



COST Action CA20128

PIMENTO

Promoting Innovation of ferMENTed fOods

WG4

Marie Champomier Vergès, Micalis Institute, INRAE, Université Paris Saclay – France
Magali Cordaillat Simmons, Univ. Clermont Auvergne, INRAE, VetAgro Sup, Aurillac – France
Antonio Del Casale, Microbion, Verona – Italy

Boosters and Hurdles towards innovation in Fermented Foods

Industry perspectives from the PIMENTO European survey

Antonio Del Casale
MICROBION srl – Microbiology Open Innovation



Funded by
the European Union



WHO WE ARE

Contract Research Organization
providing **microbiology R&D** services to

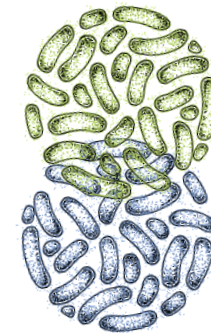
✓ **discover**
✓ **control**
✓ **exploit**

the **best performing** microbes.

OUR CUSTOMERS

- **Producing** microbial cultures
- **Using** microbial cultures
- **Suffering** of microbial contamination

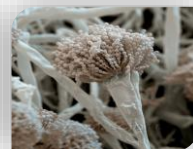
NEEDS



Enabling **innovation**

Solving **problems**

microbion



OUR PLAYGROUND: MICROBIAL BIODIVERSITY



Naturally Occurring

- Biofilms, spores, heat-resistant
- Emerging resistant strains

Root Cause Analysis
Batch val. & Product shelf-life

Food Safety

Product stability
Challenge tests

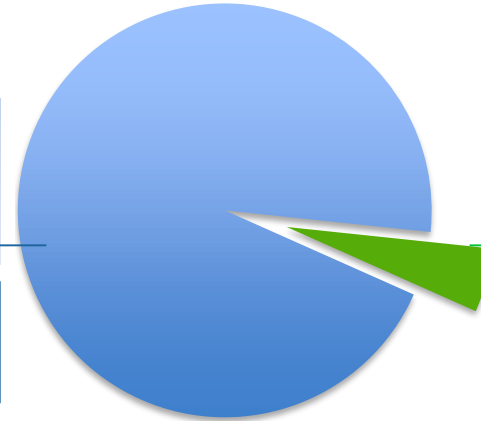
Process Validation

Risk assessment
Genomics of Antibiotic Resistance

Health

Identification, bioindicators
Detection, rapid & portable dev.

Molecular Diagnostics



We provide
insight and
practical solutions
for **any application**

Industrial microbes

- Selected, manufactured and applied
- Controlled spontaneous fermentation

Bio-fertilisers, biostimulants
Bio-pesticides, biocontrol

Agriculture

Cultured food & beverages
Spontaneous Fermentations

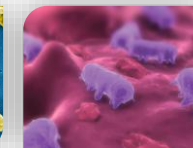
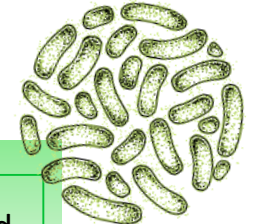
Food

Probiotics, pre/post-biotics
Microbiota in-depth analysis

Health

Bio-fuels, WWTP, bio-plastics
Precision Fermentation

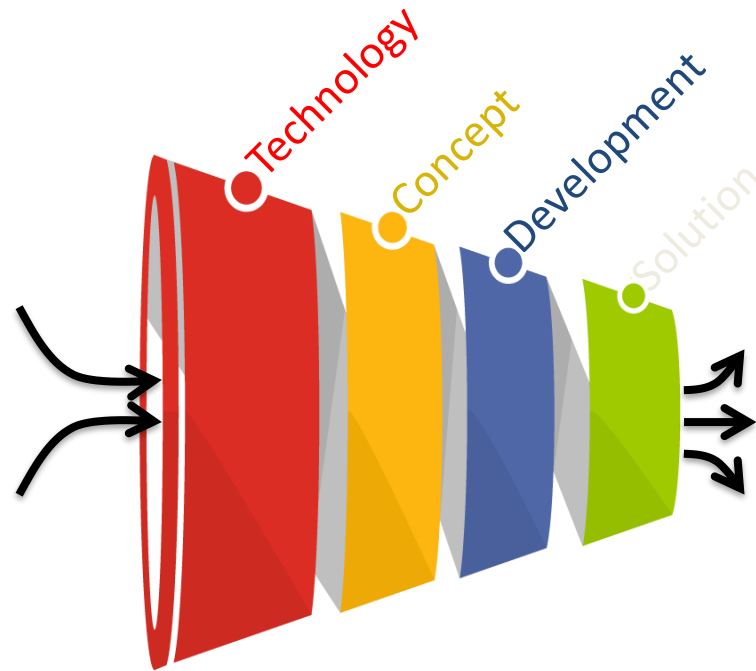
Green Chemistry



OUR KNOW-HOW AT WORK

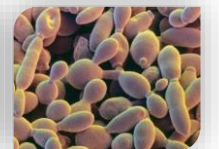
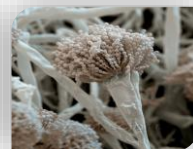
Know-how:

- Molecular microbiology
- Species identification
- Strain characterization
- Strain authentication
- Bio-banks screening
- Genome analysis
- Comparative genomics
- Metagenomics
- Culturomics
- Patents expertise
- Agri-Food & Pharma Regulatory



Services provided:

- ✓ Starter selection
- ✓ Strain tracking
- ✓ Fermentation monitoring
- ✓ Safety assessment
- ✓ Strain manufacturing & quality control
- ✓ Microbial stability tests
- ✓ Microbiota analysis
- ✓ Challenge-tests of product/plant
- ✓ Bio-banks of contaminants/strains
- ✓ Strain-specific diagnostics
- ✓ Intellectual Property Rights
- ✓ Business intelligence
- ✓ Regulatory Compliance



OUR TECHNOLOGIES

MICROBIOLOGY

- ☐ Plate counts
- ☐ Antagonism assays
- ☐ Phenotypic assays
- ☐ Antimicrobials resistances
- ☐ Fermentation
- ☐ Stability-tests
- ☐ Lyophilization
- ☐ Cryopreservation
- ☐ Microscopy

..and more

MOLECULAR BIOLOGY

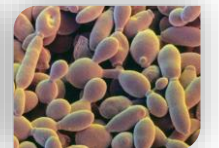
- ☐ End-point PCRs
- ☐ Fingerprinting PCRs
- ☐ Real-Time PCRs
- ☐ Quantitative PCRs
- ☐ Viability PCRs
- ☐ LAMP-PCRs
- ☐ Multi-locus sequence typing
- ☐ In-situ FISH
- ☐ Optical mapping

...and more

INNOVATIVE TECHNOLOGIES

- ☐ Whole genome sequencing
(long reads & short reads)
- ☐ Bioinformatics
- ☐ Transcriptomics
- ☐ Metabarcoding
- ☐ Metagenomics
- ☐ Flow Cytometry
- ☐ Infrared spectroscopy
- ☐ MALDI-TOF

...and more





COST Action CA20128

PIMENTO

Promoting Innovation of ferMENTEd fOods

WG 1

Build
a multi-actor
operational
network

WG 2

Cartography of fermented foods in the diet of COST Countries

WG 3

Health benefits and risks of fermented foods

WG 4

Federating scientists and Fermented Food producers

WG 5

Dissemination,
training
and events



PIMENTO WG2

Cartography of fermented foods in the diet of COST Countries

- Mapping and cataloguing fermented foods highlighting diversity
- Collect information on production and consumption (FFQ sub-group)



Deliverables:

- Atlas of fermented foods (beta version)
- 2 Publications achieved
 - ✓ protocol
 - ✓ 3FQ tool validation
- 3 Publications ongoing

Leaders:



Effie Tsakalidou



Photis Papademas

FFQ Leaders:



Michail Syrpas



Emmanuella Magriplis

Group contact:

✉ WG2@fermentedfoods.eu



PIMENTO WG₃

Health benefits and risks of fermented foods

EFSA projects

- ✓ FF & gastrointestinal symptoms
- ✓ FF & food allergies
- ✓ FF & immunity
- ✓ FF & type 2 diabetes
- ✓ FF & cardiovascular diseases
- ✓ FF & bone health
- ✓ FF & neurological disorders



Leaders:

 Guy Vergères

 Smilja Todorovic

Group contact:

 WG3@fermentedfoods.eu

Satellite projects

- ✓ Cataloguing bioactive compounds in FF
- ✓ FF for production of vitamins
- ✓ FF & nutrients bioavailability
- ✓ Health benefits of orphan FF
- ✓ FF as part of health diets
- ✓ FF in personalized nutrition
- ✓ Improving food safety of FF
- ✓ Safety and functionality of novel FF
- ✓ Functional valorization of food by products by fermentation

Deliverables:

- 14 Publications achieved
- 2 Publications ongoing



PIMENTO WG4

Federating scientists and Fermented Food producers



RESEARCH



INDUSTRY



MARKET



Leaders:

 Antonio Del Casale

 Marie C. Champomier-Vergès

Group contact:

 WG4@fermentedfoods.eu

- ✓ Bottlenecks of innovation of FF
- ✓ Network development
- ✓ Development of cluster/association of FF



Survey design and participation

A qualitative European industry survey coordinated by PIMENTO WG4

141

industry representatives

25

European countries

60

questions

2023–24

field period

March 2023 – October 2024

3

domains

REGULATORY

SAFETY

TECHNOLOGY

Questionnaire development and interpretation were themselves multi-stakeholder processes



Stakeholder meeting

Themes identified



Questionnaire

60 questions refined



Dissemination

COST Action network



Analysis

Global qualitative view



Discussion

2025 industry events

Where is innovation heading?

Customer demand, plant-based products and new fermentation substrates

72/141

reaching new customers

64/141

customer satisfaction

68%

plant/cereal/legume focus

52%

dairy/meat/fish focus

Demand is
reshaping the
innovation portfolio

Interest in new substrates /
ingredients / formulations

77% (43/56)



A strong need for fermentation science

Spontaneous fermentation relevant
to products

66% (37/56)



Including spontaneous-only and combined approaches

Health and sustainability trends converge: innovation is moving toward plant-based matrices, circularity and broader microbial/ingredient diversity.

Regulatory awareness is uneven

Companies know the basics, but critical concepts are not universally understood

Clear on labelling and required authorisations 65% (24/37)



Sufficient regulatory expertise internally 68% (25/37)



Awareness of the QPS concept



27/41 aware

14/41 unaware

Not aware of the Nagoya Protocol,
but willing to learn

61% (25/41)



**Regulatory information and training remain a practical innovation tool
— especially as EU and supra-EU frameworks evolve.**

Novel Food regulation shapes innovation choices

Regulatory burden can redirect or stop innovation before development begins

80%

avoid or try to avoid
Novel Food classification

33 of 41 respondents

16/41

would avoid this
type of innovation

17/41

would seek approval,
but try to avoid Novel Food
classification if possible

Respondents described the pathway as costly, uncertain and burdensome.

- ✓ The result is a “fit-to-conform” behaviour: innovation is adapted to existing regulatory routes.
- ✓ Earlier scientific dialogue between regulators, industry and academia could reduce uncertainty and improve evidence generation.

Industry asks for clearer concepts and definitions

Consensus terminology is perceived as an enabler of innovation

Agree with ISAPP fermented-food definition

88% (36/41)



Definition “mostly positive” for innovation

68% (28/41)



Support legally-binding definition

75% (31/41)



Specific status/guidance for starter cultures

73% (30/41)



Clear definitions can connect safety, health and sustainability — and give innovators a more predictable framework.

Hurdles depend on company size

SMEs feel financial constraints most strongly; large companies emphasize knowledge and market factors

SMEs — hurdle considered important (n=84)

Financial limitations



38

Knowledge / know-how



24

Market limitations



22

Large companies (>250 employees) — high importance (n=2)

Knowledge / know-how



9

Market limitations



8

**Different company profiles need different support mechanisms
— financing alone will not solve all barriers.**

Technical hurdles concentrate at industrialisation

The strongest barriers appear when moving from R&D to scale-up and production

Top technical hurdles (n=113)



Discovery → Pilot → Scale-up → Commercial production

The bottleneck is not the idea — it is access to infrastructure, technology transfer and capital.

Safety knowledge is a bottleneck — but not a brake

Companies want to innovate, yet need clearer evidence packages for new strains, ingredients and products

Knowledge gaps for new strains / ingredients (n=31)



Foreseeable product-safety bottlenecks (n=43)



76%

do not let safety issues stop innovation

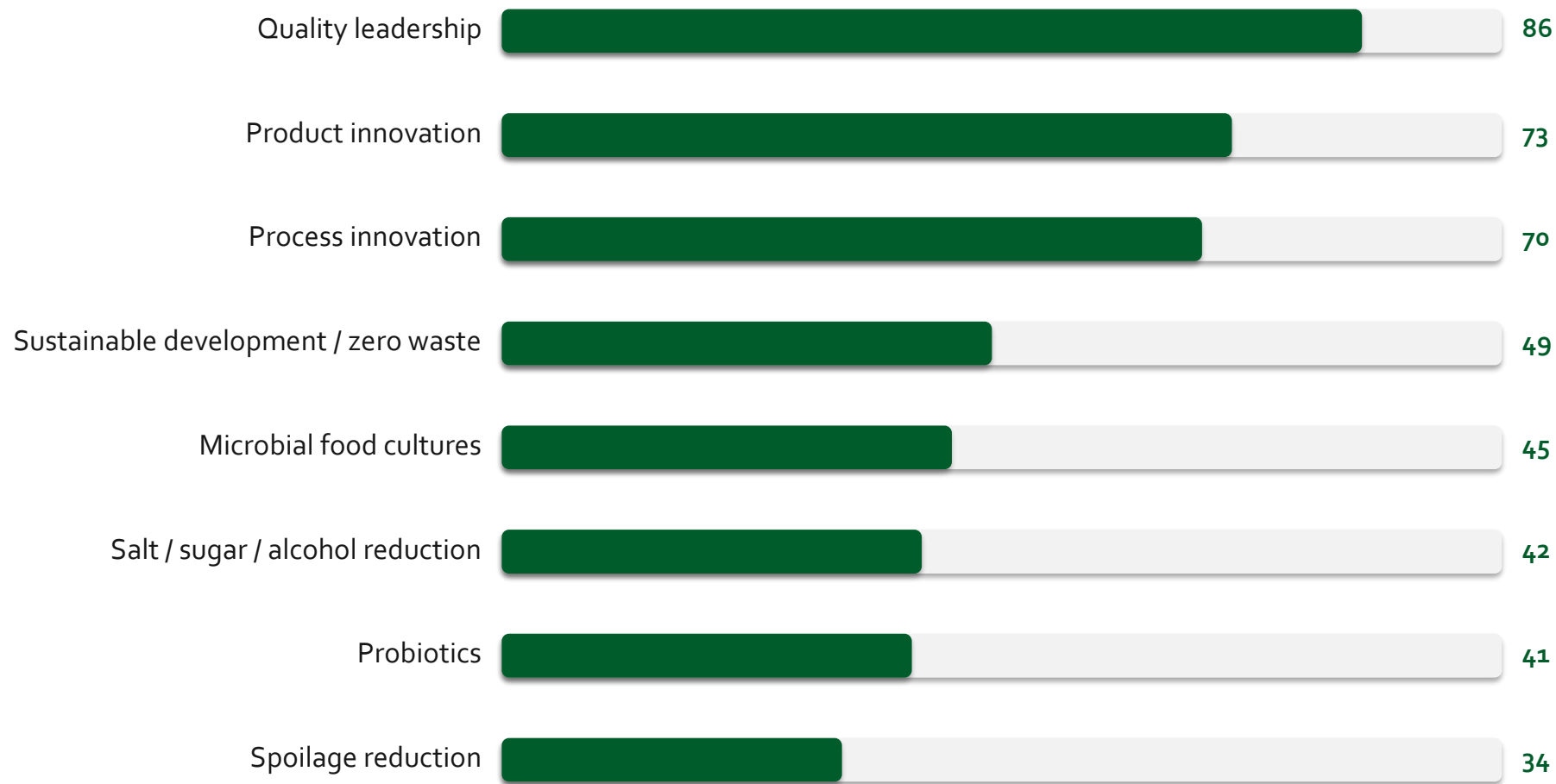
41 of 54 respondents

The need is therefore not to lower the safety bar,
but to make the scientific requirements clearer
and easier to generate collaboratively.

What will drive innovation in the next 5 years?

Quality leadership remains first — with sustainability and microbial innovation close behind

Innovation priorities (n=113)



Innovation ambitions extend beyond national markets

Companies increasingly look to Europe and international markets

Last 5 years
2018–2022

Next 5 years
2023–2027

Targeting the European market

68



93

of 141 respondents

Targeting markets beyond Europe

56



67

of 141 respondents

A more enabling European innovation ecosystem matters for competitiveness as much as for science.

Collaboration is desired — but partnership formation has costs

The preferred partner is academia, yet practical barriers slow cooperation

97/141

rely on internal funding

64/141

rely on internal know-how

54/113

academia is partner of choice

SMEs need easier access to grants
and pre-competitive consortia

Main limitations to collaboration (n=113)



From survey findings to actionable recommendations

Four intervention pillars proposed by PIMENTO WG₄

TECHNICAL

Public–private partnerships

- Pilot & production plants
- Technology transfer
- Strategic research agendas

SAFETY

Strategic benefit–risk roadmaps

- New processes & matrices
- New strains / ingredients
- Biopreservation
- Good control practices

REGULATORY

Regulatory education + science

- Training on legislation & frameworks
- Research topics for innovative FF
- Pre-competitive regulatory science

SMEs

Access + participation

- Mutualise grant scouting
- Support academic partnerships
- Increase participation in innovation consortia

Goal: reduce duplicated effort, accelerate evidence generation and connect the whole fermented-food innovation chain.

Take-home messages

Innovation is strong — the ecosystem around it must become easier to navigate

1

DEMAND IS THERE

Customer expectations are pushing fermented foods toward health, sustainability, plant-based matrices and new microbial solutions.

2

THE BOTTLENECK IS TRANSLATION

Scale-up infrastructure, safety evidence and regulatory uncertainty are the main points where promising innovation slows down.

3

COLLABORATION IS THE BOOSTER

A European pre-competitive cluster can align research agendas, regulatory science, funding and partnerships — especially for SMEs.

Fermented-food innovation needs a shared European space for science, industry and market dialogue.



COST Action CA20128

PIMENTO

Promoting Innovation of ferMENTed fOods

Follow-up:

Antonio Del Casale

a.delcasale@microbion.it

+39 3474831103

microbion



**Funded by
the European Union**