put in place and the major determinant is to agree on the key aspects to be developed. The ball is in the hands of the staff of the Unit, but it appears essential to act rapidly.

Intitulé UR / équipe	C1	C2	C3	C4	Note globale
BIODIVERSITÉ ET BIOTECHNOLOGIE FONGIQUES	A	A	A	B	A

C1 Qualité scientifique et production

C2 Rayonnement et attractivité, intégration dans l'environnement

C3 Gouvernance et vie du laboratoire

C4 Stratégie et projet scientifique

Statistiques de notes globales par domaines scientifiques

(État au 06/05/2011)

Sciences du Vivant et Environnement

Note globale	SVE1_LS1_LS2	SVE1_LS3	SVE1_LS4	SVE1_LS5	SVE1_LS6	SVE1_LS7	SVE2 _LS3 *	SVE2_LS8 *	SVE2_LS9 *	Total
A+	7	3	1	4	7	6		2		30
A	27	1	13	20	21	26	2	12	23	145
B	6	1	6	2	8	23	3	3	6	58
C	1					4				5
Non noté	1									1
Total	**42**	**5**	**20**	**26**	**36**	**59**	**5**	**17**	**29**	**239**
A+	16,7%	60,0%	5,0%	15,4%	19,4%	10,2%		11,8%		12,6%
A	64,3%	20,0%	65,0%	76,9%	58,3%	44,1%	40,0%	70,6%	79,3%	60,7%
B	14,3%	20,0%	30,0%	7,7%	22,2%	39,0%	60,0%	17,6%	20,7%	24,3%
C	2,4%					6,8%				2,1%
Non noté	2,4%									0,4%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

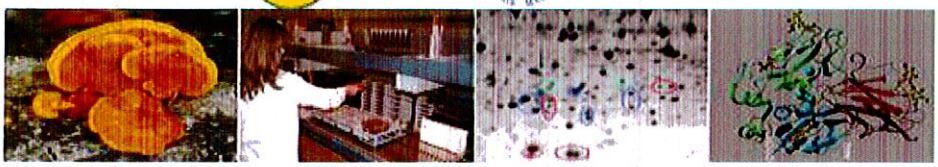
*** les résultats SVE2 ne sont pas définitifs au 06/05/2011.**

Intitulés des domaines scientifiques

Sciences du Vivant et Environnement

- **SVE1 Biologie, santé**
  - **SVE1_LS1 Biologie moléculaire, Biologie structurale, Biochimie**
  - **SVE1_LS2 Génétique, Génomique, Bioinformatique, Biologie des systèmes**
  - **SVE1_LS3 Biologie cellulaire, Biologie du développement animal**
  - **SVE1_LS4 Physiologie, Physiopathologie, Endocrinologie**
  - **SVE1_LS5 Neurosciences**
  - **SVE1_LS6 Immunologie, Infectiologie**
  - **SVE1_LS7 Recherche clinique, Santé publique**
- **SVE2 Ecologie, environnement**
  - **SVE2_LS8 Evolution, Ecologie, Biologie de l'environnement**
  - **SVE2_LS9 Sciences et technologies du vivant, Biotechnologie**
  - **SVE2_LS3 Biologie cellulaire, Biologie du développement végétal**

UMR 1163



Biodiversité Criblage fonctionnel Protéomique Structure

Biotechnologie des Champignons Filamenteux

Marseille, le 6 avril 2011

Monsieur le Président du comité d'experts AERES

Objet : Volet général
Observations de portée générale sur le rapport d'évaluation de l'UMR 1163 de Biotechnologie des champignons filamenteux.

Référence : **S2UR120001594 - Biodiversité et Biotechnologie Fongiques - 0131842G**

Après lecture du rapport du comité d'évaluation de l'AERES, les remarques suivantes ont été émises par le conseil de laboratoire.

L'Unité apprécie la façon positive dont son activité au cours des quatre dernières années a été évaluée par le comité : maintien d'un bon niveau scientifique, passage d'une recherche orientée par les applications à une recherche plus portée vers le développement de la connaissance, la restructuration de l'unité en une seule équipe pour plus de transversalité et de complémentarité entre les différents chercheurs, le développement de la collection de champignons (CIRM-CF) et l'intégration de jeunes chercheurs renforçant l'expertise scientifique de l'unité.

En revanche, l'unité regrette que la structure de la présentation et le choix des exposés aient pu donner aux évaluateurs une impression de dispersion. Les priorités de l'unité sont et resteront centrées sur les champignons qui dégradent la lignine et les enzymes qu'ils produisent pour initier la dégradation des substrats lignocellulosiques.

Dans ce contexte, la collection de champignons (CIRM-CF), axée sur les basidiomycètes de la pourriture blanche, crée et développée au sein de l'unité, represente un outil particulièrement important pour l'étude et la valorisation de la biodiversité fongique. Comme le recommande le comité d'évaluation, un effort important sera fait

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pour l'exploration de cette biodiversité *via* la caractérisation fonctionnelle des champignons de la collection et par le séquençage et l'analyse des génomes des champignons lignolytiques à grande échelle.

Les collaborations scientifiques avec des partenaires français et européens développées ces dernières années permettront de mener à bien certains projets, tels que l'amélioration et le développement de la base de données FOLy afin d'accroître sa notoriété et son attractivité. De même, les partenariats industriels existants devront être étendus afin d'orienter les applications vers de nouveaux domaines de la chimie verte. Dans ce contexte, de nouveaux projets sont en cours d'élaboration dans lesquels l'unité veillera à participer plus activement à leur coordination.

En ce qui concerne la gouvernance de l'unité, l'avis du comité rejoint l'avis des personnels de l'unité sur la venue d'un directeur de recherche expérimenté pour compenser le départ de l'ancien directeur. Le profil de ce recrutement sera défini avec la hiérarchie et contribuera à l'orientation à moyen termes des options scientifiques de l'unité.

Je vous prie d'agréer, Monsieur le Président, l'expression de mes sentiments les meilleurs.

Pour le président et par délégation
Le Vice-Président du Conseil Scientifique
De l'Université de Provence

Denis BERTIN

UNIVERSITÉ DE PROVENCE Aix-Marseille I

J. Sigoillot

Jean-Claude SIGOILLOT
Directeur de l'unité

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