



ifth

Activateur de projets



**New agro-based man-made
fiber using a room temperature
& a solvent-less process**

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IFTH French Institute of Textile and Clothing

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October 9th 2014, Roubaix**



Technology Centre tuned to serve the companies of the textile sector, IFTH proposes its plural offer to answer your new challenges, strengthen your strategic relevance, rhythm your training efforts and challenge the performance of material and product.

• **A European reference in terms of research & Development.**

• **A plural offer dedicated to companies**

Innovation and Corporate Solutions

Assisting Corporate Solutions

Quality and Corporate Solutions

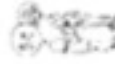


• **A network**

of 7 technological platform of support to innovation essential to develop new materials and products:

- ✓ Non woven engineering
- ✓ Composite engineering
- ✓ Knitting engineering
- ✓ Creation/conception and product marketing tools
- ✓ Finishing engineering
- ✓ Consumer health and safety platform
- ✓ P2F – Spinning technological platform

• **An international ecosystem**





1 – The solution to activate your research and innovation projects

Reinforce your strategic relevance and address the challenges of material and product performances

2 - Support in your innovation projects, expertise and consultancy needs

More than 400 companies have benefited of IFH Innovation and Corporate Solutions in a strict respect of the required confidentiality

3 – More than 80 textile experts in 8 fields.

Standard and labels - Technologies et environment - Economy, Actors et Intellectual Property – Life Style – Professional Equipments – Technical Textiles / Textile Structure – Characterisation – Active Textiles

4 – Technological means

Support to innovation platforms to concretise the realisation of your procepts and prototypes

5 – Business intelligence tools

To evaluate the pertinence of your innovation actions



AIRBUS / OXYLANE / WL GORE / P&G / VERTBAUDET / ZYEX / DSM



1 – Product qualification global process control

Standardisation Definition : Participation to commissions – ISO – CEN – AFNOR

- BNTH management

Development of new tests : answer to our customer new market needs, available from product development stage.

Promotion of customer Quality Insurance, within AFAQ, ASQUAL, COFRAC, EUROLAB, AFOCERT, etc.

COFRAC ISO 17025 accreditation for our 5 laboratories* for more than 400 test methods

*Accreditation N° 1-0513 (Mazamet), N°1-0110 (Troyes), N°1-0101 (Lyon), N°1-0241 (Muhouse), N°1-0071 (Lille)

2 – A partner for mandatory certification

PPE CE marking, fire-fighter suits homologation, fencing suit and mask testing, F1 suits fire testing, medical dispersive CE marking.

Classification for Building and transport tender: M, I, F, Euroclasses.

3 – A partner for voluntary certification

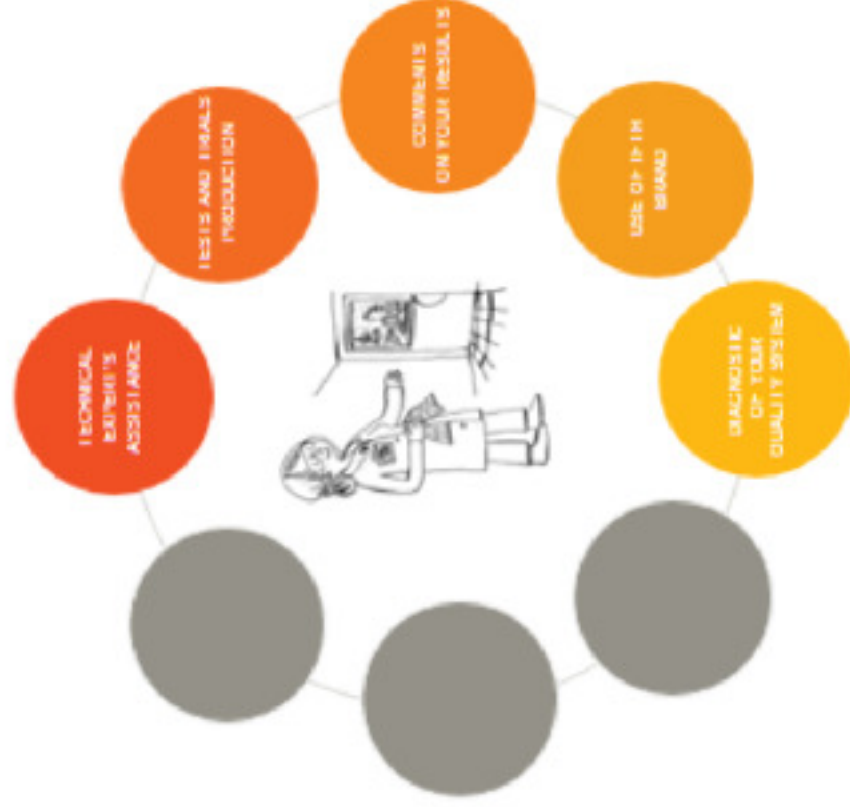
Label Ceeko-level, antibacterial, anti dust mite, protection U.V. geo-synthetics.

4 – A clear and extensive offer adapted to your products and markets

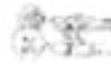
IFTH laboratories propose an extensive list of test for textile covering the different stages of product manufacturing from fibre to final product and addressing all textile markets.

5 – A Laboratory In China : Joint Venture IFTH-CMA

IFTH-CMA Limited is a mandatory partner to control your Asian production from inspection on your partners' production sites to product characterisation prior to shipment and commercialisation.



PSA / OXYLANE / FAURECIA / CASTORAMA / ANSES





1 – Training Leader for the Textile Clothing Retail Pipeline

Renowned by professional for more than 60 years.

2 – More than 3000 actors and users of Textile and Clothing have benefited of our knowledge.

A support dedicated to everyone: designer, product manager, buyer, sourcing manager, merchandising responsible, quality responsible, R&D responsible.

3 – 4 modular training paths

Discovery Path : Actual training course on eco-conception, textiles structures, colour, product labels, intimate wear universe.

Evolution Path : A large panel of training course from A to Z that will take you to the art of textile.

Action Path : An individual customised support to implement an action plan directly applicable in your company.

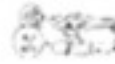
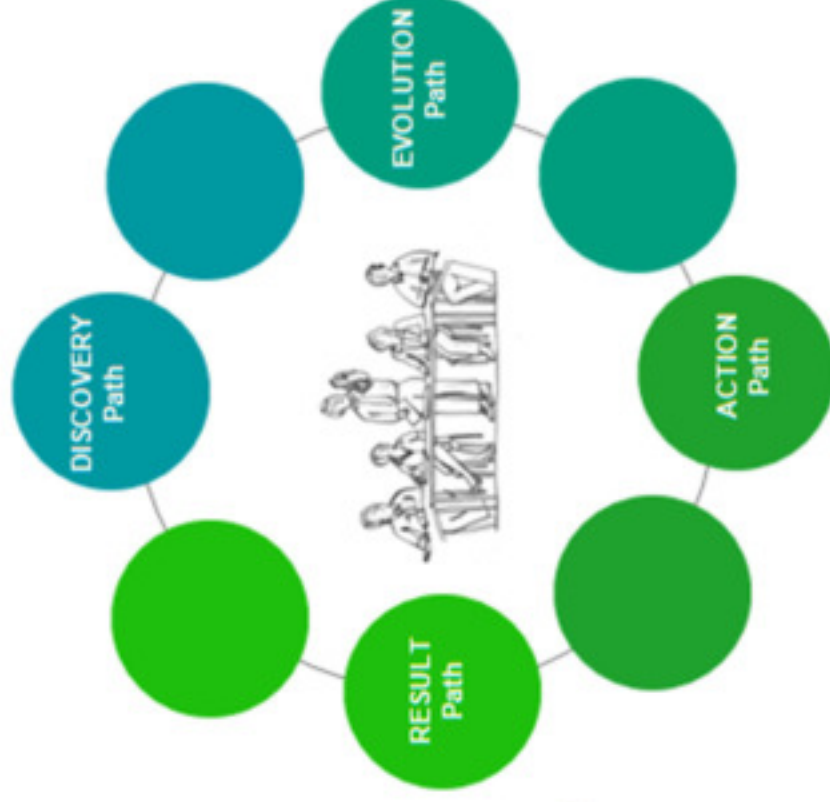
Result Path : Availability of customised tools (multi-criteria decisional matrix, dynamic reporting, road map) to measure one performances and benefit from a pertinent analysis done by IFTH experts.

4 - 60 expert trainers

Our expert trainers share their knowledge by putting their expertise at your service.

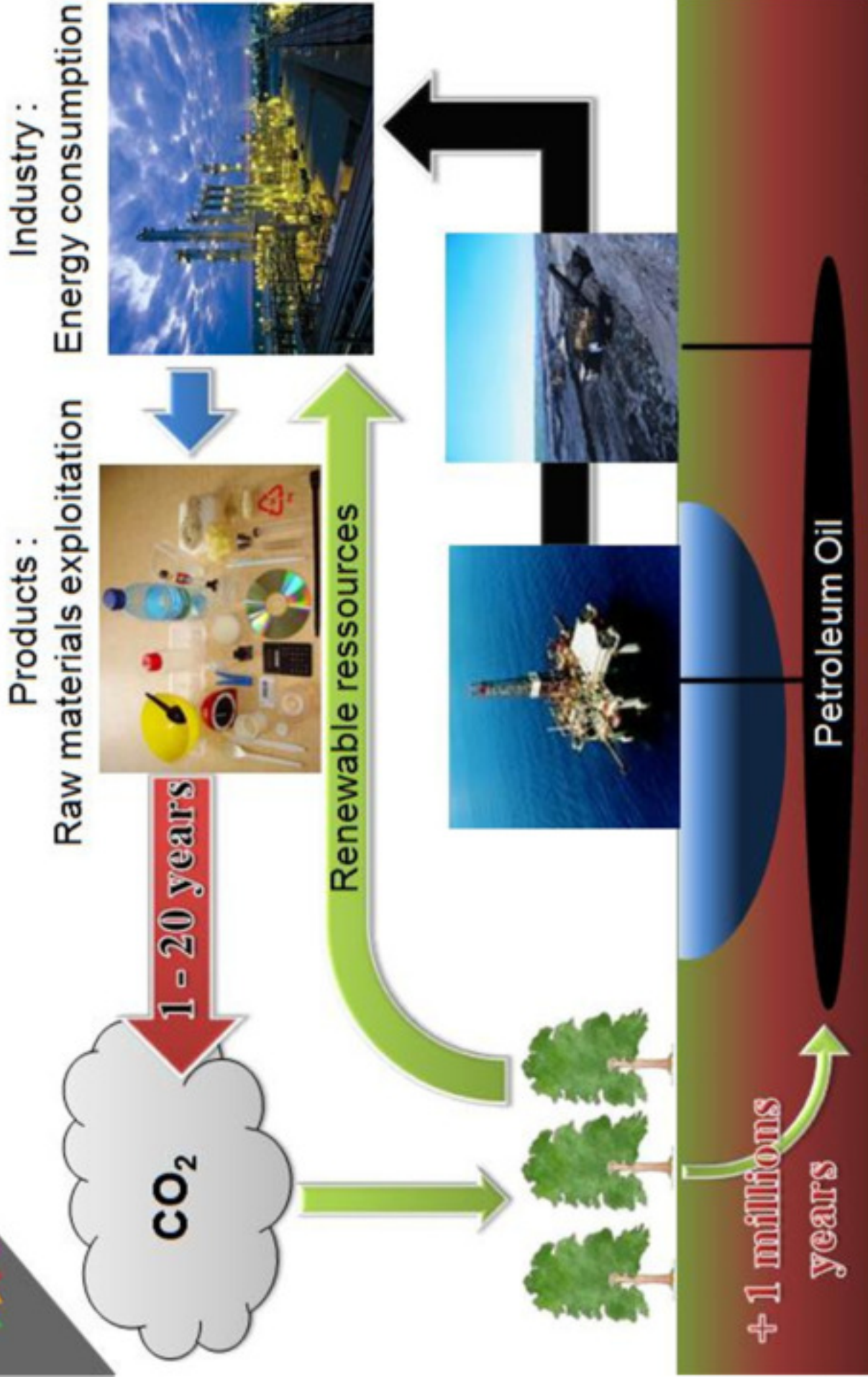
5 – A geographical proximity

Thanks to its network, IFTH is close to you in France and internationally.



MONOPRIX / AUCHAN / HEYTENS / EDEN PARK / PETIT BATEAU / DIM / QUIKSILVER

Context



- **Green chemistry**
 - **Modified vegetable oil**
 - **Investigation of 2 polymer synthesis routes**
- **Environmentally-friendly process**
 - **Overall energy consumption reduction by 67 %**
 - **Room temperature extrusion process**
 - **No solvent**

- **Agile production process**

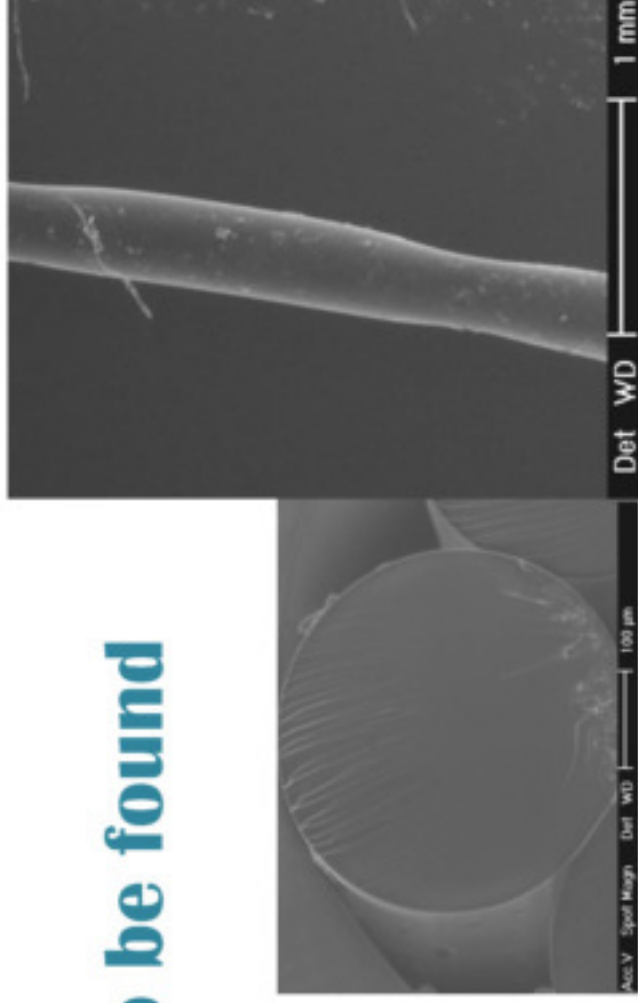
- **Compact automatized system**
- **Short time to production regim**
- **Low waste: solid, liquid, volatil organic compound (VOCs)**



New fiber spinning process

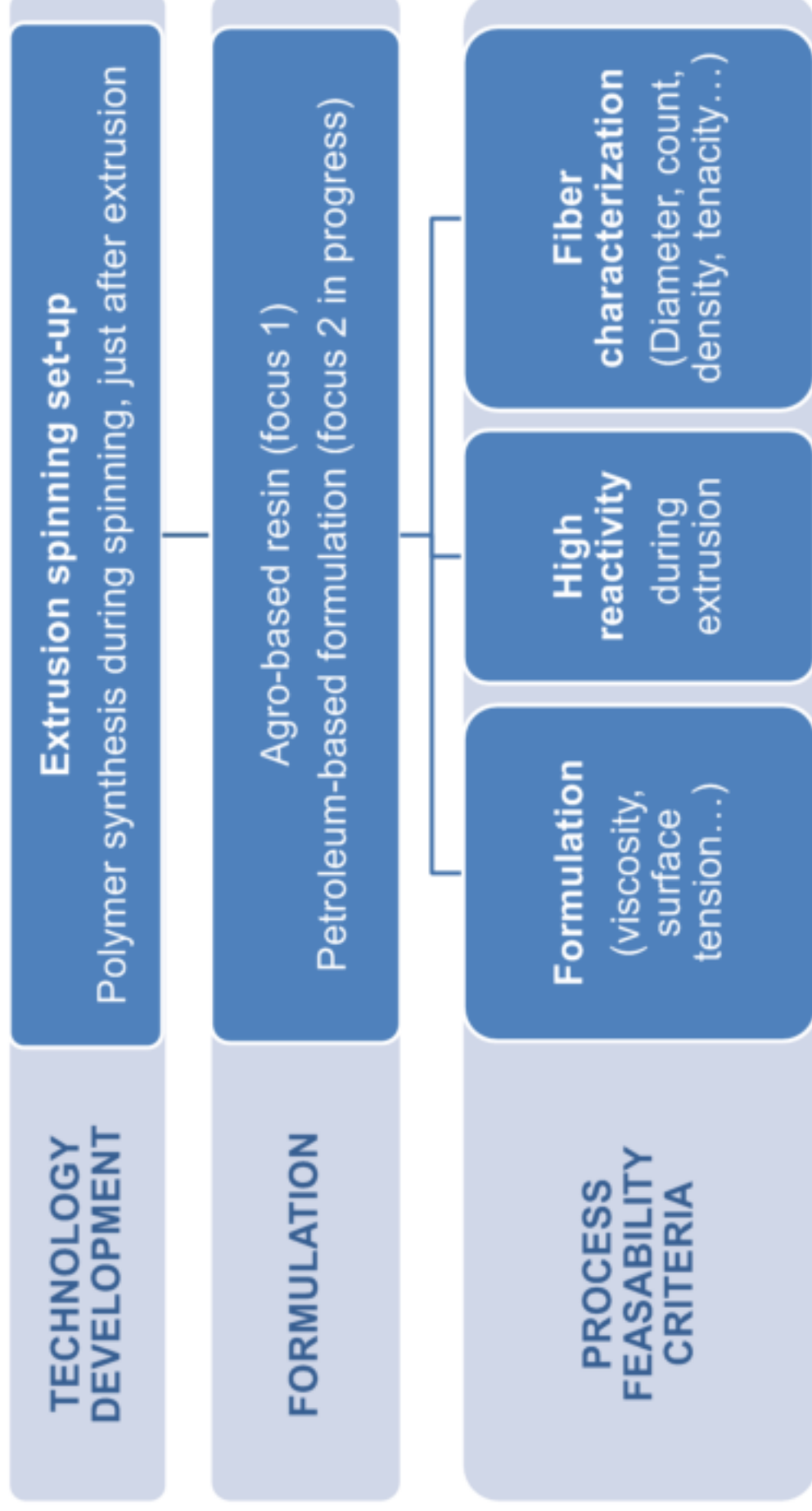
- **New paradigm yet to be found**

- **Not melt-**
- **Not wet-**
- **Not dry-spinning**

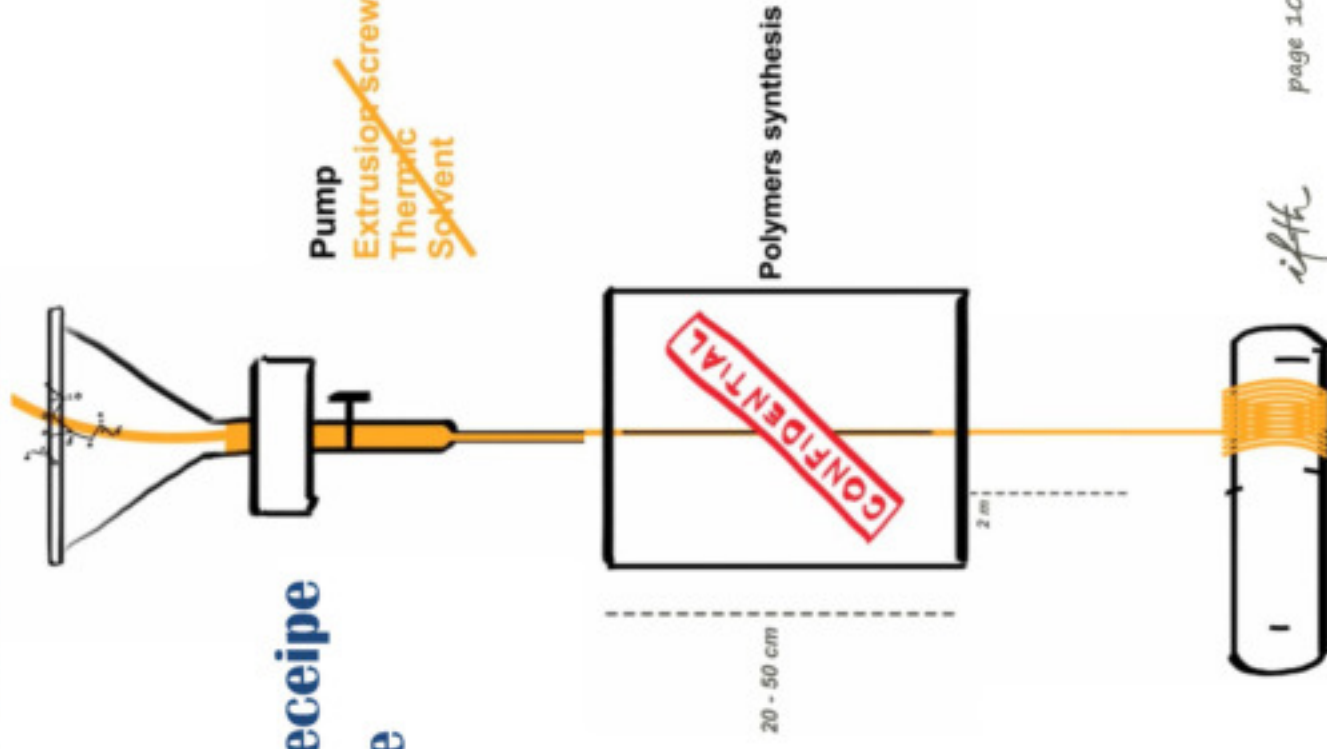


- **Turn key solution for niche market series**
 - **Low investment cost**
 - **Rapid set-up for steady production**
 - **High throughput, high reactivity, easy to clean**

Investigation methodology

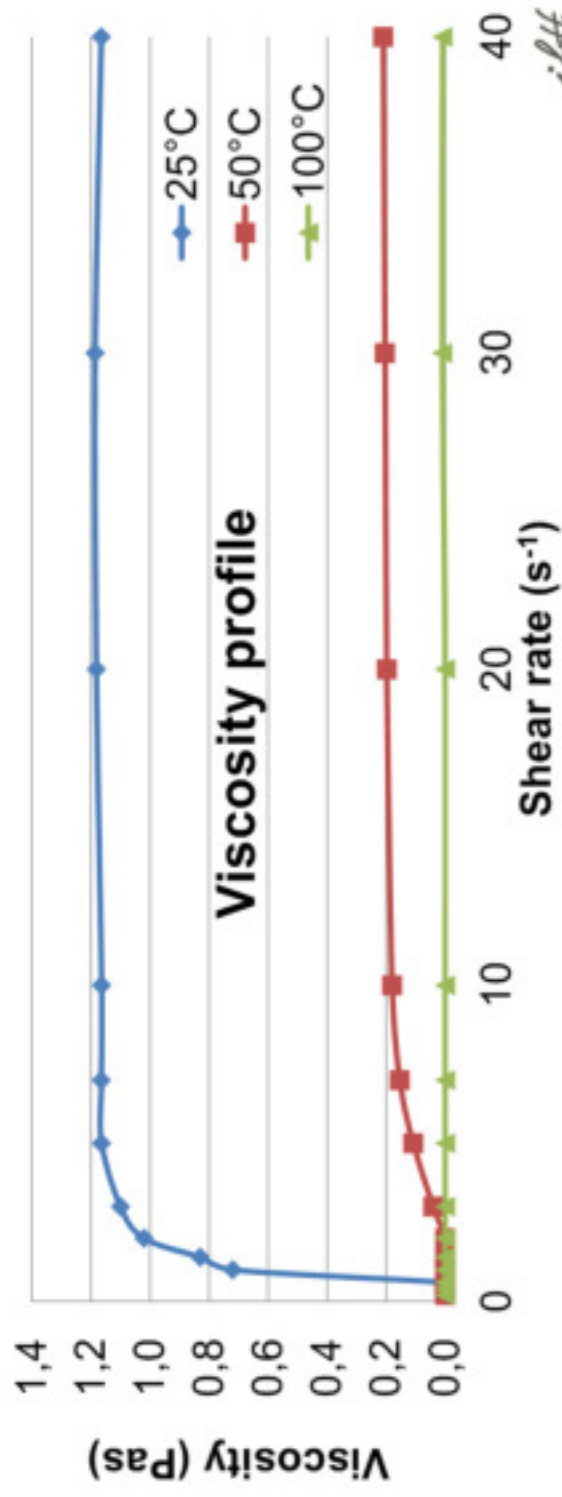
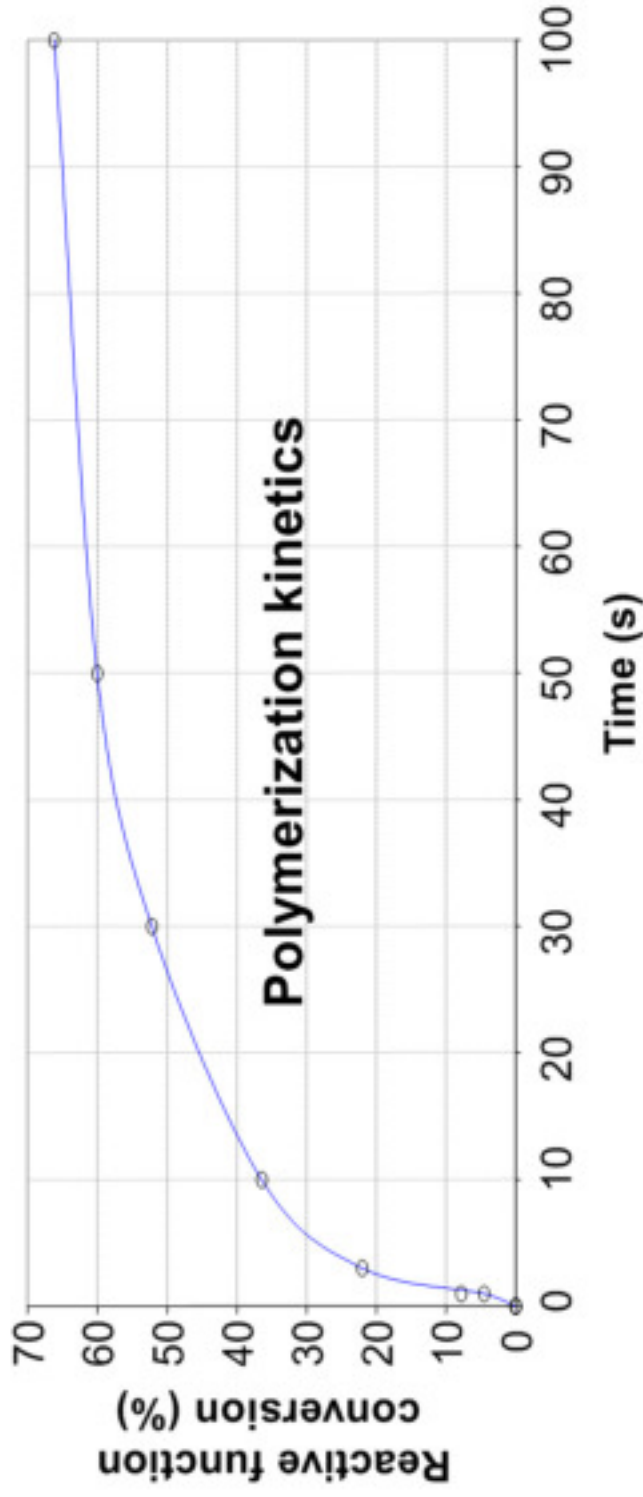


Lab process description



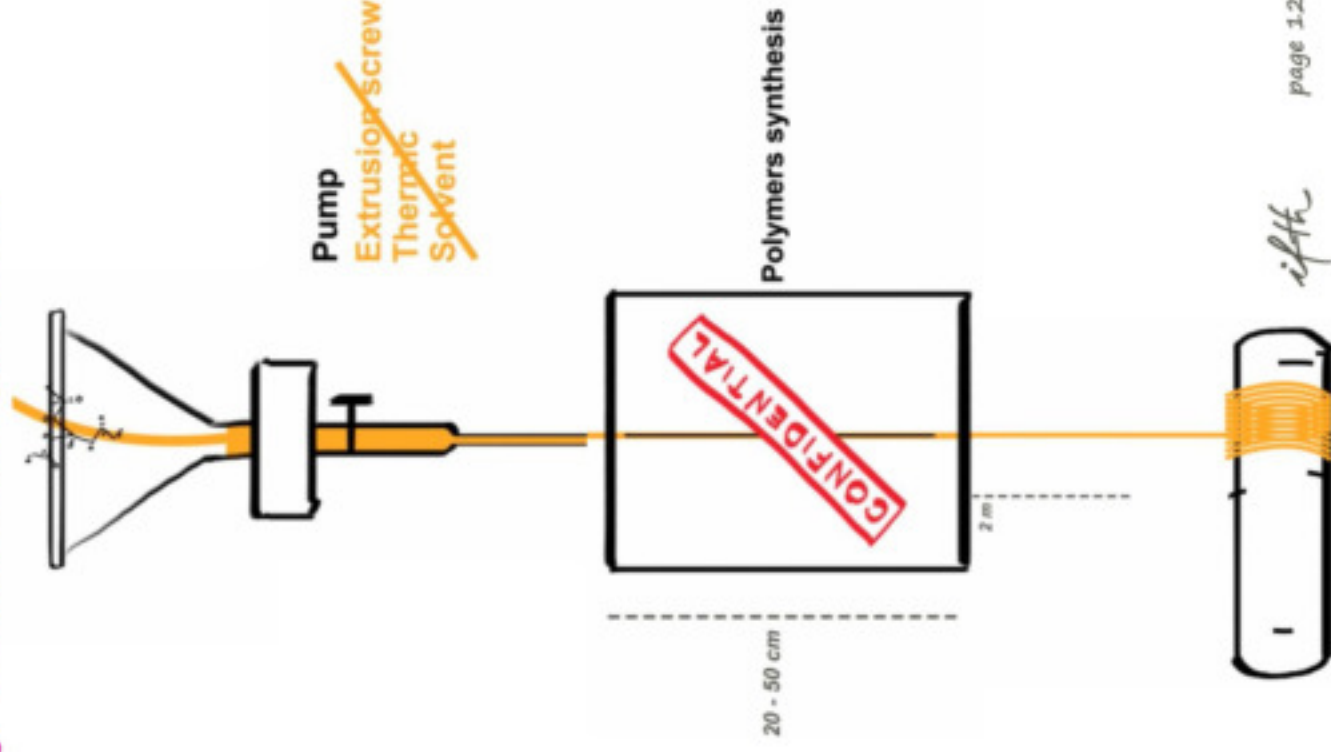
- **Mixture upstream preparation**
 - Adding compounds according to recipe
 - Stirring at room / low temperature (max 50°C)
- **Low viscosity mixture**
 - Working range : 1 to 4 Pa.s
- **Extrusion speed (lab scale):**
 - Throughput : 0.2 – 0.9 Kg/h
- **Total vertical space required**
 - ± 3 meters high process

Formulation characteristics



Process energy consumption

- **Extrusion :**
 - **Lab set-up**
 - Pump : 40 W
 - PC : 60 -90 W
 - **Pilot set-up**
 - Pressured reservoir
 - (compressed air) : ± 100 W
- **Polymer synthesis system :**
 - **Multi-scale unique set-up**
 - Equipment 1: 600 W
 - Equipment 2 : 1 500 W



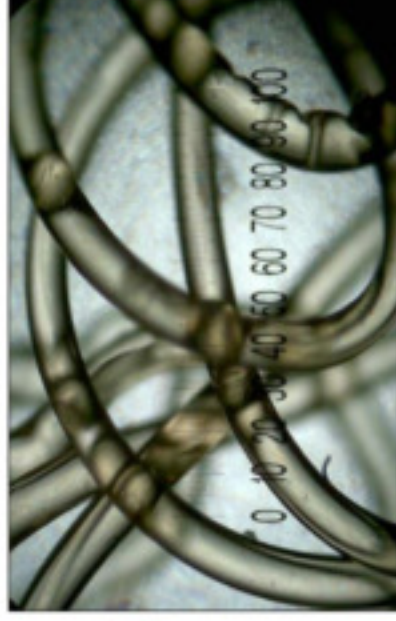
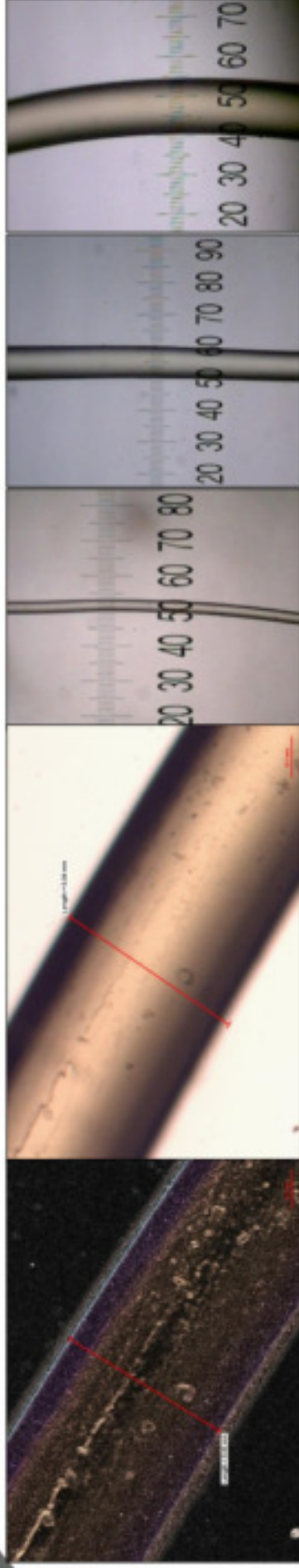
Raw material & formulation preparation

- **Current receipe**
 - **Modified vegetal oils : 100% solid content**
 - **Oligomers / prepolymers / monomers blends**
 - **Reactive diluant and / or viscosifiant**
 - **Reactive liquid adjuvants (3 to 5 %w)**

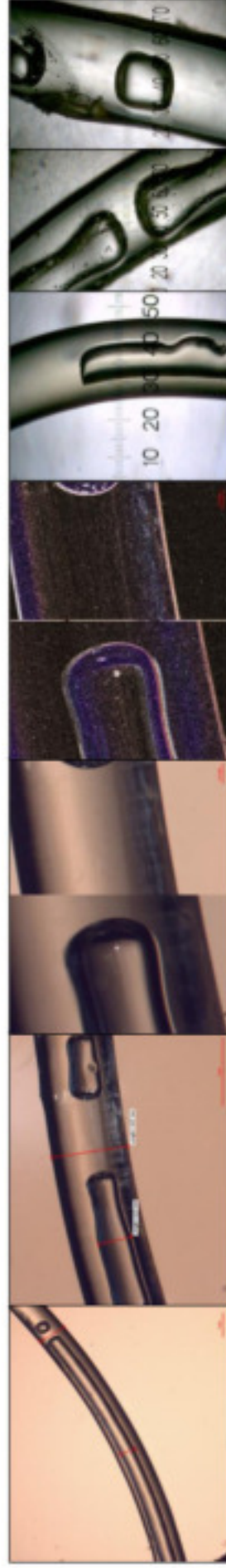


- **Multiple combination of blends possible**
 - **Genuine end-performances inherent to the process**
 - **Market-driven customized of formulations**
 - **Agro-based resin is not a requirement, just a bonus**
 - **Imagination...**

Success and difficulties



- Diameter range = 50 – 300 μm
- Spinning flaws remediation



- **Monofilament fiber (2Kg produced)**
 - **Diameter : 254 μm (spinneret diameter 580 μm)**
 - **Count : 485 dtex**
 - **Density : 0.6 < 1 \rightarrow floats in water**
 - **Force at break : 121,6 cN (to be promoted)**
 - **Tenacity : 2.4 cN/Tex (to be promoted)**
 - **Glass transition temperature Tg : - 8°C**
 - **Moisture regain : 4 %**



Further work : Perspectives

- **Downstream textile fiber transformation**

- Up-grade mechanical properties
- Production of longer filament



- **Search for industrial partnership**

- Fiber processing up-scaling
- Equipment investment efforts : ± 300 k€
- End-users markets identification in progress
 - Patent in progress
 - NDA required





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**Thanks to
academic, institutional
and industrial partners**

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