

Flax and hemp fibres: the biobased solution for the composites industry

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Flax and hemp fibres are high-quality resources that are available in quantity. These plant-sourced raw materials can make sustainable industrial innovation economically competitive. What is the state of the art in the flax and hemp composite industry in 2019?

In only a decade, the flax and hemp industry has met the challenge of a constantly changing market and now offers a broad range of semi-finished products that demonstrate the technological potential of flax and hemp in the composite industry. The adoption of natural fibre reinforcements for composites can provide significant added value thanks to the unique properties of these materials. In addition to reduced environmental impact, NFC have many remarkable properties such as vibration damping, moisture sensitivity, acoustic properties etc.

The market position of natural fibre composites

The market position of natural/biobased fibres in composites is not well documented. A recently published study that was compiled by Nova Institute and edited by FNR presents detailed data for both Natural Fibre Composites (NFC) and Wood Polymer Composites (WPC).

In 2012, biobased composites were mainly used in decking, siding, fencing and automotive whereas in 2017 there has been a strong growth in other application areas (technical, furniture and consumer goods) as shown in Table 1.

Production and supply

The value chain, from flax and hemp farmers via fibre extrac-

tion and refining companies up to producers of rovings and yarns, is very well integrated. In Europe, where most of the flax and hemp fibres are produced, the actors in this value chain are grouped in the CELC, the European Confederation of Flax and Hemp. It is the only European agro-industrial organization to unite all the stages of production and transformation of flax and

hemp. Founded in 1951, it is the privileged intermediary for 10,000 European enterprises across 14 countries, overseeing fibre development from plant to finished product.

The production of flax fibres dm and cm is concentrated in three countries: France, Belgium and the Netherlands and represents 218 300 tonnes or 76% of the



Scutching of flax fibres ©Confédération Européenne du lin et du chanvre

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Tab.1: Increase in market volumes of biobased composites (WFC and NFC) in Europe from 2012 to 2017, in different application areas

Biobased composites (NFC, WPC and others)	Main production method	2012 Tonnes	2017 Tonnes	CARG %
Decking, siding and fencing	Extrusion	190,000	200,000	1
Automotive	Compression moulding	150,000	150,000	0
Technical application, furniture and consumer goods	Injection moulding, compression moulding, RTM, 3D	17,000	60,000	29
Total	-	357,000	410,000	3

CELCE flax and hemp composites directory

numerical calculations ...). A tool that offers legibility to manufacturers via a unique nomenclature and technical, scientific and commercial visibility for each of the 'composite' CELC players.

With its 5 thematic entries (fibre producers; reinforcement and semi-product producers; merchants and distributors; manufacturing composite processors; technical support & services), this interactive directory is questionable by company, product or keyword.

An identity card by company is available with for each, date of creation, salary size, global turnover and percentage of turnover achieved in export, sectors of activity and core business.

worldwide production (CELCE-2017/2018).

The above numbers do not take the production of linseed flax for oil into consideration.

Flax/Linen is a multi-use fibre for numerous and innovative applications: fashion textile, 60%; lifestyle textile, 30%; and technical products including composites, 10%.

In 2016, The European production of hemp fibres was about 25,000 tonnes.

The main application is in high quality paper, for 57%. Insulation accounts for 26%, and the use in biocomposites, for 14%.

The supply of both flax and hemp fibres is secure, and the produc-

tion chain is well organized. The flax and hemp manufacturers and subsectors use several operational techniques to secure a reliable supply:

- *Contractual agreements*: stakeholders commit to specific volumes, prices and qualities
- *Co-partnerships*: bringing in fibre producers as partners
- *Buffer stocks*: safety inventories to guarantee a reliable supply in terms of available volumes and fibre quality
- *Multi-supplier resources*: increasing the number of fibre supply outlets cuts down on dependence and lowers risk and can even push suppliers to compete.

Cartography

A new platform dedicated to the use of natural flax and hemp fibres in high-performance composite applications is now available online. Aimed at industrialists, this professional directory identifies and references the operational solutions developed by members of the CELC Technical Centre. Beyond a clear and transparent presentation of the value chain and professions of the flax and hemp industry, the platform qualifies the know-how and quantifies for the very first time the production of an evolutionary product offering, complemented by a panel of services and technical support (characterization,

Conclusion

In conclusion, it can be stated that the flax and hemp fibre industry offers a dynamic and reliable production/value chain.

Of all-natural fibres used as a reinforcement for composites, flax and hemp have the longest history in developing high performance products. The flax and hemp industry is well organized, both nationally and internationally, and offers a strong service to the composite industry. □

More information:
www.jeccomposites.com
www.europeanflax.com
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