Develop bio-based fibres and/or functional molecules to improve the performance of textile products

Develop innovative bio-based fibres and/or bio-based additives for textile applications that outperform conventional (synthetic or natural) counterparts in terms of both technical and sustainability performance.

Proposals may address either bio-based fibres or bio-based additives, or both.

This topic excludes the use ‘as such’ of fibres and materials that already have a significant use in Europe. If proposals aim at these high-volume fibres and materials, the focus must be on innovative components (such as new bio-based additives) or treatments to improve their properties.

Proposals should target the fibre composition and its performance in specific applications, and/or functional molecules to improve the properties of specific textile products in identified applications. These functional bio-based molecules/additives can include colourants, flame retardants, water or gas proofing agents, UV and heat stability agents, fillers, photo- or thermo-reacting molecules, hydrophobic or hydrophilic agents, biocides, etc.

This topic includes any bio-based feedstock, provided it can be sourced in a way that is sustainable both from an environmental and an economic perspective.

Proposals should target mild operating conditions and resource-efficient processes to add sustainable processing steps to a value chain.

Proposals that focus on yarns should deliver new yarns that are compatible with conventional textile machinery.

Proposals should include an experimental validation of the proposed concept via direct comparison with existing comparable options.

Proposals should involve consumers, designers, trend influencers and/or specific end-user organisations to identify requested and feasible performance requirements in for example clothing, technical textiles and geotextiles.

Proposals should address all requirements for RIA as shown in Table 3 in the Introduction of the Annual Work plan 2019.

The technology readiness level (TRL) at the end of the project should be 4-5 for the bio-based value chain in question. Proposals should clearly state the starting and end TRLs of the key technology or technologies targeted in the project.

Industry participation in the project would be considered as an added value because it can play a supportive role to demonstrate the potential for integrating the developed concepts and technologies into current industrial landscapes or existing plants so they can be deployed more quickly and scaled up to apply industry-wide.

Indicative funding:

It is considered that proposals requesting a contribution of between EUR 2 million and EUR 5 million would be able to address this specific challenge appropriately. However, this does not preclude the submission and selection of proposals requesting other amounts.

The global consumption of textile fibres is increasing rapidly. This market has been growing with an annual rate of approximately 4%, reaching around 103 Mt in 2017[1]. Synthetic and traditional natural bio-based fibres like cotton cannot meet the increasing demand in a context of limited resources. The production capacity of cotton, for example, is limited by sustainability constraints linked to resources consumption (land, water, fertilisers, pesticides, etc.).

Concurrently, consumers are increasingly demanding sustainable high-quality textiles: from renewable feedstock, sustainably produced, and with clear end-of-life qualities to support a circular economy. Innovative bio-based yarns and textiles can enter and compete in the established textile markets by meeting all of consumers' evolving sustainability requirements, combined with performance levels that exceed the state of the art.

In the same context, also bio-based additives for textiles have the potential to guarantee environmental sustainability while providing specific technical properties to meet consumers' demand. Moreover, bio-based functional molecules can represent valuable, non-hazardous alternatives for fossil-based additives currently used in textile applications.

The new bio-based fibres, as well as improved or tailor-made bio-based additives, can, for example, provide better mechanical or physical properties than the existing fibres in specific applications.

The **specific challenge** is to meet market requirements for new textile products outperforming the state of the art in terms of technical properties and sustainability aspects.

[1] The Fiber Year GmbH. The Fiber Year 2018 - World Survey on Textiles & Nonwovens. Issue 18, May 2018 (Table of Content and Executive Summary available at: https://www.thefiberyear.com/fileadmin/pdf/TFY2018TOC.pdf).

Expected impacts linked to BBI JU KPIs:

- contribute to **KPI 1** – create at least one new cross-sector interconnection in the bio-based economy;
- contribute to **KPI 2** – set the basis for at least one new bio-based value chain;
- contribute to **KPI 5** – validate at least two new bio-based materials;
- contribute to **KPI 8** – validate at least one new and improved processing technology reflecting the 'TRL gain' since the start of the project.

Environmental impacts:

- reduce the environmental impacts associated with the developed textile products as compared with the state of the art;
- increase the overall resource efficiency;
- reduce greenhouse gas emissions.

Economic impacts:

- develop textile products, either entirely bio-based or containing bio-based additives, with improved properties and performances as compared with the state of the art for the targeted applications, thus enhancing their market deployment;
- increase the competitiveness of bio-based industry in the textile sector;
- increase income and business opportunities for stakeholders and actors (including primary producers) in the bio-based sectors, in particular in the textile sector.

Social impacts:

- create new job opportunities in the bio-based sector, particularly the rural, coastal and/or urban areas.

Type of action: Research and innovation action.

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