

BLUENET

Creating new life for discarded fishing and aquaculture gears to prevent marine litter

Recycling operation and Development of PA and PE/PP compounded pellets for textiles target products (ropes and textile wear)





- 1. Collection of a representative waste samples: Hand Sorting by type of net and aquaculture rope
 - Stream 1 & 2: Polyolefinic & Nylon fishing nets
 - Stream 3: Ropes used in mussel aquaculture
 - Stream 4: Ropes used as holding elements in aquaculture
- 2. Identification of polymer type (Composition & impropers)
- 3. Selection of the target waste sub-streams:
 - For Polyolefinic Target (Stream1, SS 3 (G type rope) and S4).
 - For PA target (Streams 2)
- 4. Recycling process development.
- 5. Upgrading of recycled materials at lab scale (PA and PO fractions)
- 6. Evaluation of process specification (multifilament) and functional specification (mechanical properties).
- 7. Development of upgraded pellets at pilot scale (80-200kg) for

AQUICULTURE ROPE PROTOTYPES.











Support of BIDEZAIN Company

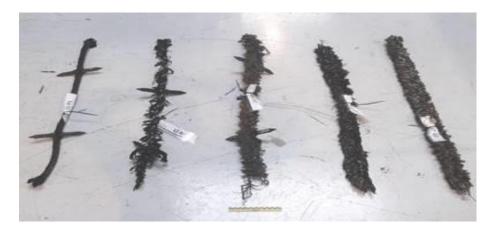


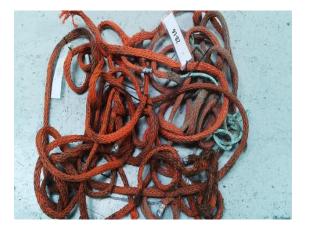




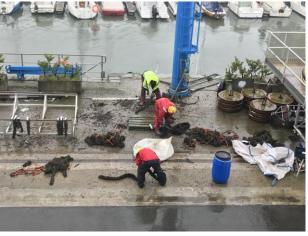




























Recycling Process for Fishing Nets (Stream 1 and 2)

- 1. Size reduction by Shredding
- 2. Float Sink (and Washing) for the removal of impurities and foreign materials
- 3. Drying
- 4. Pelletizing by extrusion







Recycling Process for Aquaculture Ropes (Stream 3 and 4)

- 1. Washing with a pressure gun
- 2. Washing at 40°C
- 3. Shredding
- 4. Float Sink
- 5. Drying
- 6. Pelletizing by extrusion





Main drawbacks/limitations of the recycling process

1. Fishing nets:

- An appropriate selective collection of the nets needs the support and implication of the authorities (Basque Government), the fishermen and the Waste Manager of the Port
- 2. Physically difficult to transport and manage the fishing nets due to the high weight presented and their morphology
- 3. A pre-cutting stage is necessary before the fishing net is crushed
- Expectation of a high cost recycling process according to the actual price for the recycled pellets – Technical vs Economical Feasibility

2. Aquaculture Ropes:

- 1. High organic matter presents in the ropes for mussel production
- 2. Many stages for an appropriate washing of the material
- 3. Prediction of a high cost recycling step related to the washing requirements
- 4. Serious doubt about the Economical Feasibility: Opportunity for bioplastics



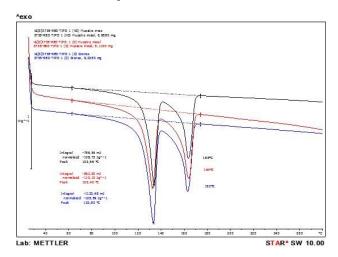




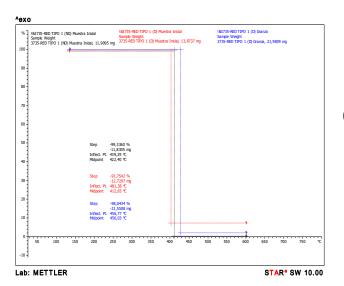
SELECTION OF STREAMS AND MATERIALS UPGRADING VIA COMPOUNDING



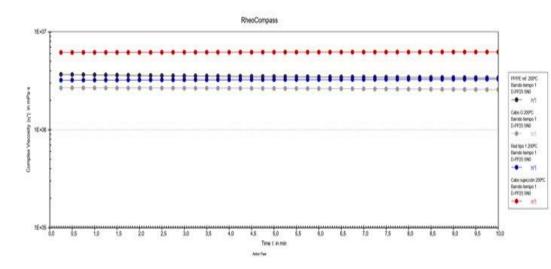
- 1. VIRGIN MATERIALS AS REFRENCE.
- 2. Evaluation of PA and PO fractions composition.



- 3. Evaluation of state of degradation (rheology).
- 4. Selction of additivs (MAXIMIZE RECYCLED CONTENT)



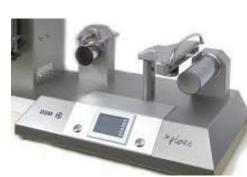
Composition





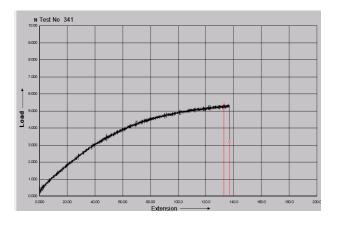
ITERATIVE COMPOUNDING AT LAB SCALE. SELECTION OF FINAL COMPOUND



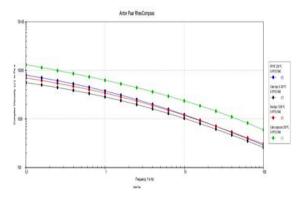








Tenacity (g/d)



Viscosity

Target properties evaluation

ADDITIVE 1 (%) ADDITIV 2 (%)



Spinning/stretching of monofilament



SELECTION OF FINAL PA AND PO COMPOUNDS



PROCESS UPSCALING. BATCH PROTOTYPES











Lab scale compound







