



LIFE Environment and Resource Efficiency

LIFECITRUS

LIFE14 ENV/ES/000326

D6_Networking

28 June 2018.





This report collects information on the D6 action raised in the memory of the project “LIFECITRUS-LIFE14 ENV/ES/000326”.

1. INTRODUCTION

The Mediterranean Region is one of the largest exporters of citrus fruits in the world, as well as including fresh processed companies, it also includes juice companies and citrus concentrates. These companies generate citrus by-products that can be valued in the company itself to obtain new natural ingredients.

The challenge of the project is to obtain purees from citrus by-products that can be applied to all types of food and does not alter its organoleptic properties. Once the puree is obtained, it offers a wide range of possibilities to any company in the sector that seeks the development of increasingly natural foods.

In addition, project beneficiaries have contacted relevant companies and associations at the regional, national and international levels and workshops have been organized to explain their viability opportunities. Thanks to that, different agri-food companies are developing tests in the demonstration plant to learn more about the process and they are training with the CTC’s staff, which promotes their replicability.

Benefits and synergies with other projects

The project assumes the recycling of a type of waste that currently, in the best of cases, is used directly in animal feed without added value and with high environmental costs in its management due to problems of transport and storage of a raw material with a high humidity. Since LIFECITRUS process could be implemented in the generating company itself, it is possible to expand the value chain of citrus processing, ensuring the use of the by-product in the same industry and minimizing the generation of waste.

The LIFECITRUS project is committed to the development of new products within a circular economy using sustainable technologies available in the current market.

Networking activities are necessary to improve the dissemination of the project objectives, activities and results in other contexts.

2. METHODOLOGY

In this context, this information has been used to establish contacts with different related projects and research groups, highlighting the projects of the LIFE program of the European Union.

In the first place, coordinators and project partners related to citrus valorization were contacted, but due to the low number of projects, contact was extended to technicians and researchers

with lines of work related to food due to the application of the new ingredient. Then, the network of contacts was expanded with other projects on waste valorization and lines of work with health and sustainability in general. In addition, the project partners agreed to attend meetings / events organized by other projects or by public bodies to disseminate the results of the LIFECITRUS project and learn about other lines and activities that could be used to identify application improvements during the LIFECITRUS project.

Information about the LIFECITRUS project was sent and activities/collaborations were proposed such as:

1. Exchange of information through email (including newsletters).
2. Exchange of information through meetings.
3. Attendance at meetings with technicians from food and environmental sustainability areas.
4. Participation in seminars and conferences organized by partners from other projects.
5. Collaboration request for the participation of other projects in events organized within the framework of the LIFECITRUS project.
6. Collaboration request to include information in the magazine 'CTC Alimentación' within the framework of the LIFECITRUS project.
7. Invitation to know the demonstration plant and organization of the visit.

Finally, it is intended to organize the final meeting with the media in September 2018, where other LIFE projects will be invited to participate.

3. RELATED PROJECTS AND ESTABLISHED SYNERGIES

Table 1 shows the related projects, the type of networking activity and the established synergies. A total of 27 projects were identified, of which 17 projects established collaboration. In addition, 4 research and technology centers wanted to know the LIFECITRUS project in more detail. 15 synergies have been detected and have allowed for the creation of a network of contacts among which the technicians of the LIFE ECOCITRUS project, LIFE CITRUSPACK, LIFE WOGAnMBR, LIFE FOOD WASTE STAND UP and the Basque Culinary Center (BCC) stand out.

Table 1. Projects for networking and synergies

<p>LIFE ECOCITRUS (LIFECITRUS participated in its networking event)</p> <ul style="list-style-type: none"> - Dynamization of recovery - Development of new products 	<p>LIFE FOOD WASTE TREATMENT (meeting in Alibetiopias 2016)</p> <ul style="list-style-type: none"> - Dynamization of the valorization. Minimum consumption of water and energy - Development of new products 	<p>LIFE GISWASTE (mailing and collaboration in the special edition of the magazine dedicated to LIFECITRUS project)</p> <ul style="list-style-type: none"> - Dynamization of recovery. Digital tools 	<p>LIFE iCirBus4industries (meeting in CTAEX facilities (interview by La Despensa-Radio Nacional) and invitation to participate in LIFE Day (16th June 2017))</p> <ul style="list-style-type: none"> - Wastewater treatment sludge management - Drying options
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LIFE WOGAnMBR (participated in the LIFECITRUS conference) - Wastewater treatment	LIFE M3P Material Match Making Platform (meeting in LIFECITRUS conference) - Dynamization of recovery. Digital tools	LIFE FOODPRINT (mailing and newsletter exchanged) - Carbon footprint	LIFE AQUEMFREE (mailing and newsletter exchanged) - Wastewater treatment
LIFE CITRUSPACK (mailing and newsletter exchanged) - Development of new products	LIFE FOOD WASTE STAND UP (mailing and newsletter exchanged) - Dynamization of recovery	LIFE BAQUA (mailing and information exchanged) - Development of new products	LIFE WATERREUSE (mailing, newsletter exchanged and meeting in LIFE Day of Murcia (8 th June 2017) - Wastewater treatment
LIFE AGROWASTE (mailing and newsletter exchanged) - Dynamization of recovery. Digital tools - Development of new products	PROYECTO GOOD HERBS (mailing and meetings with project partners in the framework of the final project conference) - Training - Good practices - Rural development - Active compounds-health	PROYECTO HERBARTIS (mailing and collaboration in the framework of the final project conference) - Training - Good practices - Rural development - Ecological agriculture Visit of CTFC and FITOMON to the demonstration plant	PROYECTO HERBS4YOUTH (mailing and collaboration in the framework of the project conference) - Training - Good practices - New food regulations - Rural development - Dynamization of recovery Visit of No Gravity to the demonstration plant
IBA (meeting in the framework of the GOOD HERBS project conference in Bucharest and visit to demonstration plant) - New food regulations - Benefits health-fiber-use bakery and pastries	BCC (mailing, meeting at the BCC's facilities and visit to demonstration plant) - Development of new products	CITOLIVA (mailing and meeting at the CITOLIVA's facilities) - Active compounds-antioxidants - Drying options - Development of new products	AGRICULTURAL MINISTRY OF TURKEY AND TURKEY TECHNICIANS (meeting at the CTC's facilities and visit to demonstration plant) - Dynamization of recovery
PROYECTO SATIN (newsletter exchanged) - Health			
VALORLACT (Not interested)	LASAIFOOD (Not interested)	LIFE CERO Residuos (Unachieved)	LIFE HAPROWINE (Unachieved)
LIFE CITROFUEL (Unachieved)	LIFE Fresh Box (Unachieved)	BREAD4PLA (Unachieved)	LIFE IRRIMAN (Unachieved, but

			meeting in LIFE Day of Murcia (8 th June 2017))
LIFE WHEYPACK (Unachieved)	LIFE BIOCOPACPlus – BIOCOPAC (Unachieved)		

8 projects have not responded to our collaboration, despite considering them interesting for LIFECITRUS and 2 projects have responded negatively. Figure 1 shows the meeting held in the CTAEX facilities for the exchange of information and in Figure 2 the photo of the IBA headquarters in Bucharest.



Figure 1. Meeting at the CTAEX facilities



Figure 2. Meetings at the IBA headquarters in Bucharest (Romania)

In the links section of the website of the LIFECITRUS project, projects of the LIFE program that have accepted our collaboration have been linked. In the section links you can also find links to other projects. The purpose has been to expand our network of contacts and increase the dissemination of the recycling of citrus by-products. Information available at <http://www.lifecitrus.eu/index.php/es/proyecto/enlaces>.

4. DESCRIPTION OF DETECTED SYNERGIES AND DEVELOPED ACTIONS

This section describes the synergies with the projects and lines of research detected, as well as the decisions taken to improve the LIFECITRUS project.

1. New food regulations

The topic of what regulations apply to new foods obtained with a new ingredient of uncontrolled origin for human consumption has appeared in meetings with technicians. The partners of the LIFECITRUS project propose the manufacture of a co-product of the manufacture of juices and indicate that there is no specific regulation because it would not be waste, it must follow the same law as other food products.

In the project an uncontrolled by-product has been used, but the companies supplying the by-product have been informed that they had to make the collection directly in the processing line to avoid contamination.

After receiving the by-products, microbiological analyses have been carried out to ensure that it is an edible product, without contamination.

2. Benefits health-fiber-use bakery and pastries

Experts in health have informed us about the benefits of fiber for health and therefore, the new ingredient was sought a high fiber content. Variations in the concentration of this parameter caused the project partners to consider changes in the LIFECITRUS process with the use of variable water for extractions.

3. Development of new products

Numerous technicians work in the development of new products and apply for projects to the LIFE program, so it is a synergy that is considered to give added value to vegetable by-products.

4. Active compounds-antioxidants

Experts in antioxidant compounds have informed us about the benefits of flavonoids for health and therefore, the new ingredient was sought to have an interesting content in hesperidin. Variations in the concentration of this parameter caused the project partners to consider changes in the LIFECITRUS process with the use of variable water for extractions.

5. Drying options

In the meetings with technicians of other projects, it was established that there are many options to have the new ingredient in powder form. The demand of the companies that would use the new ingredient would be greater if a format like the additive that is intended to replace is offered.

6. Dynamization of the valorisation. Digital tools

Small companies indicate that they do not have a high production of the by-product and the processing costs are high for an individual implementation, so the technicians of other projects have offered us a solution, which is the use of digital tools to boost the situation by facilitating the access to information on by-product focus and achieving solutions to environmental problems in an integral way.

7. Health

LIFECITRUS project has managed to obtain a new food ingredient, but its destination can go further than basic food and can get compounds of interest that improve health. Other projects such as SATIN tackled the issue of health and satiety, which can be achieved by the fiber content of the product.

8. Training

LIFECITRUS project has improved the training of technicians to achieve high implementation in the companies targeted by the project. In the first place, a high percentage of time was dedicated to knowing the equipment and treatments of the product in a theoretical manner, but after carrying out the first edition and holding meetings with project technicians closely linked to training, such as GOOD HERBS or HERBATIS, we were able to determine that it was necessary to adopt measures such as a longer time in the demonstration plant and more *in situ* explanation of the equipment and its operation.

9. Good practices

This point is in line with training and a minimum consumption of resources and therefore, the technicians of other projects proposed us to evaluate different raw material ratios: water in the optimization of the LIFECITRUS process. This measure was adopted and even in demonstrations with companies has been taken or will be considered.

10. Rural development

LIFECITRUS project has been shown to technicians of other projects as an example of rural development because the farmers have been able to know new outlets for their production and could value their surpluses if they worked on the production of the new ingredient.

In addition, partners of the HERBS4YOUTH project, experts in control of less developed regions, have indicated to us that this use of waste can lead to mistakes, it should be noted that crops with diseases should not become industrialized and productions with low pesticide control either because the new ingredient uses the skin as raw material, which is where the pesticides are retained. Regarding the dissemination carried out, information has been incorporated on the need to value by-products that have an industrial destiny and do not contribute health problems to consumers.

11. Organic agriculture

In relation with the previous point, the use of organic farming productions allows to obtain a natural ingredient of higher quality and without problems for human health. After the meeting with technicians of the HERBARTIS and HERBS4YOUTH projects, the need to contact

a greater number of farmers and to develop the new ingredient from an organic by-product was corroborated.

Currently organic products are increasingly demanded by consumers and would favour the implementation of LIFECITRUS process.

12. Wastewater treatment

Wastewater treatment projects have raised the need to control wastewater, so samples have been taken for control. Accessible information is available to companies to know the needs of the treatment of purification. In the case of the demonstration plant, the permits of the CTC to develop its research and technological activity have not been a problem for the correct development of the project, but the production companies do have to comply with the parameters of dumping and therefore they must install a purification plant.

13. Dynamization of the valorisation. Minimum consumption of water and energy

The consumption of water and energy necessary for the LIFECITRUS process has been optimized trying to work with more continuous batches, to avoid stops in the process and frequent cleaning of equipment. At a semi-industrial level, water and energy consumption are higher, but an integral design reduces them, and this information has been supported by the LIFE FOOD WASTE TREATMENT project, which worked to provide solutions for management and individual treatment of organic fractions and packaging of the food industry. Minimal consumptions are of great importance for the viability of the process at the economic level, but also for the environmental sustainability of our project because it is financed by an environmental program.

14. Wastewater treatment sludge management

Just as the need for wastewater treatment has been determined, the installation of a biological treatment would generate sludge. Technicians from other projects could inform us about the best management options for them and provide this information to interested companies.

15. Carbon footprint

The contact established between LIFE FOODPRINT project technicians and LIFECITRUS project could serve to disseminate a new tool that allows measuring the carbon footprint of the pastry and flour industry sector. In this way, the tool can be provided to other food industries such as processing and conservation of fruits and vegetables, with a high presence in the Region of Murcia, and potential implementers of the LIFECITRUS process that would benefit from the results of the project and could reduce their CO₂ emissions adopting measures such as the change of fuel used in boilers among others.

Finally, knowledge of food legislation LIFECITRUS partners provide project has a processing line according to the new demands of sustainability to develop new ingredients and, at the same time, new beneficial foods for health.

On the other hand, LIFECITRUS project has encountered problems of interest on the part of companies to fill out surveys, attend workshops, make comments in public and perform tests in the demonstration plant in a group because there is business competition. A completely open broadcast prevents entrepreneurs from collaborating on projects and decreases replicability due to fear of competition between companies. The results are available to all companies and their comments reach the public, prefer to meet individually and the number does not become very high. Therefore, from the LIFE ECOCITRIC project, we adopted the need to use social networks to increase the dissemination and impact of the news, as it is information that arrives in real time and a tool currently used by consumers, in addition to increasing the number of visits to the web; with the LIFE iCirBus4industries project, we learned that participation in media interviews such as radio can be very beneficial to make ourselves known to society and boost sustainability and the circular economy; and from the Layman and AfterLIFE reports of other completed projects, such as LIFE WATERREUSE, we designed report designs for the LIFECITRUS project that is easy to understand.

In addition, with the participation in different international events organized by other projects, we held meetings with technicians and determined that it is possible to continue characterizing the citrus by-product to look for new recycling options. The diffusion of LIFECITRUS in the technical and scientific field has allowed collaborations with partners of other projects to work on the valorisation of by-products and offer industrial practices closer to a circular economy.

On the other hand, projects such as LIFE WATERREUSE, LIFE WOGAnMBR and LIFE iCirBus4industries on the treatment of wastewater and sludge generated, have raised the need to control the wastewater generated by the process due to its high organic load. In the demonstration plant there is no wastewater treatment plant, but it has not been required for the development of this process because the CTC pilot plant has the necessary permits for its scientific and technical activity.

The biggest problem encountered, and that other projects show, is getting companies to participate in dissemination and training events because they have little time availability, so from the LIFE WOGAnMBR project we learned that the support of large associations like FIAB may be necessary to achieve establish a greater number of contacts. The LIFECITRUS project used the FoodforLife platform of FIAB to make itself known nationally.

5. CONCLUSIONS

In summary, along the project lifetime, the beneficiaries have already carried out networking activities with 17 LIFE projects, among others. Then, the objective foreseen in the proposal of create a network with, at least, 3 projects has been reached. Finally, the following can be concluded:



- LIFECITRUS project has developed different networking activities, where meetings for information exchange and participation in events of other projects stand out.
- 15 synergies have been detected that could link the LIFECITRUS project with other projects
- The synergy that comes from lines of work to boost valuation because there is a high number of projects with financing is remarkable.
- The project has incorporated ideas from other projects to face problems that did not allow to reach the indicators initially established. It highlights the improvement achieved with the use of social networks and the media to reach potential stakeholders.
- The project has responded to questions raised by technical experts in matters such as regulations or health products.
- The support of large associations such as FIAB allows expanding the network of contacts and improving the search for synergies.