

About COST

COST is the longest-running European framework supporting trans-national cooperation among researchers, engineers and scholars across Europe.

It is a unique means for them to jointly develop their own ideas and new initiatives across all fields in science and technology, including social sciences and humanities, through pan-European networking of nationally funded research activities. Based on a European intergovernmental framework for cooperation in science and technology, **COST** has been contributing - since its creation in 1971 - to closing the gap between science, policy makers and society throughout Europe and beyond. As a precursor of advanced multidisciplinary research, **COST** plays a very important role in building a European Research Area (ERA).

It anticipates and complements the activities of the **EU Framework Programmes**, constituting a “bridge” towards the scientific communities of **COST Inclusiveness Target Countries**. It also increases the mobility of researchers across Europe and fosters the establishment of scientific excellence.

The former science organization which was structured into nine science and technology domains has been replaced by a new organization aiming at guaranteeing a fully open and bottom-up approach through the establishment of a single Scientific Committee. This also includes a renewed evaluation and selection procedure aiming at identifying breakthrough ideas and favoring interdisciplinary and multidisciplinary projects.

COST's Goals

In 2011, the CSO adopted the **COST Strategy** to achieve **Vision 2020**, looking at four goals:

- Best performance in its implementation;
- Orienting **COST Actions**
- Improving cooperation within **COST** countries and beyond;
- Ensuring good governance.

How COST works

COST does not fund research itself, but provides support for networking activities carried out within **COST Actions**. **COST Actions** are bottom-up science and technology networks open to researchers and stakeholders, with a four-year duration and a minimum participation of five **COST Countries**.

COST Actions are active through a range of networking tools, such as meetings, workshops, conferences, training schools, short-term scientific missions (STSMs) and dissemination activities. **COST Actions** are open to researchers from universities, public and private research institutions, as well as to NGOs, industry and SMEs.

COST invites researchers throughout Europe to submit proposals for **COST Actions** through a continuous Open Call. Following a thorough evaluation and selection process, the decision for funding a proposal is taken by the **COST Committee of Senior Officials (CSO)** within eight months from the collection date. Successful proposals are approved to become **COST Actions** and can expect to 'kick-off' within three months thereafter. For more information on the next collection dates and on how to submit a proposal for a **COST Action**, please visit the Open Call page.

COST Actions are also open to international cooperation, by allowing the participation of researchers from Near Neighbour Countries and International Partner Countries on the basis of mutual benefit.

What is ActInPak

The main objective of the **Action** is to develop a knowledge-based network on sustainable, active and intelligent fibre-based packaging in order to overcome current technological, industrial, and social limitations that hinder the wide deployment of existing and newly developed solutions in market applications.

Research and development of new fibre-based packaging materials with active and intelligent features have shown huge potential to optimise the supply chain, and increase the shelf-life of foodstuff and enhance consumer consciousness of food utilisation. Very few of the potential solutions have, however, been able to reach the market.

This **Action** aims to identify and focus on the key technical, social, economic and legislative factors relevant for a successful deployment of renewable fibre-based functional packaging solutions. This will be achieved by conducting research and development into active and intelligent packaging, encompassing both scientific and technical solutions, addressing the opportunities for, and obstacles to, market introduction. The innovative approach of this **Action** lies in the sharp focus on the integration of active and intelligent solutions in papermaking in order to create next-generation functional fibre-based packaging. The **Action** will achieve the objectives by providing an open multidisciplinary platform for the complete paper and board packaging value chain and aims at strong involvement of industrial partners throughout Europe. Sustainable fibre-based packaging materials with new and active functionalities may help to introduce new products on the market with higher value and profits for paper and board manufacturers than traditional products.

Currently, 30 countries are involved in the network, with [participants](#) representing over 95 institutes and companies.

Working Groups

1. WG1 'Development/Innovation'
2. WG2 'Industrialization/Market introduction'
3. WG3 'LCA/Sustainability issues, health and safety'
4. WG4 'Knowledge transfer and dissemination'

WG1 'Development/Innovation'

The objective of WG1 is to identify the technical limits to and opportunities for the development of active and intelligent fibre-based packaging. WG1 will focus on sustainable solutions based on fibres and biopolymers that can extend shelf-life and add value to the product. Antimicrobials, stimuli responsive systems, RFID and anti-counterfeiting devices, printed intelligence, indicators and sensors will be considered within this WG in order to

understand the potential of present and future technologies. In particular the problems of inclusion of such systems or devices in fibre-based packaging will be studied, considering different strategies ranging from direct inclusion, through chemical or physical techniques, from development of coatings or multilayer structures to printing and to the addition of modified filler to obtain active nanocomposites. Due to the very diverse expertise involved in the different techniques considered, an interdisciplinary approach and a strong interaction among researchers from different areas is foreseen, allowing for a thorough analysis of the different envisaged solutions. While fibre-based material will be the main focus of the Action, also the use of biopolymers alone or in combination with fibres will be considered in order to cover all possible pathways towards the development of sustainable smart packaging solutions.

Methods and means - WG1 will start considering smart fibre-based packaging solutions present on the market or studied at lab scale and existing legislation related to this topic will be reviewed. Information will be collected not only through literature search and patent analysis but also through the organisation of a seminar and workshop. The results of these activities will be grouped and ordered in order to create an overview to be discussed in expert panels to define the most promising technologies and the technological evolution needed for their successful development. Based on this research into solutions and technologies, innovation and pilot trial tests are key to identify the most promising active and intelligent fibre-based solutions. In the end, this WG targets TRL 4 to 8.

Anticipated results - The main outcome of the WG1 activity will be an overview of the present research in different areas of active and intelligent fibre-based packaging as well as the main achievements of the partners. These results will be made available to experts all over the world through the Action website and presented in different review papers giving an up-to-date report of the research in the different areas of active and intelligent fibre-based packaging. Guidelines for future research and development will also be produced focusing on major technical challenges to overcome for the successful exploitation of smart packaging solutions.

WG2 'Industrialization/Market introduction'

The objective of this Working Group is to identify market demands, supply chain challenges and legislative restrictions that need to be considered so as to ensure a successful introduction of active and intelligent fibre-based packaging in real-world applications. Technological solutions discussed in **WG1** will be considered from a different point of view to understand the optimal strategies for their development from lab scale to market application. Strong interaction with the industry will be needed in order to understand technological issues for the scaling-up and industrialization of different processes, as well as to identify the non-technological problems that could endanger their market introduction. Legislative limitations will be discussed comparing the European situation with that of other countries where smart packaging has already found its way to the market and consumer expectations will be analysed

for the different types of active and intelligent fibre-based packaging solutions, trying to clarify what active packaging means for consumers and which features have higher added value for the general public.

Methods and means - Workshops/discussions will be organised to address industrial issues and to help the industry enter the market with new smart packaging. Every year one or two specific meetings will be dedicated to a 'problem box' focusing on industrial challenges. Industry can introduce their current problems or issues, and one (or more) will be selected to be discussed using problem-solving methods (for example Ishikawa, 5 Whys, or TRIZ) and brainstorming techniques during the meetings. Furthermore, the meetings will be used in order to gather information, consumers' associations will be invited and the events will be open to non-experts for participation in order to reach the general public. The results of these activities will be discussed in multidisciplinary panels formed by technologists, industry covering the whole value chain, and market experts. The aim is to define strategies for an efficient industrialisation and market introduction of active and intelligent fibre-based packaging solutions. In particular, actions to be undertaken for the evolution of possible solutions from TRL 8 to 11 will be considered.

Anticipated results - The main results of **WG2** will be the preparation of a publication, targeted towards the industry and non-experts, summarising the information collected as well as guidelines resulting from the discussion. A seminar and workshop will be organised for the same reason and a road map will be used as guideline to provide directions towards market implementation

WG3 'LCA/Sustainability issues, health and safety'

The objective of this Working Group is to identify sustainability, health and safety issues of innovative packaging solutions. The **Action** is focusing on fibre-based and biopolymer packaging which are inherently endowed with a limited carbon footprint; the inclusion of new features in the original materials, however, often demands new processes and the use of new substances that need to be considered also from a lifecycle point of view so as to ensure the sustainability of the whole process. **WG3** will interact with **WG1** and **WG2** in analysing new materials, technologies and industrial processes with **LCA** and more circular economy-oriented sustainability impact assessment indicators trying to reveal potential environmental shortcomings of the considered solutions. The recyclability of new materials, as well as health and safety issues related to the inclusion of new chemical substances will be analysed and alternatives proposed when critical situations are envisioned.

Methods and means - As in **WG1** and **WG2**, the activity will be developed starting from the collection and analysis of currently existing information on environmental impact and safety issues related to smart packaging. Once again, a literature search will be completed and complemented by the organisation of a seminar that will bring together experts from the different areas involved.

Consumer perspectives will be also considered in order to evaluate possible differences between the real risks and those perceived by the public opinion while talking about intelligent and active fibre-based packaging.

Anticipated results - The outcome of **WG3** will be summarised in technical work and scientific papers covering the topics related to sustainability and health and safety issues of intelligent and active fibre-based packaging. Workshops and summer schools on the same topics will be considered and a road map developed using the collected information will represent the state-of-the art from which future research directions will be identified.

WG4 'Knowledge transfer and dissemination'

The objective of **WG4** is to disseminate the generated knowledge to the industry and society. It will interact with the other WGs supporting them in the organisation of seminars and workshops and coordinating the activities related to dissemination. An Editorial Board will be formed to facilitate the preparation and publication of results in scientific as well as general journals. A Knowledge Transfer Committee will be also created to facilitate the exchange of information from the different Working Groups and the industry so as to increase the opportunities for an actual application of the Action's outcomes.

WG4 leader will be responsible for coordination of general dissemination activities and development and exploitation of the website.

Methods and means - As a basis for evaluation of the knowledge on active and intelligent packaging and its market introduction a survey will be sent all over Europe at the start of the Action. The same questions will be sent again at the end of the Action in order to compare the knowledge level of understanding of active and intelligent packaging. The tools used for dissemination and knowledge transfer will be those cited in the **COST Rules** and **Procedures** and will include, among others, the organisation of Conferences and Seminars, Innovation Workshops and Training Courses. Short-Term Scientific Missions (STSMs) will be supported by the Action as well as the exchange of reports, publications and scientists between Action members but also outside the Action boundaries. A website will be created and maintained to give visibility to the Action's progress and main results and to act as a virtual arena for exchange of information on Action topics.

Anticipated results - All information generated during the **Action** will establish a reference point and database for future research and development in the area of active and intelligent fibre-based packaging and products. It will identify which technical, social, economic and legislative factors to focus on and the possibilities/limitations for successful introduction to market. Deliverables will be in the form of a better knowledge of the industry and society, but also new products in the market, and less fear from the consumer on the topic. Identification of the factors and limitations to focus on during development will foster successful market introduction of active and intelligent fibre-based packaging.

What is an STSM

Short Term Scientific Missions are **COST** networking tools aimed at increasing collaborations through exchange of researchers between Partners. **STSMs** are thus exchange visits fostering collaboration, contributing to the scientific objectives of the Action and allowing participants to learn new techniques and to have access to data/instruments/methods not available in their own institution. They are particularly intended for young scientists such as **Early Career Investigators (ECI)**. **STSMs** can be from a Participating COST country:

- To another Participating **COST** country
- To an approved **Near Neighbour Country** (NNC) institution and vice versa
- To an approved **International Partner Country** (IPC) institution
- To an approved **European Organisation** (and vice versa in case of RTD organizations)

Each **STSM** has to be started and concluded in the same Grant Period - that is between June 1st of one year and 30th April of the next year for **ActInPak**.

COST distinguishes between two types of STSM with the following duration and allowed funding:

	Duration	COSTS
STSM	5-90 days	160 €/day up to € 2500
STMS by an Early Career Investigator (ECI)	91 – 180 days	160 €/day up to € 3500

SHORT TERM SCIENTIFIC MISSIONS

Application and selection procedure

Applicants can register online through the following website: <https://e-services.cost.eu/stsm>

The following information has to be provided during the registration procedure:

- » the Action number;
- » the title of the planned STSM;
- » the start and end date;
- » the applicant's details, including key academic details and workplan;
- » the applicant's bank details;
- » the host institution;
- » financial data (amount for travel and subsistence)

After encoding the information a formal STSM application will be issued which has to be downloaded and sent by the applicant electronically (by e-mail as attachment) together with CV, full work plan*, list of publications motivation letter, letter of support from the home institute and invitation letter from the host institution and any other documents which the Applicant may regard as helpful in supporting the application at the evaluation process to:

- » the future Host of the STSM;
- » the ActInPak STSM coordinator (Marco Giacinti B.: marco.giacinti@unibo.it).

*In the work plan, elaborate on the expected impact of the STSM on ActInPak as well as the expectations for dissemination of the work (e.g. a presentation during an ActInPak meeting, an external conference presentation, a video pod cast for the ActInPak website, etc.).

The complete application file (as described in the COST Vademecum), including MC approval, must be submitted at least three months before the start date of the proposed STSM.

The STSM coordinator will evaluate the different proposals on the base of the relevance of the topics addressed and of the proposed activities with respect to the COST action focus. Selection will be made every two months (approximatively January – March – May – July – September – November) and results will be communicated on the Action Website as well as via mail to the different applicants. Proposals declared as eligible will be funded until the total number of STSM considered for the Grant Period will be completed.

In case the number of proposals exceeds the number of available positions a selection will be made based on the following priorities:

- a) ECI STSM
- b) Industrial STSM (from or to industries)
- c) STSM involving young researchers (Master or PhD students)
- d) Amount of funding requested (lower amount for the same stay will be preferred)

The possibility to fund additional STSM will be discussed within the Steering Committee depending on the budget available.

More information:

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