FEFPEB

october 30th 2015

Olivier de Lagausie SIEL-GROW

« Wood in contact with food, a scientific approach »

12.00 12.30 hours

Context

Wood …

Context

… is authorized for direct contact with food

… contributes to

final **quality,**
final **safety**,
and **character**
of many food products.

Context

But

- use of wood **excluded** in different « good practice guidelines ».

Context

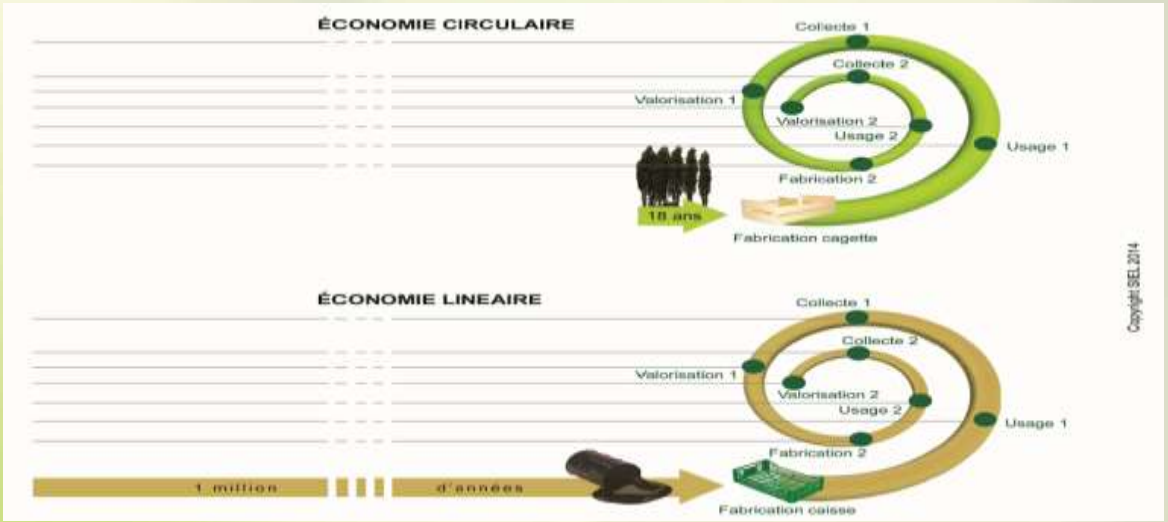
- Light weigt packaging **baned** by the Retail industry from their F&V logistics organisation (lately Intermarché).

INTERMARCHÉ
Les Mousquetaires

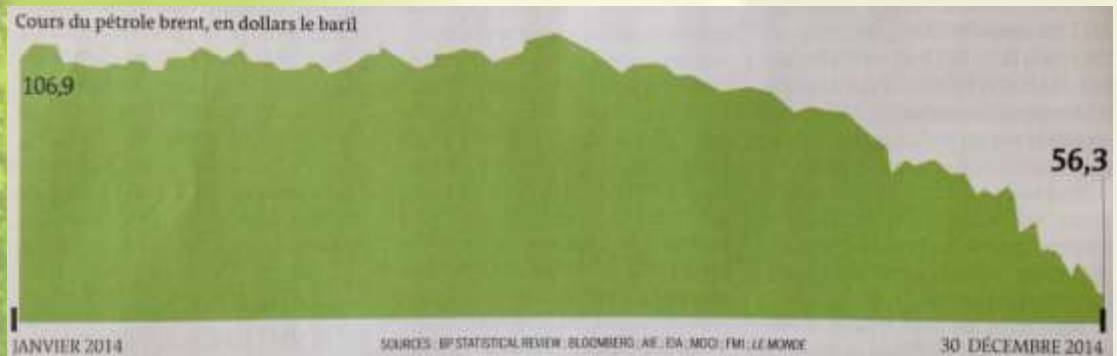
Auchan

Context

so renewability, sustainability, circular economy, environmental benefits, are not enough….



…when price of oil is plummetting!



Context

- **Food crises everywhere!**

Yesterday: “deli meat causes cancer!” (source WHO)


La charcuterie est cancérogène, la viande rouge «probablement» aussi selon l'OMS

Mots clés : nutrition, alimentation, cancer

Par Pauline Fréour - le 26/10/2015

Last week: 142 products tested, most are problematic for our health, due to mineral oil in paper and board packaging

Context

- **Lack** of harmonised european regulation on wood in contact with food

European regulation

1. ECR n°1935/2004

"Material do not transfer their constituents to food in quantities which could:

(a) endanger human health;

(b) *bring about an* ***unacceptable change in the composition*** *of the food;*

(c) *bring about a* ***deterioration in the organoleptic*** *characteristics"*

Context

- **Lack** of scientific data…

…for technical file to be produced to the enforcement authorities with food contact certificates.

Answer: EMABOIS!

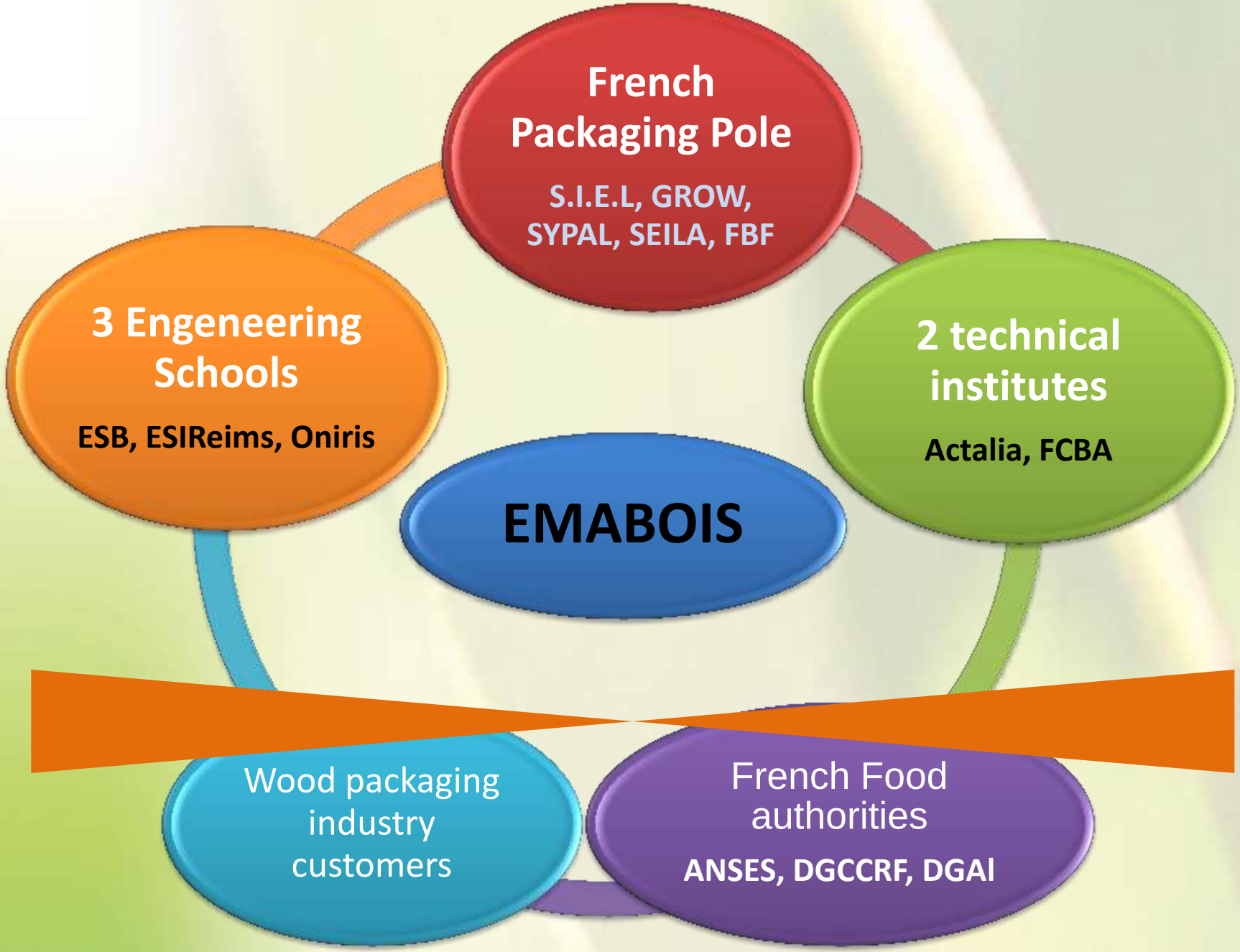
Answer:

« Scientific Consortium EmaBois »

Wooden packaging for food

First French Scientific Consortium

At instigation of the french industrialists of the wooden packaging


French Packaging Pole
S.I.E.L, GROW, SYPAL, SEILA, FBF
3 Engeneering Schools
ESB, ESIReims, Oniris
2 technical institutes
Actalia, FCBA
EMABOIS
Wood packaging industry customers
French Food authorities
ANSES, DGCCRF, DGAl

EMABOIS

Title of the study:

" **Sanitary control** and sensory profits of the use of **wood** packagings, pallets and wooden industrial boxes during the storage and during the preservation of **foodstuffs** " requiring:

- to identify and quantify potential chemical, microbiological migrations from wood to food

- to develop or confirm reliable and adapted **analytical tools** to the wooden material

Sectors studied:

www.fromages-aop-auvergne.com

P. Paccard-R. Ismaïl ©

Milk and Dairy Products sector

Fruit and vegetables sector

Seafood sector

RAW WOOD

www.emballage-leger-bois.fr

http://www.blanchet-sa.com/

Analytical chemistry

The wood in contact with food, chemical part.

Scientific partners

Analytical chemistry

In line with real Conditions:

Raw Wood
Single-use
2 species: **peeled Poplar, sawn Pine** (France)
2 moisture content: 13% (dry) et 36% (wet)
2 areas into tree: sapwood and heartwood

3 food simulants→ mimics real foods
A : Ethanol 10%→ Aqueous contact
D : Ethanol 95% → Fatty contact
E : Tenax© → Dry contact

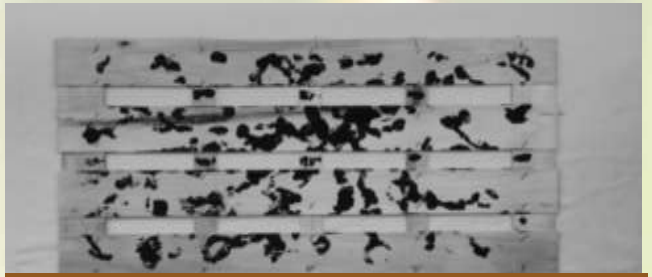
2 Temperatures : 4°C, 23°C
8 Contact Time : from 1h to 10 days

Analytical chemistry

In line with real Conditions:

Quantitative Risk Assessment study → Real contact surfaces wood/real food

Baskets - Oysters → 3% of contact
Crate - Apples → 11% of contact
Crate - Salads → 22% of contact



Apples crate

→ to apply a corrective factor to our Global and Specific migration results

Innovative Data

Global migration

Analysis of Global migration and Specific migration

Definition **« Global Migration »** : Total mass given by a material to food expressed in mg / kg food or mg / dm^2 contact surface

Analytical Tools

- **- Validated method to get migrat from wooden samples :**
  Gravimetry : evaporation of the simulant

- **Validated Method to identify migrat from wood :**

1. **Infrared** → characterisation of chemical functions
2. **LC-ESI-MS** → characterisation of **non-volatil compounds** after séparation

Liquid chromatography - Electro Spray Ionisation *tandem* ***Mass spectrometry***

3. **GC/MS** → characterisation of **volatil compounds** after séparation

Gas chromatography - Mass spectrometry

Global migration

- + **4800** tests
- Identification of all **non-volatil** compounds
- Very good knowledge of non-volatile compouds :

- **Only innocuous molecules** migrated from wood to food
  - Examples :

    Sugar, fatty acids, carboxylic compounds

    Glycerin, syringole, Ethyl pyruvate

    → already used by food-industry pharmaceutical industry

Specific migration

Definition: **Value of the migration of a specific compound in mg / kg food**
Identification and kinetics of **volatil compounds**

1) Identification

Analytical Tools

Validated advanced Method= TD-GC/MS (Thermodesorbtion with gas chromatography/mass spectrometry).

Contact Wood-Tenax©

Tenax© Analysis By TD-GC/MS

Identification
Kinetics
volatils compounds

+ 1 500 tests

146 volatils molecules identified
7 families

Chemical Families
Cetones
Acides
Algehydes
Furanes
Terpenes 2 (derivative alcohol)
Esters
Terpenes 1(derivatives alkenes)

Specific migration

2) calculation of maximal migration

+ 1,300 tests

"Worst case" approach:

- worst posible migration per family
- specific **migration measures** during direct contact case **between wood and Tenax**

Results

- **maximal specific migration observed was** less than **0.07 mg / kg Tenax**

Very tiny migration .

Specific migration

3) **Risk assessment by calculation of maximal exposure, demanded by EFSA**

Consumption of 1kg of packaged food per day
Results :
- maximum exposure is 0,133µg / kg body weight / day
much less than
- maximum exposure for molecules classified as "structural alert“ : **1.5 µg / kg body weight / day**

Specific migration

4) Final verification of all tresholds

The TTC (Threshold of Toxicological Concern) approach was chosen: a PROBABILISTIC method, **validated by FDA + EFSA, Approach according to molecule structure:**

No problematic situation identified
The 146 volatile molecules are innocuous to consumers as recognized by the TTC database

Scientific conclusions :

- **Innocuous volatils molecules for consumer**
- **Safe exposure for consumers**
- **No argument against the use of wood in direct contact with food**

The wood in contact with food, microbiological part

Scientific partners

2 MICROBOIS aims and fulfilments

Technical tools:
Validate robust extracting method of microorganisms from wood in lab and in real conditions → Technical innovations

New scientific data :
about ecosytem “Wood-food” : microflora and migrations

Microbiology

Study Conditions = real conditions

* Wood: **RAW**

single-use

3 wooden species : **Peeled Poplar, sawn Pine, sawn Spruce** (France)

* 2 moisture contents: 18% (dry) et 37% (wet)

* 2 foods + 3 Microorganisms identified as risks to the appropriate three sectors studied

cheese *Listeria monocytogenes (bacteria)*

apple *Escherichia coli (bacteria)*

apple *Penicillium expansum (molds)*

Microbiology

Analytical Tools for Microbiology

Planing method validated

→ **thickness of wooden units > 5mm**

Grinding method validated

→ **thickness of wooden units <5mm**

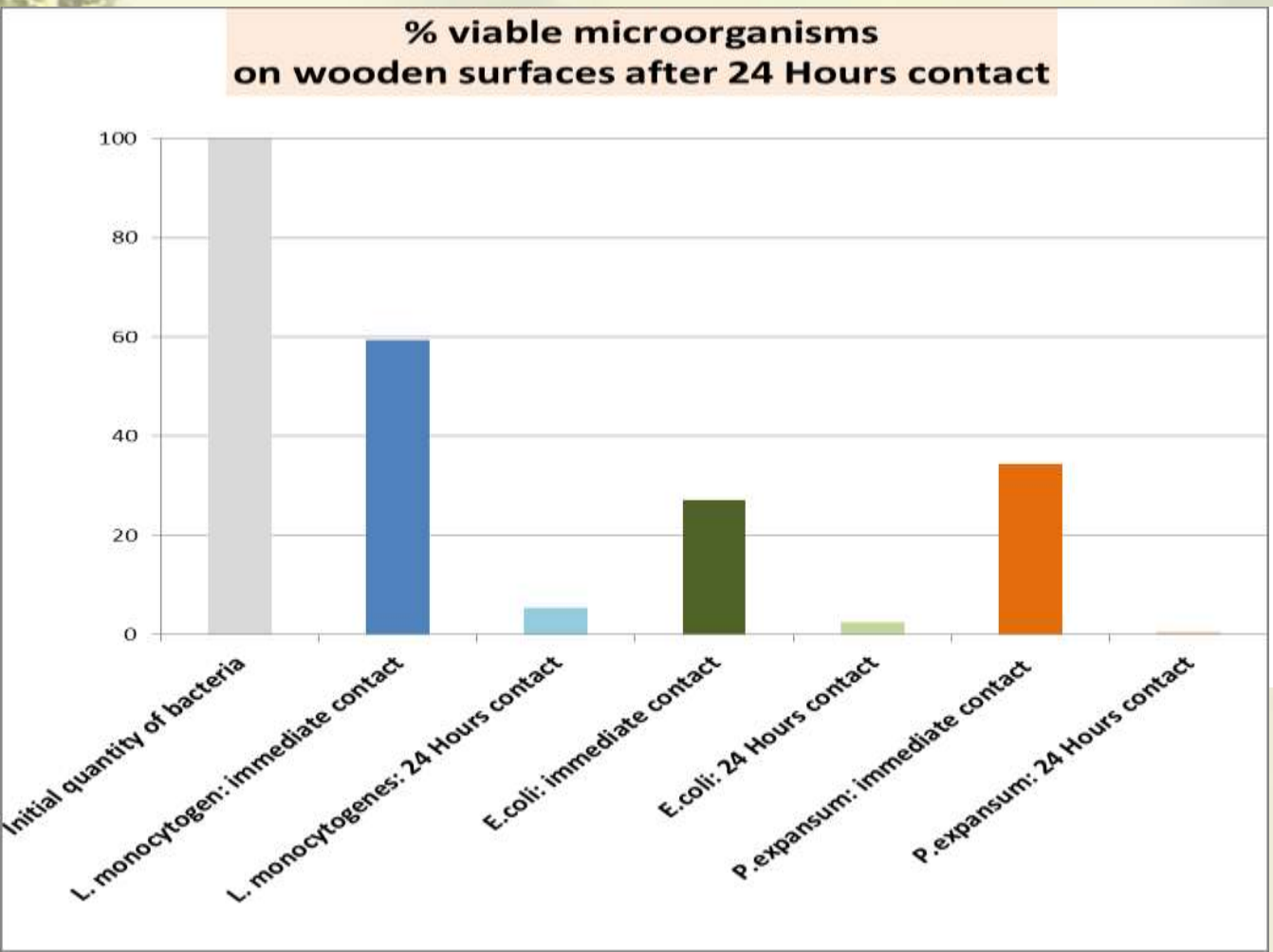
Blender

2 min in Peptone solution

Microorganisms Identification (Standard)

Microbiology

-1- Assessment of the microbial survival on the raw wood overtime



Innoculation
After 24h
Drastic reduction
of microorganisms
on wood
factor 20-200

Anti-microbial effect

-2- Assessment of microbial flora on wood used in real conditions

→ No food; no bacteria inoculation

108 **wooden ripening shelves**

at the packaging factory gate, in stotage area or ready for use.

→ **Planing method**

→ 5 sought pathogenic microorganisms (French regulation on dairy products): *Listeria monocytogenes, Escherichia coli, Staphylococcus aureus, + Salmonella and Bacillus (families)*

→ 108 samples analyzed 3 times for 5 different microorganisms

→ Identification of microorganisms according to standards

→ + 3800 tests

❖ **NO pathogenic microorganisms onto wood**

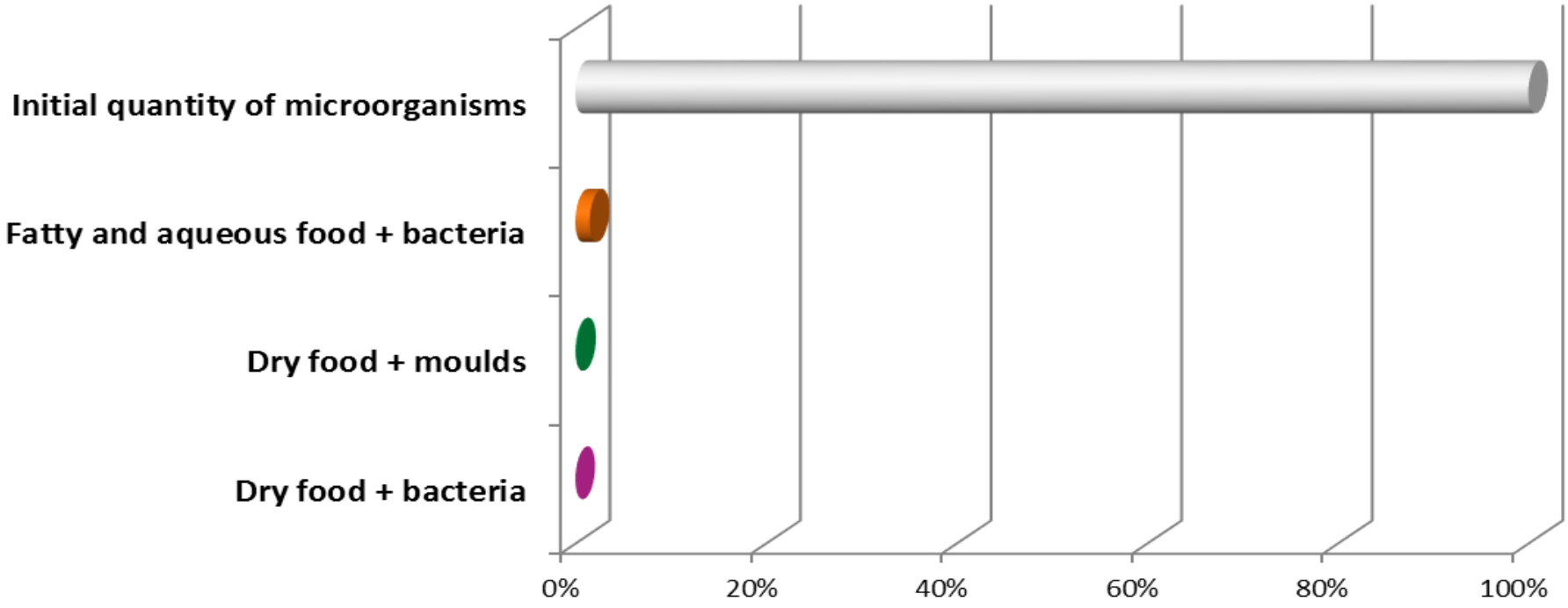
❖ **Microbiological Safety of wood in direct contact with food**

-3- Assessment of Microbiological migration from Wooden surfaces to the food in direct contact

Intentional inoculation of 2 bacteria and moulds.

+ 2600 tests

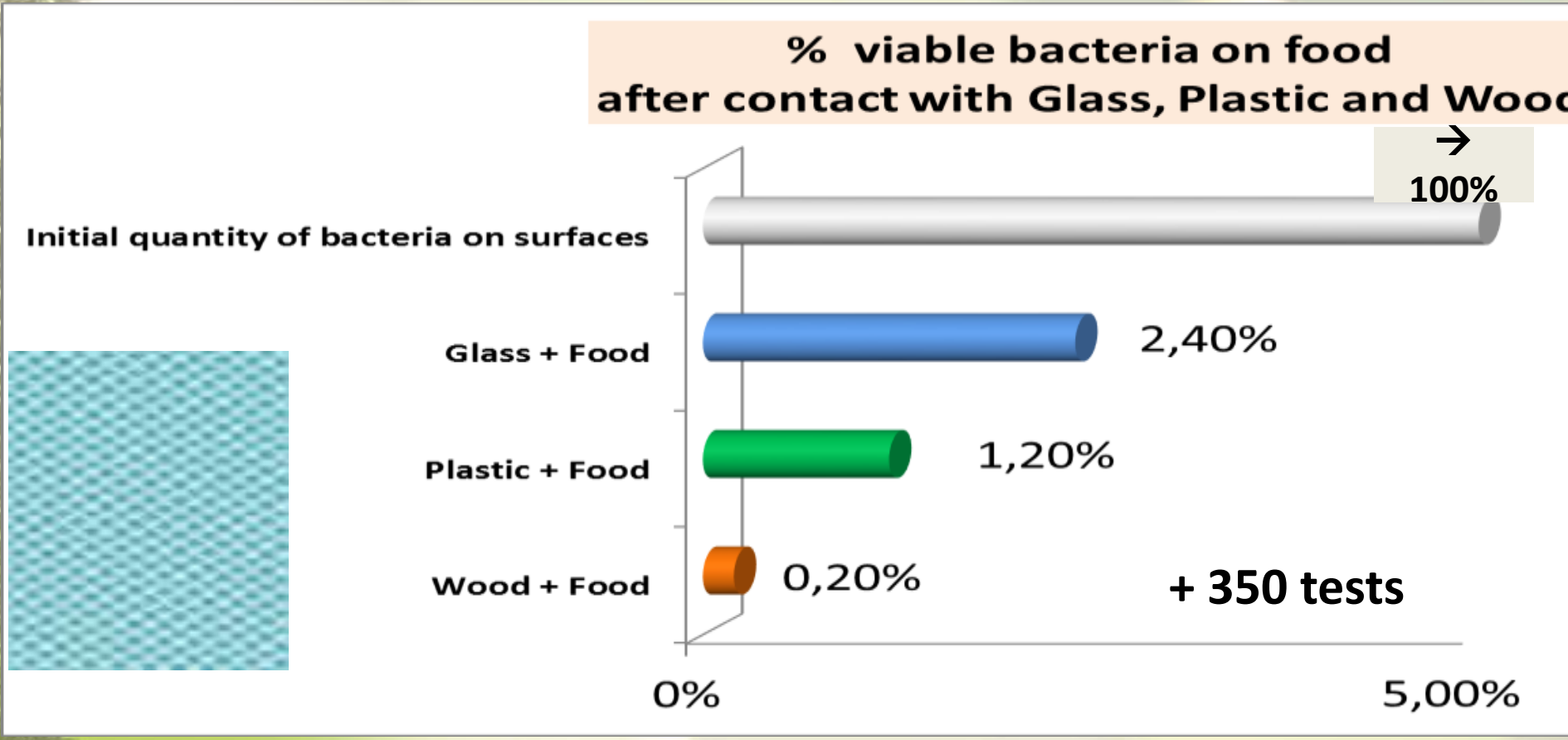
% transfert rates of microorganisms from wooden surfaces to food



❖ **99% of micro-organisms do not migrate from wood into the food – after 24 hours -**

Microbiology

-4- Comparison of microbiological migration from 3 packaging materials to food



Plastic "inclined mesh awning" used in cheese industry = pourous plastic…

- **The transfer of microorganisms from wood to food is the lowest**

Conclusion

- Confirmation wood suitable for food contact

with

Exemplariness of the approach - Risk Analysis –

Transparency - Scientific Robustness

Large communication


BOISmag

Le bois emballe la recherche



LLAGES MAGAZINE

ENTRE DE RESSOURCES DE L'EMBALLAGE EN LIGNE

S APTE AU CONTACT ALIMENTAIRE

par Tiziano Polito

Une étude scientifique du consortium Emabois confirme que les emballages en pin, en peuplier et en épicéa sont inoffensifs

Il aura fallu six ans pour confirmer ce que


Franc-parler

Du bois dans nos assiettes


bois&vous

EmaBois : Retour de recherches sur les emballages alimentaires en bois

CONSORTIUM SCIENTIFIQUE EMABOIS


VAUCLUSE AGRICOLE

EMBALLAGE

Le bois, apte au contact alimentaire


ED

Emballage industriel

Le bois est apte au contact alimentaire

l'agriculteur de l'Aisne

Emballage : le bois au contact alim



L'emballage bois revient en force



34 press & internet articles

Assessment of hygienic status of single use wooden packaging for fish

Partnership

FEDEMCO

UAB Universitat Autònoma de Barcelona

Material :

Wooden crates in Poplar and Pine <u>with</u> drainage

Expanded PolyStyrene (EPS) <u>with</u> drainage

High Density PolyEthylene (HDPE) <u>without</u> drainage

Main results :

1. Wood only have **antimicrobial** properties → Poplar < < Pine
2. Wooden packaging: lowest contamination after contact with fish → **positive hygienic status**
3. **Single-used** materials guarantee the **quality** and **safety** of the fish
4. **Drainage system** guarantees the quality and safety of the fish

→ NO stagnate water

→ NO bacteria growth

5. **The fish in contact with the plastic is the most contaminated**


LES BONS FRUITS D'AUTOMNE !
LA QUALITÉ DU TERROIR ET DES VRAIS PRODUCTEURS
VOUS LA RECONNAÎTREZ : L'EMBALLAGE EST EN BOIS


LES EMBALLAGES LÉGERS EN BOIS,
EXALTENT LES BONS PRODUITS
GASTRONOMIQUES ET LES VALORISENT.
QUAND LA NATURE RENCONTRE
LA NATURE, POUR DES REPAS RÉUSSIES.
REJOIGNEZ NOUS !
LA QUALITÉ VOUS LA RECONNAITREZ
LES EMBALLAGES SONT EN BOIS
À l'époque des perturbations de la chaine alimentaire (pollutions des océans par les micro particules de plastiques, excès de traitements antibiotiques et pesticides, crise de la malbouffe), le bois non traité des cagettes annonce le vrai retour au valeurs naturelles.
La filière bois ce sont 450 000 salariés, 17 000 communes forestières en France. Une ressource fantastique pour l'emballage, l'aménagement, la construction, gérée durablement (coupe et replantation en France). Les emballages légers en bois représentent 50 sites industriels en milieu rural, non délocalisables et socialement responsables.
SIEL


Ecologique
Vivable
Viable
Durable
Social
Équitable
Économique


SIEL
Syndicat national des Industries de l'Emballage Léger en bois
100 % PROTECTION
0 % POLLUTION
LES COQUILLAGES EXIGENT
LE MEILLEUR MATERIAU :
LE BOIS !
BOURRICHES ET EMBALLAGES BOIS
MATÉRIAU DURABLE
BACTÉRIOSTATICITÉ
ÉCHANGES HYGROMÉTRIQUES
VALORISATION DES PRODUITS
OSTRÉICULTEURS
CONCHYLICULTEURS
Vous savez élaborer
des produits
de grande qualité...
SEUL LE BOIS VOUS
DONNE CETTE GARANTIE !
...et vous voulez les valoriser.
C'est notre spécialité !
EMABOIS 2015 : CONFIRMATION DES QUALITÉS UNIQUES DU BOIS
Retrouvez les fabricants responsables : www.emballage-leger-bois.fr


MAIS OUI,
IL Y A ENCORE
DE BONS
FRUITS & LÉGUMES
DE PRINTEMPS
EN FRANCE !
LA QUALITÉ DU TERROIR ET
DES BONS PRODUCTEURS
VOUS LA RECONNAÎTREZ :
L'EMBALLAGE EST
EN BOIS
SIEL

Thank You!