



FLAG MARENNES OLÉRON FRANCE

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« Circular economy in fishing and aquaculture areas »

Pilot project: Development of oyster spat collectors (coupelles) based on biosourced & biodegradable materials



Project leader: **Regional Shellfish Committee of Charente Maritime**

Total cost of the project : **44 604 € including 40% + 40% Région Nouvelle-Aquitaine**

Specific characteristics of the Marennes Oléron basin: **natural collection area for oyster spat; more than 700 oyster farming companies**

Partnership

- **Project leader: Regional Shellfish Committee of Charente Maritime**



- **SeaBird: Consulting company & compounder / material development**

- > Formulation
- > Material characterization and prototype production
- > Project management and engineering, process support, technical assistance, legal monitoring
- > Study on the ageing of equipment in the marine environment



- **SOGEMAP: Plastic injection company / tests on injection molding machine**



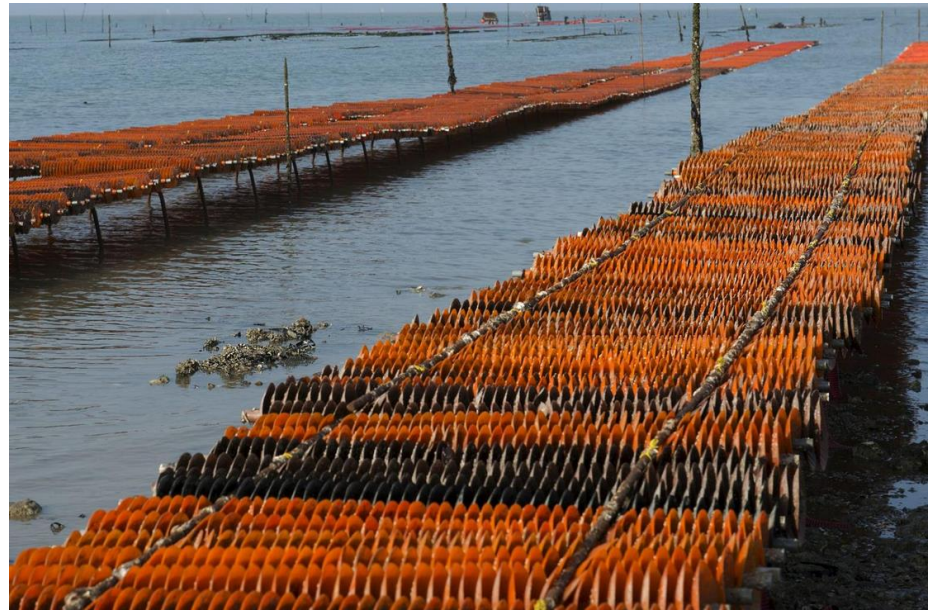
- **FLAG Marennes Oléron: funding support, information sharing with the local partnership and raising awareness**



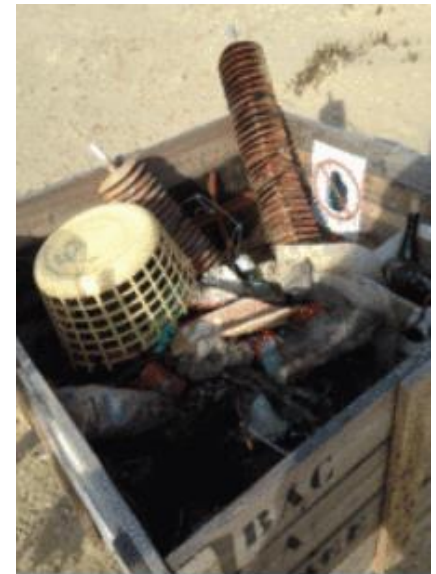
Oyster spat collectors (coupelles)

- **Oyster spat collection (June/August):** Microscopic larvae form and can be carried by currents. They will try to hang on supports called “spat collectors”: plastic coupelles are mainly used
- **Shell formation (+ 6 months / January):** Transfer of spat collectors
- **(+ 8 months / March) :** The coupelles are unclipped and installed on 1m² iron tables, spaced 20 cm apart, so that the oysters can grow.
- **Detaching (+ 12 to 24 months / March).** The coupelles are removed from the water and the oysters are separated from their supports to continue their production cycle...





This equipment generates plastic waste that can end up on beaches.

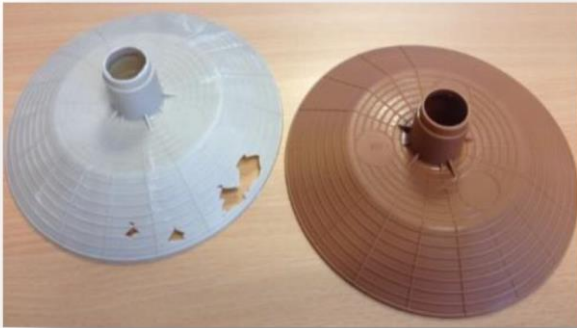


Project objectives

- Develop coupelles based on biosourced/biodegradable polymers
 - Recovery of shell by-products: + 5500 tonnes from shellfish farming
- Optimize the compromise between product durability and degradation of oyster spat collectors at the end of their life
 - Test the mechanical properties of the developed material.
- If successful, help more biodegradable oyster aquaculture materials to be marketed:
 - By making the technology accessible to whole oyster aquaculture sector
 - By informing oyster farmers and consumers of the benefits

Steps of this R&D project

- a) Agreement between the different stakeholders
- b) Development of a new bio-based, biodegradable and industrially-compostable bioplastic compound specific to shellfish farming, with properties equivalent to the thermoplastic (PP) currently used
- c) Process for moulding bioplastic coupelles



A gauche la coupelle en bioplastique -A droite la coupelle en plastique pétrosourcé

Testing the new material in a hot block injection mould
→ several parameters investigated

Results :

- ***formulation based on biopolyesters (biodegradable polymers)***
- ***reformulation of a more suitable compound incorporating 10% oyster shells...***

Monitoring and conclusion of the R&D phase

Monitoring recommendations in field conditions over a couple use cycle (capturing to detaching, June 2017 - August 2019): mechanical tests, ageing tests, user feedback, etc.

- About 1800 coupelles tested at sea in recent months (in progress)
- Performance equivalent to traditional oyster spat collectors. New material resists marine erosion for about five years before being naturally composted

Conclusions

- Work to be carried out on the management of the final waste (next task): standards and certifications concerning the effective % of biosourced and biodegradation in industrial compost
- Technical recommendations identified for future pre-industrial series; knowing that the first results are convincing → push the R&D company to develop and invest → launch a pilot extrusion line in a new workshop of about 200 m²
- Could be used for other shellfish plastic materials



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Oyster spat collectors (couples) based on biosourced & biodegradable materials