

Novel technology for a more cost-efficient production and promising use of nanocellulose fibres for new applications

Summary

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| Profile type | Company's country | POD reference |
| Technology offer | Austria | TOAT20220421017 |
| Profile status | Type of partnership | Targeted countries |
| PUBLISHED | Commercial agreement with technical assistance | • World |
| Contact Person | Term of validity | Last update |
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General Information

Short summary

An Austrian SME developed a patented process and built a mobile plant to produce nanocellulose fibrils out of organic materials at low costs. Thus fibrils are transformed from a high-priced niche product to a product for a broad range of applications such as functional papers and packagings, inks and varnishes, lightweight composites, medical implants, building materials, cosmetics, aerogels or hygiene products. The company is seeking a commercial agreement with technical assistance.

Full description

The SME innovative vision is to develop the most efficient, sustainable, economically viable, and environmentally friendly production technology to fulfil the growing and promising demand for nanocellulose fibrils for usage in various applications.

Nanocellulose is a promising natural nanomaterial and has gained attention due to its advantageous properties that can be used in several important areas. Nanocellulose fibrils are a fibrous nanoparticle, which is obtained from sustainable organic material such as wood, plants, waste paper or other fibrous residues. The nanofibers have a diameter of 5-100 nm and a length of several μm .

PROBLEM DESCRIPTION

Currently nanocellulose fibrils are solely used in R&D and in some, high-priced special applications. The price for fibrils (10.000 – 100.000 €/ t nanofiber) is too high to enable broader application if produced with state of the art

technologies.

DESCRIPTION OF THE SOLUTION:

An industrial-sized mobile demonstrator plant is in operation that is capable to produce fibrils at costs of 2800 €/ t, enabling the use of fibrils for various applications. The plant is capable of producing 25kg otro / day (24h operation) nanocellulose. The pulp (1-8 % density) is broken down into nanofibrils by a strong shear field and by high pressure. The plant can also grind pulp and pre-treat it enzymatically to reduce the overall energy requirement.

APPLICATION AREAS:

Nanocellulose fibrils are used to optimize specific properties of products:

1. Rheological properties (thickeners, flow inhibitors, binders)
2. Strength properties (fiber composites, thin papers, high strength cartons)
3. Barrier properties (gas-tight e.g. Tetra Pak - replacement of aluminium, plastic free transparent food packaging)
4. Carrier material for other chemical substances, enzymes etc..

The fibrils can replace toxic substances or can enable applications where there are no other solutions.

Specific application areas

- Packaging (greaseproof, gasproof, biodegradable, transparent films, replacement of aluminium)
- Ink and varnish (No vibration or impact caused cracking , no dripping, improved adhesion etc.)
- Car parts (bumpers, interior linings, recyclable composite components)
- Medical implants
- Building materials (wood composites, technical textiles, fiber-reinforced cement)
- Cosmetic products (sunscreens, wet wipes)
- Functional papers (release paper, wet-strength paper, high-strength cartons, thin paper)
- Aerogels for the oil and gas industry (temperature stabilized drilling fluids)
- Hygiene and absorbent products (diapers, skin-compatible plasters)

THE AUSTRIAN COMPANY IS LOOKING FOR manufacturers to implement reference projects at the production sites of potential partners. In this sense a commercial agreement with technical assistance is sought.

Advantages and innovations

1. Production costs:

About 1/4 compared with state of the art techniques (<2800 €/t high quality nanocellulose fibrils vs. >10.000 €/t)

2. Investement costs:

About 1/30 compared with state of the art techniques (1 Mio € vs. 30 Mio €)

3. Output:

About 17/1 compared with state of the art techniques (output scalable to ~17 t Nanofiber/day per production line vs. ~1 t/day)

Stage of development

Available for demonstration

Sustainable Development goals

- **Goal 12: Responsible Consumption and Production**
- **Goal 9: Industry, Innovation and Infrastructure**

IPR Status

IPR granted

Partner Sought

Expected role of the partner

The Austrian company is looking for manufacturers of paper, packaging, ink and varnish to implement initial trial reference projects at the production sites of potential partners. Therefore nanocellulose fibers from the existing, mobile prototype can be used.

Subsequently to initial trials the Austrian company could implement the adaptation of the plants for the user of nanocellulose for industrial scale applications.

Companies could use the nanofibers to enhance their products properties. Examples listed below:

1. Paper & Packaging Manufacturers for Special Applications

- 1.1 Gas tightness (food packaging)
- 1.2 Compostable & Recyclable
- 1.3 Greaseproof (e.g. sausage paper)
- 1.4 Tear strength
- 1.5 Increase stiffness (e.g. stacking cartons)
- 1.6 Optimize printability of cartons & paper (packaging board / paper, photo paper)

2. Ink and varnish manufacturers (water-based)

- 2.1 No cracking due to vibration (e.g. automotive)
- 2.2 Impact resistance (e.g. automotive)
- 2.3 No dripping during painting (rheology)
- 2.4 No need for adhesion promoters on e.g. emulsion paint on sheetrock wall

Companies & Institutes from other industrial sectors (e.g. car parts, medical implants, cosmetic products, aerogels or hygiene products) are welcome too in case that they have ideas to use nanocellulose fibrils within their applications.

Type of partnership

Commercial agreement with technical assistance

Type and size of the partner

- **Big company**
- **SME 11-49**
- **SME 50 - 249**
- **SME <=10**
- **R&D Institution**
- **University**

Dissemination

Technology keywords

- **02005004 - Packaging for materials**
- **02005001 - Foil, films**
- **02007004 - Colours and varnish**
- **02007006 - Fine Chemicals, Dyes and Inks**
- **02007013 - Paper technology**

Targeted countries

- **World**

Market keywords

- **09004006 - Packing products and systems**
- **08001004 - Fibre-reinforced (plastic) composites**
- **08001007 - Coatings and adhesives manufactures**
- **09004007 - Printing and binding**
- **08001008 - Membranes and membrane-based products**

Sector groups involved

Media

Images



[Mobile demonstrator plant](#)

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[Structure of wood pulp fibres](#)

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[From tree to nanofibrils](#)

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