



SPIRE and Catalysing the Circular Economy BROKERAGE EVENT

3-4 October 2017

REVALORIZATION OF CITRUS PEELS THROUGH ENERGY EFFICIENT TECHNOLOGIES

Paola Castrillo
paola.castrillo@vertech-group.com

VERTECH-GROUP

Engineering company from France-SME:

- (i) Sustainability assessments; LCA, LCC, Social LCA,*
- (ii) Ecological footprint,*
- (iii) Resources and energy efficiency assessments,*
- (iv) Technological and environmental risk assessments*
- (v) Circular economy business models,*
- (vi) Risks assessments,*
- (vii) Social acceptance analysis,*
- (viii) Production modeling and optimized waste collection and prevention.*



EUROPEAN PROJECTS

H2020 & FP7:

- **Nanopack**/18 Partners/11 countries/8M€
- **Karma2020**/16 Partners/9 countries/6M€
- **CloseWeee** /12 Partners / 6 Countries / 6M€
- **Ecoxy**/13 Partners/8 countries/5M€
- **Ecobulk**/29 Partners/10 countries/10M€
- **ValueMag**/Partners/9 Countries/5M€
- **Ligniox**/10 Partners/7 Countries/4M€
- **CH2P**/8 Partners/ 5 countries / 4M€
- **Aquanes**/ 30 Partners / 9 Countries / 8.7M€
- **PrecoM**/ 17 Partners/7 Countries/6M€.
- **JOIN'EM**/14 Partners/6 Countries /4M€
- **Fuel from Waste** / 8 Partners / 7 Countries / 3.6M€
- **Grail**/15 Partners/ 10 Countries / 6M€
- **Innobite**/ 9 Partners / 6 Countries / 4M€
- **Water4India**/ 15 Partners / 9 Countries / 4M€
- **Noshan**/ 12 Partners / 7 Countries / 4M€



REVALORIZATION OF CITRUS PEELS THROUGH ENERGY EFFICIENT TECHNOLOGIES

- **THE CONCEPT:**

Eco-Friendly Extraction of Pectin and Essential Oils from Orange and Lemon Peels. Results obtained at laboratory and semi-industrial scales: high yields and quality of the bioproducts obtained. These results, together with the environmental viability of the process support forthcoming commercialization of the technology.

- **KEY COMPONENT-SPIRE ROADMAP:**

1. *Feed: Increased energy and resource efficiency through optimal valorisation and smarter use and management of existing, alternative and renewable feedstock.*
2. *Waste2Resource: Avoidance, valorisation and re-use of waste streams within and across sectors*

- **TOPIC:**

CE-SPIRE-02-2018: Processing of material feedstock using non-conventional energy sources (IA)

EXPECTED IMPACT

- **Citrus Value Chain:** (i) Improvement in energy efficiency of at least 30%, (ii) Improvement in resource efficiency of at least 30%, (iii) Decrease in CO2 emissions by at least 40%, (iv) Decreased OPEX and CAPEX by at least 15%.
- **State-of-the-art:** (i) pectin extraction from citrus peel via hydrolysis in hot water under tightly controlled conditions, (ii) Essential Oils: mechanical treatment of the citrus fruit or via steam-distillation.
- **Cross sectorial:** Energy reduction in industrial processes through the implementation of green technologies for biowastes valorization (e.g. microwaves, ultrasound, ball-milling, etc.).

EXISTING PROJECT CONSORTIUM

PARTNER PROFILE	ROLE
Bio-Based Industry /Italy	Coordinator
Research Center /Italy	Technology Developer SPIRE Member
Research Center/Spain	Technology Developer SPIRE Member
SME/UK	Expert in Energy Efficiency and Exergy assessments. SPIRE Member
SME/France	Expert in Sustainability Assessments/Technical Coordination. SPIRE Member
SME/Germany	Expert in Business Models and Exploitation

REQUIRED PARTNERS

PARTNER PROFILE	ROLE
SMEs/Industries	End-users of the final products that will be implemented in the food, cosmetic, medical and/or pharmaceutical industries
SMEs/industries	Specialized in (i) developing high-quality natural food ingredients, (ii) drugs encapsulation and (iii) development of cosmetic and personal care products, being also able to test the quality of the final products.
Poles / Clusters	Support in social acceptance studies of the final products (e.g. for instance to recruit people for focus groups).

CONTACT DETAILS

Dr. Paola Castrillo

paola.castrillo@vertech-group.com

11 rue Defly 06000 Nice-France

Calle Almagro, 25, 28010 Madrid-Spain

Skype: paolacastrillovg



***Innovating the present,
imagining the future***