BioAsie HTMS - 1st Workshop at LISBP (Toulouse, FR), 23-26th June 2015

HTMS BioAsie project

Bioprocess intensification

Challenges related to transfer limitation

BIO-Asie

INSTITUT FRANÇAIS SINGAPOUR

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

ĐẠI HỌC BÁCH KHOA

Université de Toulouse

LISBP LABORATOIRE D'INGÉNIERIE DES SYSTÈMES BIOLOGIQUES ET DES PROCÉDÉS

INRA SCIENCE & IMPACT

cnrs

INSA TOULOUSE

Université de Toulouse

OUTLINES
Tuesday 23rd June

FILLAUDEAU Luc
Overview of HTMS aims and context ***~15'***
Description of LISBP ***~ 15'***

LINDLEY Nicholas (LISBP head) ***~ 30'***
Presentation and visit of LISBP

Lunch time (CEMES)

GOMA Gérard (LISBP) ***~ 90'***
Biomass and bio-economy: the international context

PHAM Tuan Anh & CAO Bach Xuan (SBFT) ***~ 60'***
Pretreatment of lignocellulosic biomass: Steam explosion (rubber wood) and Organosolv (bagasse)

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Objectives of Workshop

1. to overview the scope of BioAsie HTMS, the field of competences of each partner and existing scientific actions
2. to conduct opened discussions on scientific approach and their specificities
3. to merge / to fuse ideas for future international projects.
4. to browse opportunities and to define common actions

HTMS FRAMEWORK
AROUND SEVERAL KEYWORDS…

Deconstruction of lignocellulosic matrices

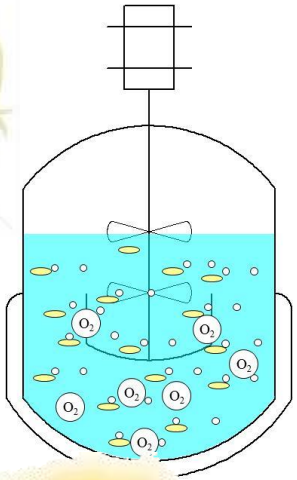
Release of fermentable carbon

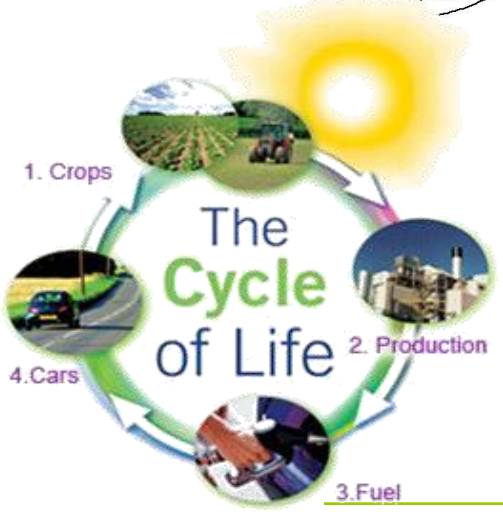
Control of microbial activity

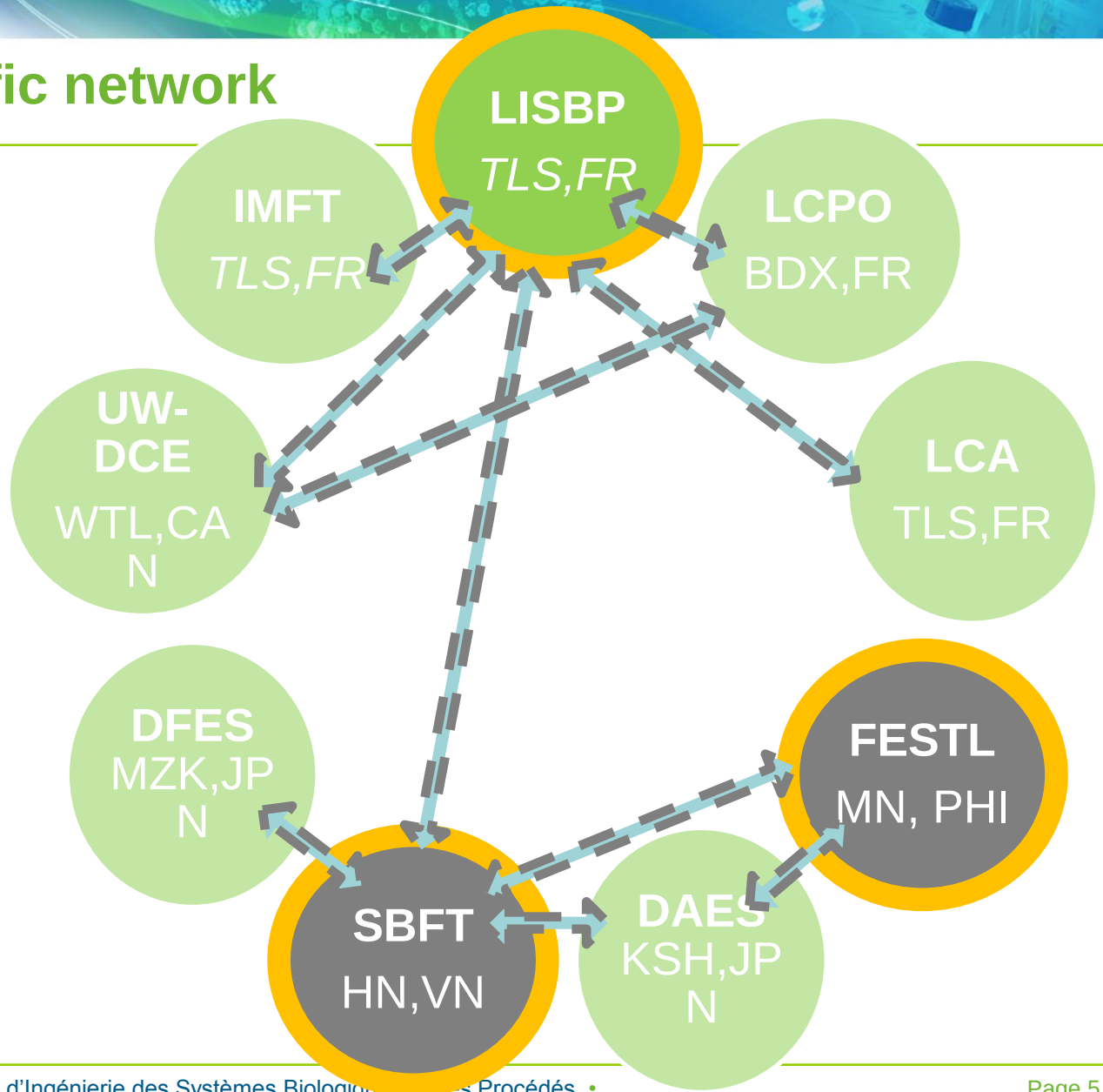
Bioprocess intensification and high dry matter content

Physical and biochemical multiscale approach

Scientific network







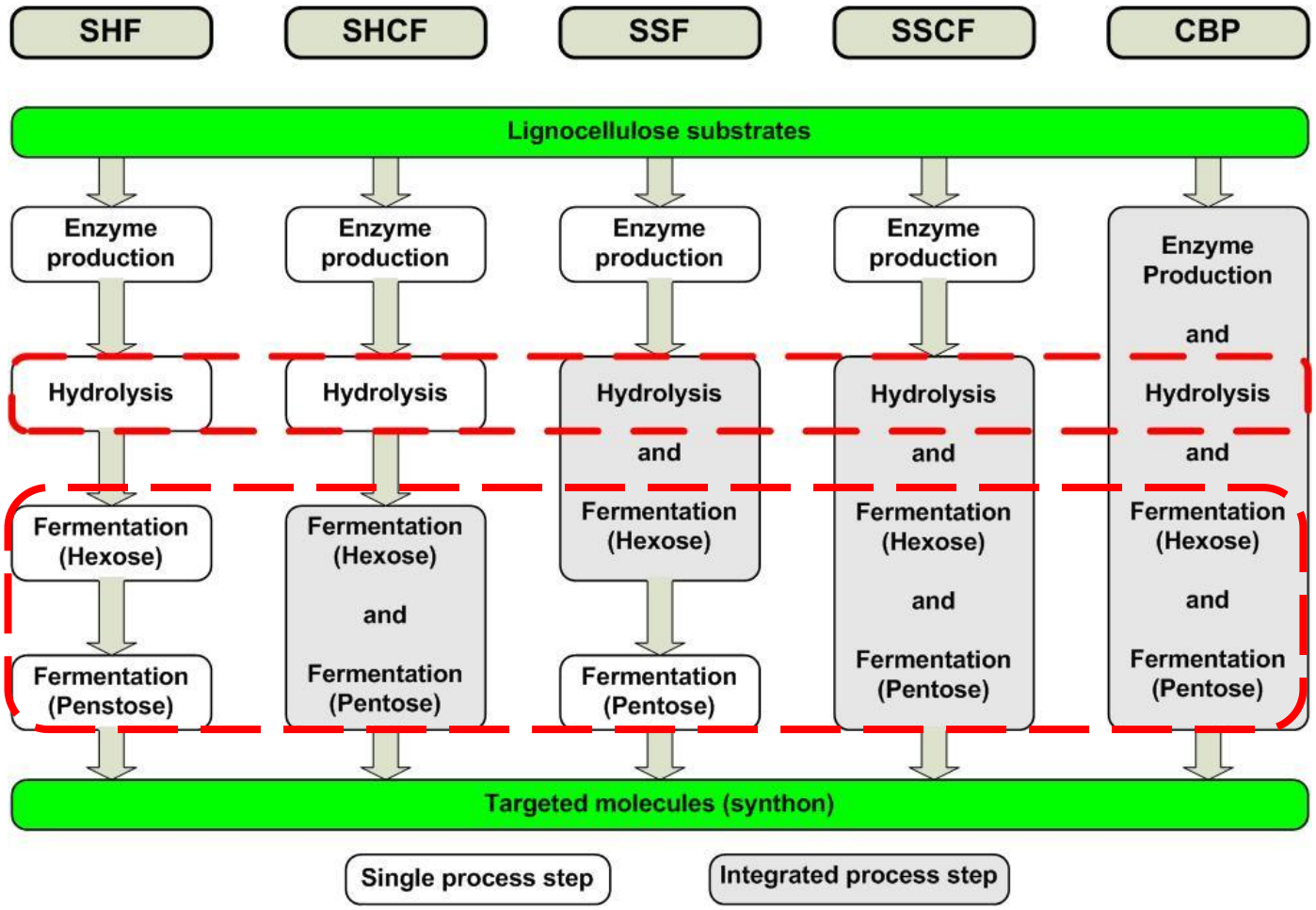
Bioprocesses

Complex lignocellulosic substrates

Release of fermentable carbon

Microorganism metabolism control

Products



Biocatalysis

From biodiversity to the ess

Deconstruction

Pretreatment

- Thermal, Mechanical
- Ammoniac , Na OH,KOH
- Acids HCl,H2SO4,H3PO4,HCOOH
- Pulp & Paper techs
- Plasma techs
- Organosolv ionics liquids
- Bifonctional microorganisms

Performant Enzymes and Microorganisms

Enzymatic Screening & Production

Enzymatic hydrolysis

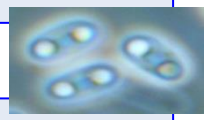
?

Sugars, lignin

?

Green Energy & Chemistry

Fermentation



Targeted products

Ethanol
Butanols
Single cell oils
Isoprenoids
Hydrocarbon
And others

LISBP
SBFT
FETSL

SCOPES AND COMPETENCES

	Pertinent & Realisitic lignocellulosic matrices	Pretreatments	(biodiversity, performant micro-organism) Enzyme selection	Enzyme production	Release of fermentable C or intermediate compounds	Hydrolysis	Performant microorganisms for bioconversion	Cell culture (C6 and/or C5)	(bioconversion or intermediate compounds) Targeted molecules
SBFT (Hanoi, VN)	☑	☑	☑	used	☑		used		☑
LCPO (Bordeaux, FR)	☑	☑	☑		☑				☑
LCA (Toulouse, FR)	☑	☑	used		☑				
FETSL (Manila, PHI)	☑								☑
IMFT (Toulouse, FR)					☑			☑	
LISBP (Toulouse, FR)	☑	used			☑	☑		☑	☑

Planning of Scientific presentations

	Tuesday 23/06	Wednesday 24/06
9h00		**ENZYME SELECTION**
	Welcome / Coffee	TO Kim Anh (SBFT)
10h00	Introduction - Context (Luc + Tuan Anh)	Screening cellulosic fungi in term of hydrolysis ability-
	Visit of LISBP	
11h00		**HYDROLYSIS / ENZ. SCREENING**
	LISBP overview by N. LINDLEY	COMA Veronique(LCPO)
12h00	Lunch (cemes)	Intermediate compounds during hydrolysis: identification and quantification.
		Lunch (cemes)
13h00		
13h45	GOMA Gérard (LISBP)	
14h00	Economical and technical context	**HYDROLYSIS**
		FILLAUDEAU L.,
15h00	**PRETREATMENT (OS, SE)**	NGUYEN Tien Cuong & LE Tuan (LISBP)
	PHAM Tuan Anh & CAO Bach Xuan (SBFT)	Hydrolysis of pretreated lignocellulosic matrixes: focus on
16h00	Pretreatment of lignocellulosic biomass: Steam explosion (rubber wood) and Organosolv (bagasse)	

Planning of Scientific presentations

9h00	Thursday 25/06	Friday 26/06
	PRETREATMENT (EXT, EXT-REAC)	
10h00	VANDENBOSSCHE Virginie (LCA)	
	Biomass pretreatment by extrusiuon and reactiv extrusion	**RESTITUTION / OPPORTUNITY**
11h00	DE LEON Rizalinda (FETSL)	FILLAUDEAU Luc
	Bioethanol production from alkaline-pretreated sugarcane bagasse by consolidated bioprocessing using Phlebia sp.	SALIM Mehdi (Ambassade) FOURNIER Daniel (DRI)
12h00		Opportunities and open discussion
	Lunch (bio5)	Lunch (restaurant)
13h00		
	LISBP - Internal conference	
14h00		Visit of TWB
	DE LEON Rizalinda	
15h00	FETSL presentation to FAME Team	
	CELL CULTURE	
16h00	CAMELEYRE Xavier (LISBP)	
	Microbial valorization of hydrolysed or pretreated lignocellulosic biomass	

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UMR CNRS/INSA N°5504

Engineering and Systems Sciences (INSIS)

Biological Sciences (INSB)

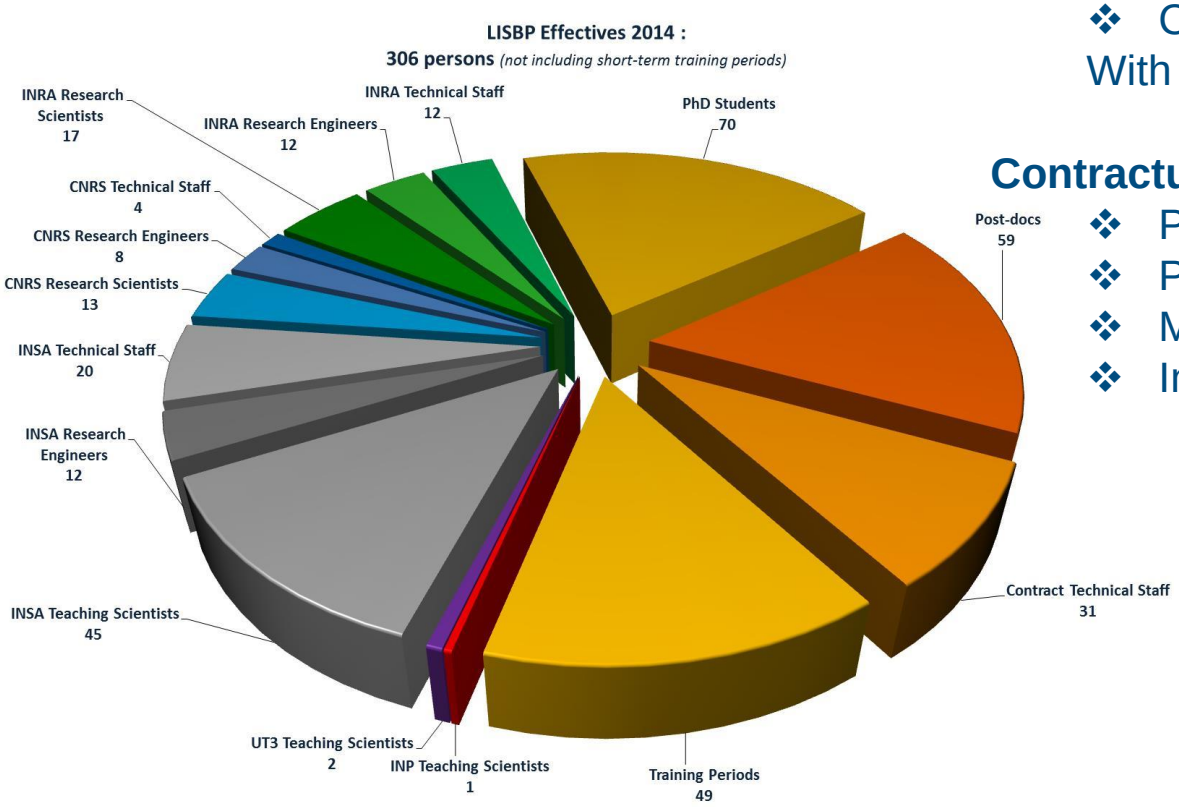
UMR INRA/INSA N° 792

Microbiology and the Food Chain (MICA)

Science and Process Engineering of Agricultural Products (CEPIA)

Laboratory evaluated A+ in 2005 & 2009. Considered unique and outstanding in 2014

Staff at LISBP ~350pers



State employees: 143

- INSAT : 77
- INRA : 41
- CNRS: 25

With 50% Scientist / 50% Ing & Tech

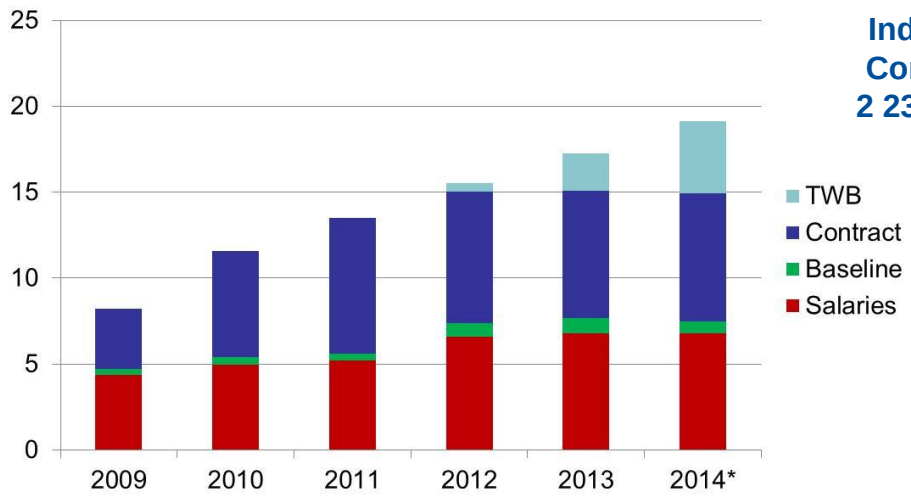
Contractual staff: 210

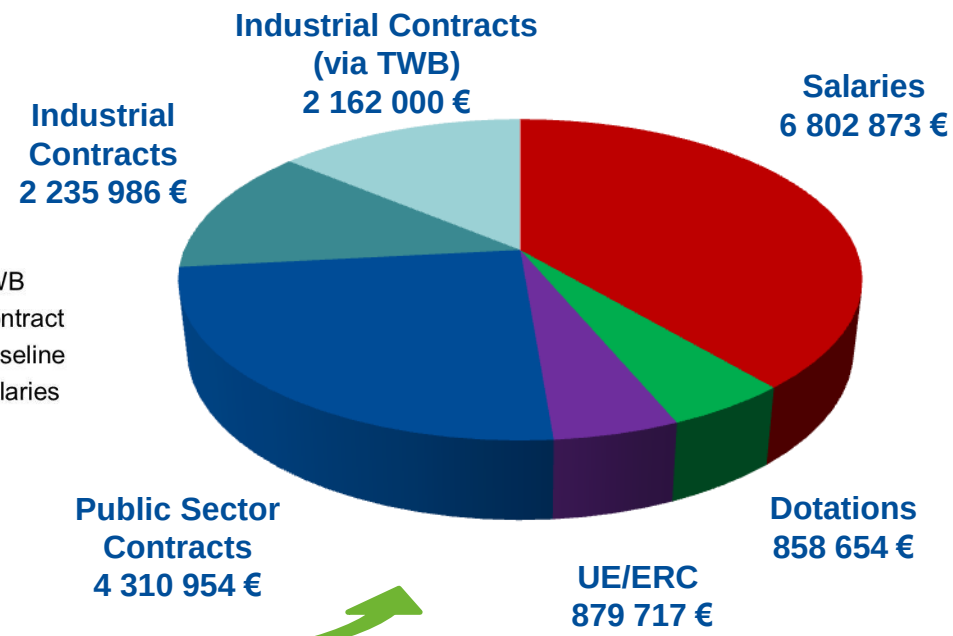
- Post-PhD : 60
- PhD : 70
- MSc : 50
- Ing & Tech: 30

Budget of LISBP ~15 M€/year

Consolidated Budget (state salaries included)

- 8,5 M€ in 2009 to 15 M€ since 2012
- additional resources via TWB since 2012 (expected 4 M€ in 2014)
- 17 European Union/ERC contracts (2009-2014)
- 4 *Science for the Future* contracts
- high success rate at national calls (>35% in 2014)



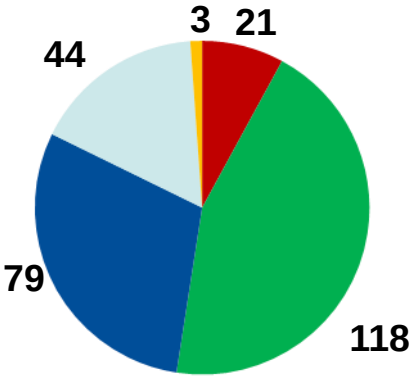


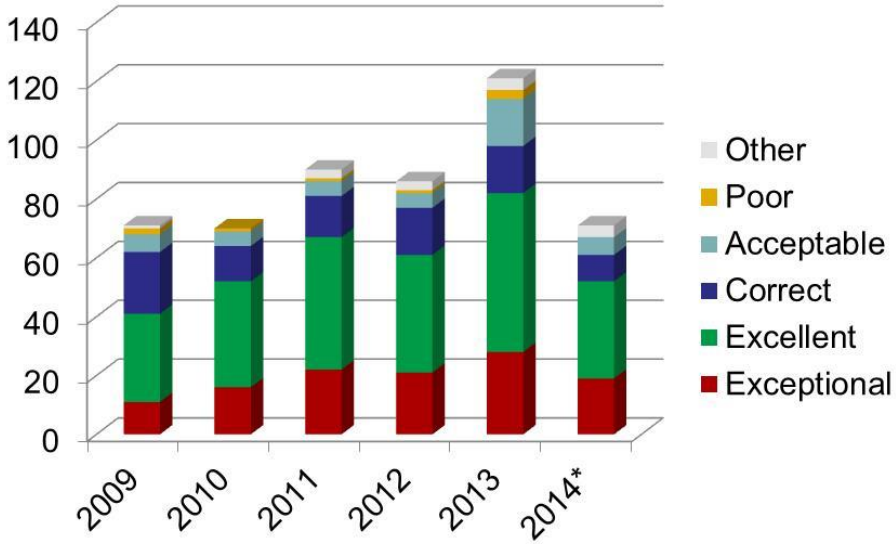
** Provisional budget for 2014 at 1st July*

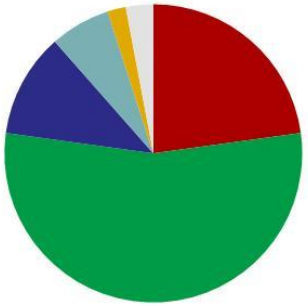
Scientific Production ~70paper/years

- >500 publications in WoS journals (x2), h-index= 21, i10 = 73
- >75% in 1st quarter journals (111 (>20%) in exceptional journals)
- co-signatures (50% national / 30% international)

2005-2009
271 WoS publications







** Values for 2014 represent only the first half of the year*

Major Disciplines

Biotechnology & Applied Microbiology (97), Chemical Engineering (75), Biochemistry/Molecular biology (59) Environmental Engineering (48), Water Resources (46), Microbiology (37)

Minor Disciplines

Biochemistry Methods (17), Analytical Chemistry (17), Food Science &Technology (17), Computational Biology (8)

LISBP Research Teams

3 major domains: biocatalysis, microbiology and (bio)chemical engineering

Catalysis and Molecular Enzymatic Engineering
M. Remaud Pr. INSA

Molecular and Metabolic Engineering
G Truan DR CNRS

Biochips and Bionanotechnology
V. Leberre CR CNRS

Engineering and Metabolic Pathway Evolution in Prokaryotes
I.Meynial-Salles Ass.Pr. INSA

Metabolism of Prokaryotes
M Cocaign-Bousquet DR INRA

Physiology and Functional Genomics of Eukaryotes
JM. François Pr. INSA

Integrated Metabolism and Dynamics of Metabolic Systems
JC. Portais Pr. UT3

Microalgal Genome Engineering
F Daboussi DR INRA

Fermentation Advances & Microbial Engineering
S Guillouet Pr.INSA

Microbial Ecosystems and Purification and Recovery Bioprocess
M.Spérandio Pr.INSA

Transfer, Interface, Mixing
A Cockx Ass Pr.INSA

Separation, Oxidation and Hybrid Processes for Environnemental issues
C.Guigui Pr. INSA