

RESEARCH ON MATERIALS FOR ECO-EFFICIENT CONSTRUCTION USING CORN AND SUNFLOWER AGRICULTURAL WASTE

In May 2022, the research to identify new bio-based materials to reduce the environmental impact of the construction sector by taking advantage of agricultural waste from corn and sunflower stalks was successfully completed. The research was carried out within the framework of the [Savasco cross-border project](#), involving actors from two regions of Spain and France where these crops represent a relevant agricultural activity.



Considering the wide spread of corn and sunflower cultivation activities in different countries of the world, this research has highlighted potentials of general interest to generate added value to their agricultural wastes, providing social and economic benefits to local producers, and at the same time contributing to a new sustainable bioclimatic architecture.

The idea for this research project was born in 2014 and its promoters managed to access funds from the European Union. [The Savasco project website highlights](#) that the construction sector, through its various components and activities, is one of the main emitters of CO₂ and that construction materials contribute significantly to the environmental impact of the sector. “Insulating materials, for example, are mostly manufactured from non-renewable raw materials of mineral or petroleum origin, the extraction and transformation of which have a great environmental impact, especially in terms of greenhouse gas emissions and energy consumption. However, the physical characteristics of some agricultural residues, such as corn and sunflower stalks, give them the thermal insulation and humidity regulation benefits that are sought to formulate construction materials. In addition, these raw materials of biological origin have many environmental advantages: they are renewable, local and constitute carbon sinks.”

Another relevant aspect of the research is that it involved the different actors that in perspective can implement an economic, sustainable and innovative bio-based construction system made with corn and sunflower stalks. [The Savasco project is managed by a consortium](#) that brings together four higher education centers through three laboratories and two research groups, a federation of agricultural cooperatives and three cooperative companies in the construction sector. The Consortium has also the support and competence of industry partners associated with the project and the specialized magazine EcoHabitar. The article published in 2022 by EcoHabitar [presents the process and results of the project](#).



Through the complex management system created between the two regions and with the input of all the participants, [the research adopted the following objectives and carried out the related activities:](#)

- Develop in the territories harvesting and transformation processes for corn and sunflower stalks at a moderate cost to produce plant aggregates with controlled physicochemical characteristics.
- Formulate and characterize construction materials incorporating these plant aggregates. Taking advantage of the available industrial tools, the stems have been transformed to provide two types of vegetable aggregates from fractions of sunflower, corn and bark. The multi-physical, environmental and economic characterization of the produced vegetable aggregates has been defined.
- Thanks to the contribution of all the actors, the research designed and built two prototypes using the construction materials developed from the agricultural residues collected in the field, and based on the results obtained in the laboratories. The two prototypes, located in the two regions of France and Spain that have different climatic conditions, have been used as research tools on the thermohygric behavior and energy efficiency of materials. The prototypes have also been used as training and communication tools.
- The project evaluated, through Life Cycle Analysis, the environmental, economic and social impacts of the construction products developed. With the transdisciplinary contribution of the academy and the complementary skills of the construction companies and the group of architects, the use performance and durability of a complete eco-efficient construction solution based on corn and sunflower has been formulated, implemented and characterized. In particular, the prototypes made possible to record the variation in temperature and humidity over time to evaluate its thermal behavior, in addition to analyzing its acoustic absorption and insulation capacity and its durability.

Considering the technical results of the research, the key objective of the project was to structure the sector, linking its different actors so that at the end of the process it could be established a network in charge of the production of vegetable aggregates and its application in the construction sector in the border territories of Catalonia and Occitania.

The last stage of the work has focused on this objective and the Savasco website presents the different [events held in 2021 and 2022 in Spain and France](#) to present the two prototypes and the final results of the research project. Organized by the Polytechnic University of Catalonia and the University of Toulouse, the events have been an opportunity to bring together all the players in the sector interested in biomaterials to discuss about the results obtained within the framework of the Savasco project on the use of corn and sunflower stalks for construction. At the same time, the events have been an occasion for local governments, institutions, the media and the general public invited to participate, to know more about the great advantages for all of taking advantage of these innovative ecological methods for the future.

All data collected will be used to write a recommendation booklet for farmers. A reference document for the characterization of corn and sunflower aggregates for its use in construction is also being prepared. These materials will be soon available in the Savasco Project website.

This research can inspire other territories dedicated to the cultivation of corn and sunflowers to seek ways to create a new value chain that contributes to a sector so important as bioclimatic architecture.



To know more

[Savasco cross-border project website](#)

[Article in EcoHabitar magazine](#)

[Components Savasco project](#)

[News and photos in mstdn.social](#)

[Savasco project partners](#)

[Events in Spain and France](#)

[Prototipo en Portal Universidad de Catalunya CDT](#)

[Prototipo - ETSAV en Sant Cugat del Vallès](#)

[Article in interempresas.net](#)

[Article in construible.es](#)

[Article in University of Toulouse website](#)

[Article in ecopertica.com](#)

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