



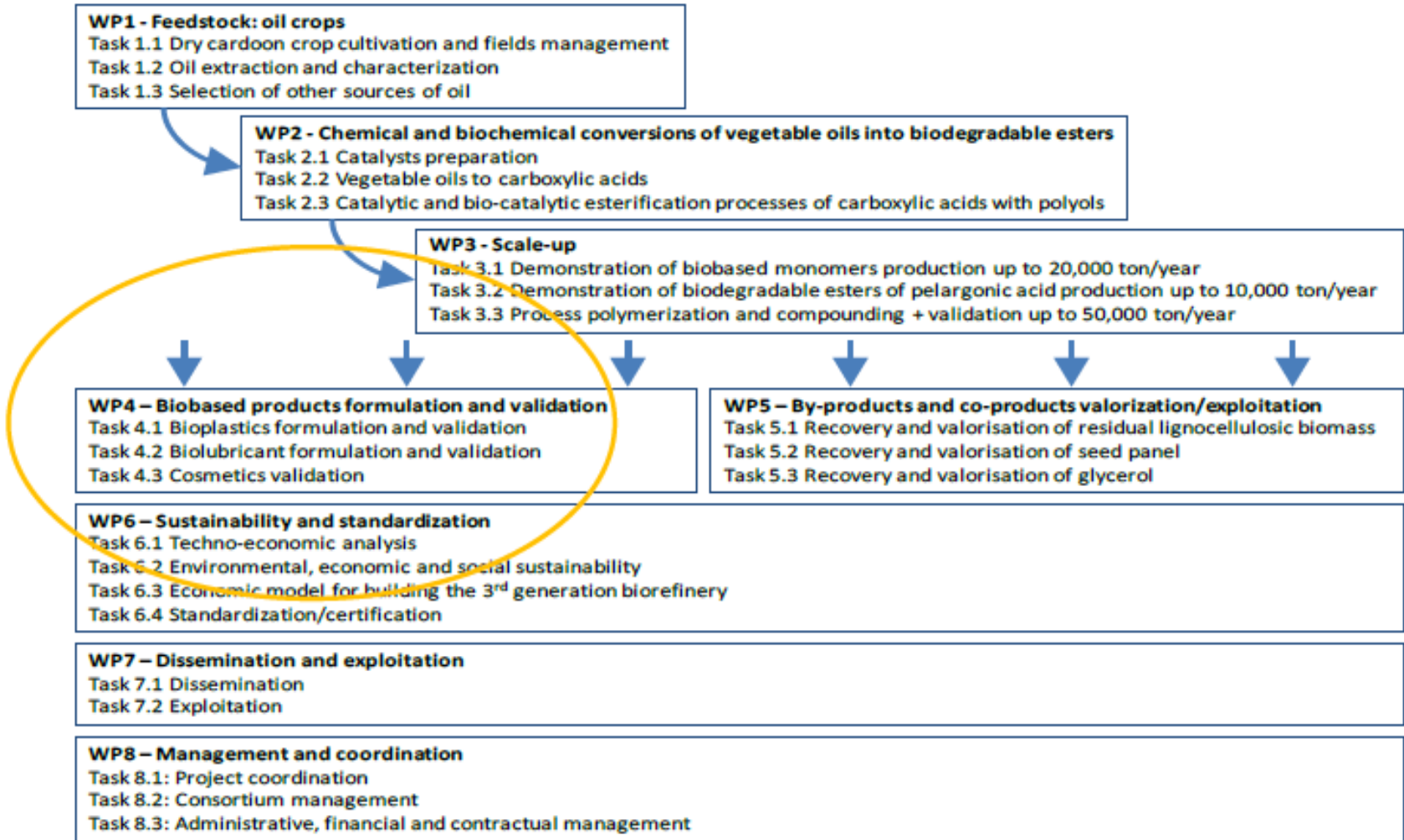
FIRST2RUN

Flagship demonstration of an integrated biorefinery for dry crops sustainable exploitation towards biobased materials production

WP4 : Biobased products formulation and validation M18-48

3rd plenary meeting, Alghero,
15th July 2016

WP & Activities





WP4 summary

■ **Main Objective:**

To validate the bio-based materials produced in *WP2* (biodegradable esters – *Matrica*) and *WP3* (scale-up of *WP2* - *Novamont*) within the formulation of biobased products, i.e. **biolubricants**, **bioplastics** and **cosmetics**.

■ **TASK 4.1** – Bioplastic formulation and validation

Obj: at least one biobased polymer for bioplastic.

TASK LEADER: Novamont

■ **TASK 4.2** – Biolubricant formulation and validation

Obj: at least one formulation of a tested biodegradable lubricant for agriculture application

TASK LEADER: SIP INVOLVED: Novamont, Matrica

■ **TASK 4.3** – Cosmetics validation

Obj: 3 to 5 finished cosmetic products for different applications.

TASK LEADER: Elementi



WP4 deliverables

The WP starts in January 2017

- **D4.1** Prototype of a machine for the use of the organic/inorganic additives into biobased polymers. **Month 36**
- **D4.2** Prototype of a new biobased material for packaging applications. **Month 48**
- **D4.3** Formulation and validation of one biobased lubricant. **Month 48**
- **D4.4** Formulation of one palm oil free biobased compound and validation through further applications in cosmetic and personal care products. **Month 48**



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Task 4.2 Biolubricant formulation and validation

Mike Peters

SIP Ltd

Biolubricant formulation and validation

Two objectives.

- 1. Establishing range of Ester basestocks.**
- 2. Development of bio lubricants.**

1. Establishing range of Ester basestocks

Three esters have been produced from C5 and C9 fatty acids, from the Matrica process, which have been esterified with a range of alcohols. These esters are an NPG Pelargonate, TMP Pelargonate and a PE complex Pelargonate / Valerate.

Their viscosities at 40°C range from 8 cSt, 22 cSt and 68 cSt respectively.

These can be blended to establish a range of viscosities required for industrial lubricants.

Biolubricant formulation and validation

2. Development of bio-lubricants.

Sample of all three esters have now been received by SIP. A programme has been devised to ensure that the esters meet the performances required in a range of physical tests for industrial oils. These include foaming, demulsibility, air release, hydrolytic stability & low temperature fluidity.

Contact has been made with lubricant additive companies, who market products for use in biodegradable lubricants. Selected ones will be used with the esters to establish important finished lubricant performance. This will include oxidation stability, friction & wear reduction, volatility & biodegradability.

The objective from this work is to gain European Ecolabel plus proof of performance for the relevant type of lubricant, e.g. ISO 15380 for hydraulic oils.



Biolubricant formulation and validation

Summary

A range of three esters with acceptable viscosities has been established, with initial physical characteristics looking encouraging.

A programme of development work has been drawn up to confirm performance against a number of significant test criteria.

Lubricant additive companies, who market products for use in biodegradable oils, have been contacted for samples and cooperation in testing.

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Task 4.3 Cosmetics validation

Federica Carlomagno
Elementi Srl

Cosmetic prototypes production

- To check project feasibility, **4 esters** were produced and selected at **lab scale** in Matrica, starting from **pelargonic acid**.
- **5** different **prototypes** of cosmetic finished formulas were made.
- **Commercial names**, linked to esters' skin feel were suggested:
 - Silky Ester – Neopentyl glycol dipelargonate
 - Rich Ester – Pentaerythrytyl Tetrapelargonate
 - Light Ester – Tripelargonin
 - Soft Ester – Polyglyceryl-2 tetrapelargonate

- **Prototype 1 - DAMAGED HAIR LEAVE-ON TREATMENT**
containing Neopentyl Glycol Dipelargonate
- **Prototype 2 - FUCHSIA INSPIRATION**
containing Pentaerythryl Tetrapelargonate and Polyglyceryl-2 Tetrapelargonate
- **Prototype 3 - LIGHT FOUNDATION**
containing Neopentyl Glycol Dipelargonate and Tripelargonin
- **Prototype 4 - SUN SPRAY OIL SPF 15**
containing Neopentyl Glycol Dipelargonate and Tripelargonin
- **Prototype 5 - HYDRATING CREAM**
containing Polyglyceryl-2 tetrapelargonate





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Thank you for your kind attention