**Massimo Pizzol Aalborg University Denmark**

We can cover this task:

·         Provide evidence with life cycle and techno-economic assessment (LCA/TEA) that the cost for the novel advanced biodegradable polymer products are not significantly higher compared to existing polymer products (PE, PP, PET) on the market.

More specifically our contribution can be in these areas (some or all depending on budget available):

* LCA and LCC based on primary data from the consotium on the TRL5 and TRL6-7 technologies selected and for a range of algal biomass types and production sites as well as processing technologies
* Same for TEA. To be honest we don’t have direct experience with that but I have been co-author in some TEA papers, we can built it up this expertise, it’s very similar to LCA and takes some of the same data. Or we can work on this task together with some other partner in the consortium.
* Simulation of upscaled / industrial scale scenarios for the technologies where we don’t have primary data (TRL7 and more).
* Simulation of end of life treatment scenarios and their assessment
* Carbon and nutrient mass balances for the business models selected for upscaling to show the degree of circularity
* If needed, analysis of biomass availability of supply considering wild and cultivated harvest and constraints to reach upscale. Honestly we have already done it in other projects not sure we can be so innovative here. Unless there is some new angle (I will need to read the initial proposal ideas to better formulate this).
* We also have the opportunity to include social scientists from our department for a social assessment if budget allows. Social acceptance of the new products and social impacts in the value chain. Some of them also work with circularity indicators and circular ecodesign and circular business models if needed.

We usually have all material needed for the part A relatively quickly so let me know how you I need to proceed there (if you prefer me to input the infor direclty in EU portal or I should send in a tempalte or other).

I agree with the comment mentioned at the meeting that one key aspect is that we will be competing with proposals “betting” on other types of feedstocks. Need to put up a strong rationale on why seaweed is a promising resuorce (e.g. no land competition with food cultivation).

**EURECAT Spain**

Our contribution in the project could be in 3 different activities:

* To improve the bioplastics formulation by extrusion compounding
* Rheological, thermal and mechanical characterization
* Bioplastics processing by casting (film manufacturing), injection moulding, thermoforming or melt extrusion (multifilament for textile) or monofilament extrusion (for 3D printing)

Also, Eurecat has a patent for increase the additives and nanoadditives  dispersion into bioplastics (US-assisted extrusion compounding) that could help to improve the film barrier.

**NTNU Norway Prof. Finn Aachmann**

Partner description

NTNU Dept. of Biotechnology and Food Science, represented by Professor Finn L. Aachmann (Biopolymer structure and interaction). Aachmann has been working on structure determination with NMR spectroscopy proteins and carbohydrates. As part of the Biopolymer and Biomaterial group we have access to marine biopolymer, biomaterial, NMR and rheology characterization resources and labs. In addition, Aachmann has experience with biorefinery of seaweed, modification of polysaccharide and physical-chemical characterization of biopolymers. Leader for the projects AlgModE RCN (Research Council of Norway) 1200k€), Alginate modifying enzymes can be relevant for the proposal; Norwegian Seaweed biorefinery platform (SBP-N 4800k€). Partner in Projects Mar3Bio (ERA-MBT, 3.4M€), SNAP (Blue-Bio, 2.1 M€), GP Seaweed (RCN, 1.1M€) focusing on seaweed valorization, RI Seaweed (RCN, 7.6M€) on research infrastructure for seaweed research, Norwegian NMR platform (RCN, 7.8 M€) and Centre for Research-based Innovation within industrial biotechnology (RCN; 18,7M€).

In BioMAT-Alg, NTNU can contribute to the biorefinery of seaweed, chemo-enzymatic modification of polysaccharides, characterization of polysaccharide products, and biomaterial characterization. NTNU will make scientific contributions by applying relevant competence and established methodology.

* NTNU can contribute to the consolidated biorefinery of seaweed, with a focus on polysaccharides (Laminarin, fucoidan, alginate and cellulose). This contribution encompasses chemo-enzymatic processing of seaweed biomass
* NTNU can contribute with upgrading of alginate using alginate modifying enzymes like epimerases and lyases.
* NTNU can contribute to the structural and compositional characterization of seaweed biomass. Additionally, NTNU can provide characterization using the following techniques: NMR for structural elucidation, CD for conformation determination, ITC for molecular interaction, SEC for analytical and preparative separation, HPAEC-PAD for carbohydrate sequencing, and SEC-MALS for MW and chain flexibility determination. Furthermore, NTNU specializes in mechanical and rheological characterization of biopolymer-based gel systems.
* NTNU can contribute expertise in polysaccharide engineering for different biomaterials and applications.

Infrastructure at NTNU

**The Biopolymer lab** includes size exclusion (SEC) and ion exclusion (IEC) chromatography system ranging from analytical to semipreparative up to 10 g scale, isothermal titration calorimetry (ITC), circular dichroism/optical rotatory dispersion (CD/ORD), SEC-MALS (multi-angle light scattering), high-performance anion-exchange chromatography with pulsed amperometric detection (HPAE-PAD) system, surface plasmon resonance (SPR), and lyophilizers.

**The Rheology lab** is equipped with three rheometers with various geometries, two texture analysers, mastersizer for zeta potential and particle size, dissolution apparatus and multiple ultra turrax homogenisers.

**The NMR lab** (part of NNP) Provides access to 5 x Bruker AVIII HD or newer NMR spectrometers (800 and 600 with TCI cryoprobe, and 600, 400 and 80 MHz instruments).

Shared infrastructure with Sintef Industry

**The seaweed lab** (part of RI Seaweed) equipped with 120 L stainless steel processing tank with heating and steering, 30 L Orb glass processing tank with temperature regulation and mixing, spray drier (<2 kg batch size), Ambr crossflow system for high-throughput separation and characterization of biopolymers, vacuum filter (<30 L batch size), Rotovapor (10 L batch size), filter presses 4S+8S, elemental CHNSO analyser, and industrial grinder (500 kg/h).