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Stability and safety of wastes-based packaging materials (EcoBioCAP-WP 4)

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► **To cite this version:**

Helene Angellier-Coussy. Stability and safety of wastes-based packaging materials (EcoBioCAP-WP 4). EcobioCap Final Meeting, Feb 2015, Montpellier, France. hal-02798806

HAL Id: hal-02798806

<https://hal.inrae.fr/hal-02798806>

Submitted on 5 Jun 2020

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Final Meeting 26 February 2015 - Montpellier

Stability and safety of wastes-based packaging materials (EcoBioCAP - WP 4)

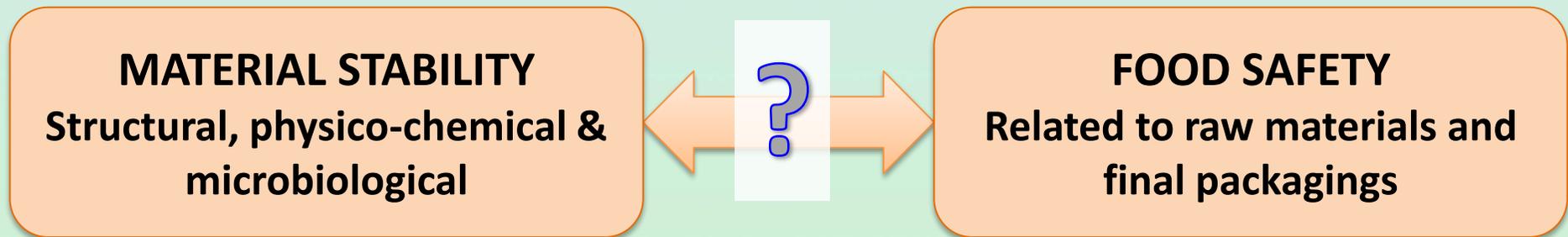
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Objective

To investigate the suitability of packaging materials developed in EcoBioCap as food contact materials (*INRA, FRAUNHOFER, CSIC, UNIROMA*)

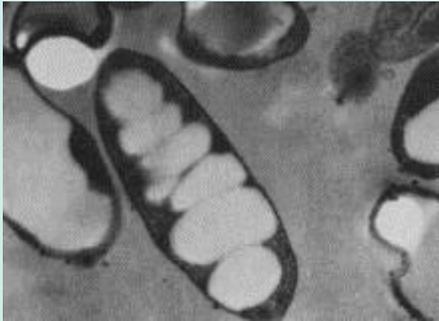


Under food contact conditions



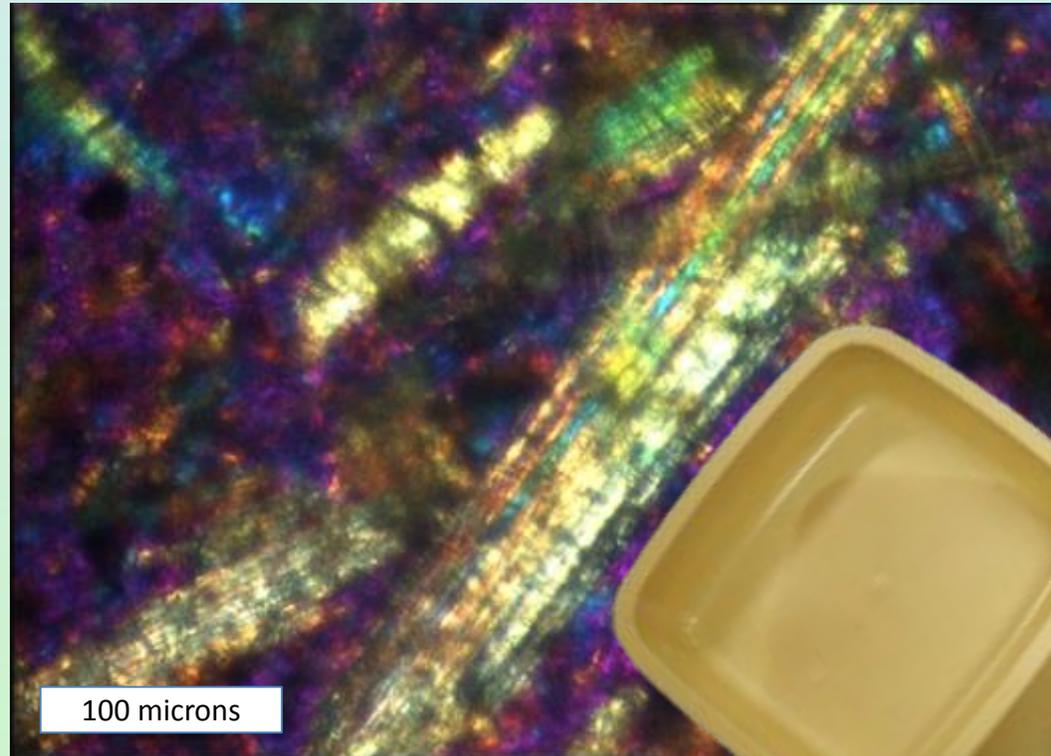
Study case : PHBV / Wheat straw fibres biocomposites

MATRIX = PHBV



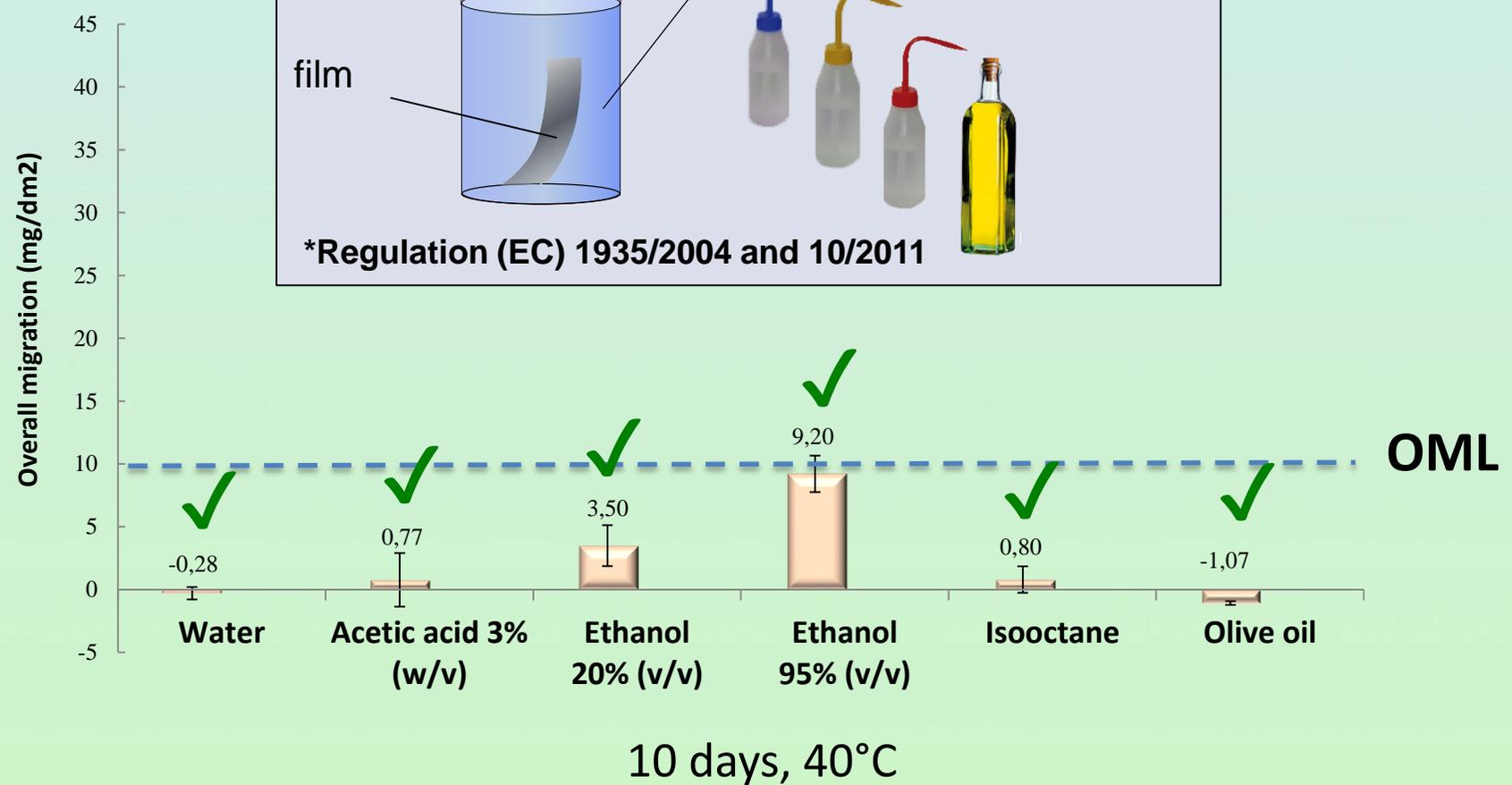
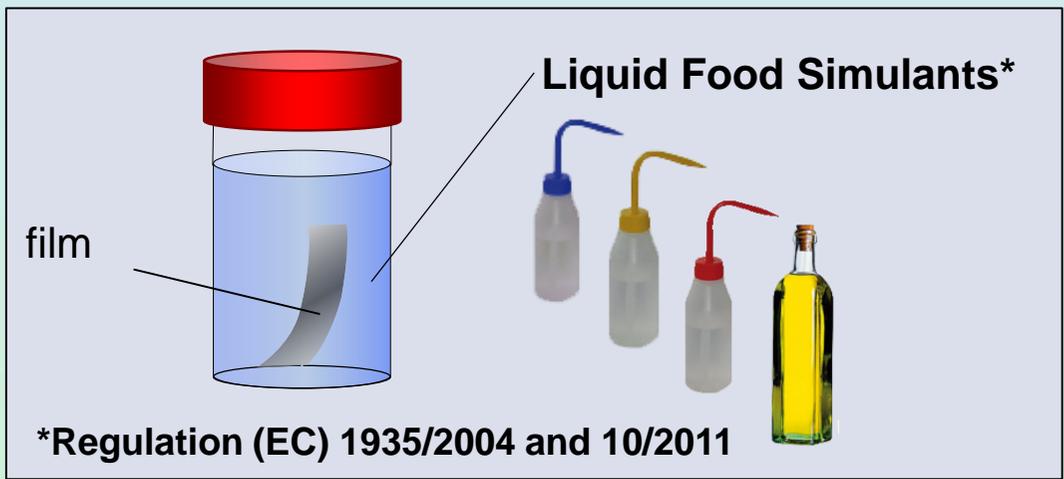
+

**FILLER =
Wheat straw fibres**



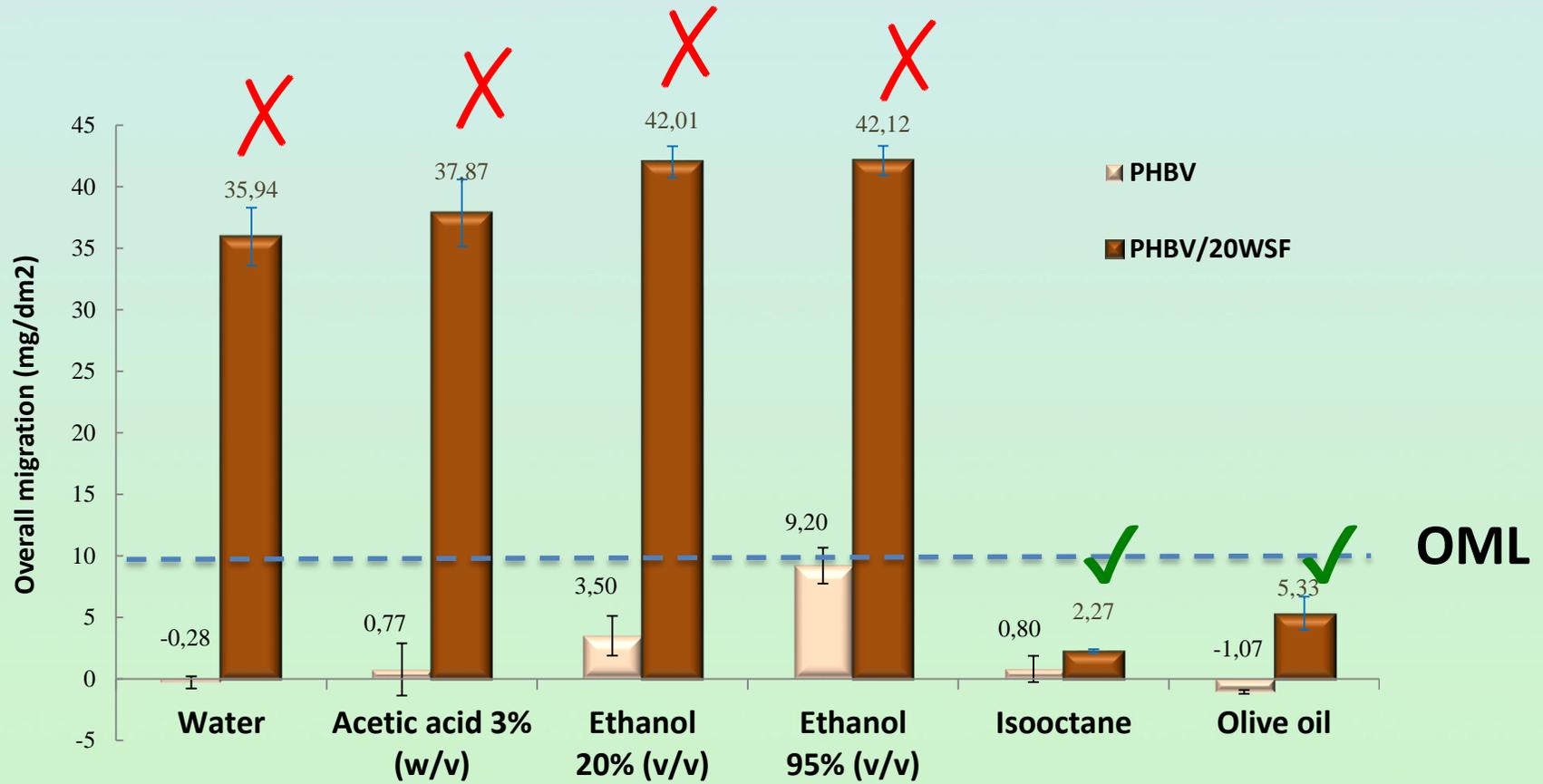


Overall migration in Liquid Food simulants PHBV (Tianan)





Overall migration in Liquid Food simulants PHBV (Tianan) + 20 wt% wheat straw fibers ($d_{50} = 150 \mu\text{m}$)



10 days, 40°C



Challenge tests & specific migration using surrogates

Surrogates = molecules representative of migratable substances

Challenge tests

Specific migration tests

PESTICIDES

PACKAGING ADDITIVES

STEP 1 : Enriching with surrogates

STEP 2 : Extraction of surrogates (at each step of the process in the case of challenge tests)

STEP 3 : Analysis



Toxicological risks of wheat straw fibres?

- **Epoxiconazole : the most used fungicide**
 - Acceptable Daily Intake (ADI) = 0.008 mg/kg body weight and per day, i.e. 0.56 mg/day for a human of 70 kg
 - Median residue in wheat straw : 2.71 mg/kg of wheat straw (EFSA, 2008)

- **Worse case of migration for PHBV/wheat straw fibres trays**
 - Trays (30g, 140x130x35 mm³, i.e. 3.7 dm²) in full contact with food
 - 20 wt% of wheat straw fibres
 - Maximal quantity of migratable epoxiconazole = 0.026 mg/kg of food
 - This would mean that a daily ingestion of more than 21 kg of food in contact with this kind of packaging... to reach the value of 0.56 mg/day

- **Taking into account the decontamination efficiency (≈80%)**
 - This would mean that a daily ingestion of more than 88 kg of food in contact with this kind of packaging... to reach the value of 0.56 mg/day



Conclusions

- **Wheat straw fibres = no safety concern** : Up to 80% of decontamination of surrogates + if the remaining quantity migrated integrally from the packaging towards the food, it did not represent any danger for human health (<ADI)
- **Inertness of PHBVs** : Can be used as food contact materials for all types of food.
- **Stability negatively affected by the addition of wheat straw fibres** : Can be used as food contact materials only for low or intermediate water activity products and/or fat products.



QUESTIONS ?

