Production and use of 'zero-kilometre' substrates in nurseries

Summary

This operational group, promoted and coordinated by Belloch Forestal SL, has worked jointly to develop local substrates for plant production; to this end, the technical, economic and environmental viability of the process for obtaining these substrates was determined.
The process led to the characterisation of different raw materials (organic by-products), after which selection of these raw materials were composted and studied in an outdoor plant, while further environmental and economic studies were also carried out. Agronomic tests were also conducted. Finally, the activities were disseminated through visits, the company's website and presentations at conferences. Additionally, Belloch Forestal was invited to present it at the ROSEWOOD European seminar in January this year.
The characterisation of the raw materials permitted selection which, once composted, were transformed into compounds suitable for use as substrates. During composting, nitrification processes were encouraged, producing slight natural acidification in the compounds. In agronomic terms, the mixtures need to be adjusted for optimising tree growing and longer-term studies should be promoted. These results indicate that investing in production of local substrates would be viable and environmentally and economically profitable, and thus helping avoid dependency on unsustainable products and foreign markets and companies, while increasing productivity and competitiveness in nurseries.

Objectives

The general purpose of the project is to obtain native substrates for the production of container plants in nurseries and thus promote specific circular horticultural practices. The specific objectives are to:

1.At an industrial scale and near the nursery, produce substrates from forestry waste generated on the Belloch estate and supplemented with by-products richer in N and/or other fibrous materials.
2.Assess the properties of the composts obtained in relation to their use as substrate and determine the mixtures with other materials necessary to achieve the characteristics suitable for their use.
3.Study the behaviour of the mixtures obtained in a tree crop, under nursery conditions, with regard to fertilisation and irrigation.
4.Assess, from the environmental perspective, the process to obtain and use the substrates. 5. Determine the technical and economic viability of obtaining and using zero-kilometre substrates.
6. Disseminate the results of the project and provide the nursery staff with the knowledge they need to adopt techniques for the monitoring of the production system related to the use of the new substrates.

Description of the actions carried out in the project

The following actions were carried out:

- Characterisation of different by-products useable as substrate after composting, in particular forest waste from Belloch Park obtained after clearances in the farm forest itself.
- Study of composting of two selected by-products in different mixtures, knowing the compost would be for use as a substrate.
- Environmental and economic study of compost production.
- Characterisation of compounds and their used in cultivation of a tree species (*Celtis australis*).
- Several dissemination actions.

Final results and practical recommendations

1. Additional raw materials included in optimal mixtures for composting oriented to the substrate production were studied.
2. Outdoor (uncovered) composting of a selection of the aforementioned raw materials was studied, showing that, nitrification (which promotes acidification of the material) can be promoted on a large scale in composting. These results were obtained despite unfavourable weather conditions in the area (excessive moisture in the material by very frequent and sometimes very heavy rains).
3. Local substrates were obtained from forest waste, with characteristics that a priori seem to be suitable for use as substrates.
4. They were used to grow trees for a few months, obtaining acceptable results; however, longer-term studies should be performed and more appropriate mixtures made to prevent the volume of the material shrinking during cultivation.
5. The economic viability of local substrate production was confirmed; costs are reduced with the use of low-cost raw materials obtained in the vicinity of the composting plant and the nursery.
6. In environmental terms, the need for local composting of by-products and more extensive monitoring of emissions during the process to minimise them was highlighted.

Conclusions

Raw materials were selected which, once composted, were transformed into compounds suitable for use as substrates. During composting, nitrification processes were encouraged producing mild natural acidification of the compounds. In agronomic terms, the mixtures should be adjusted to optimise tree growing and longer-term studies should be encouraged. These results indicate that investing in production of local substrates would be viable and environmentally and economically profitable and thus help avoid dependency on unsustainable products and foreign markets and companies, while increasing productivity and competitiveness in nurseries.

Leader of the Operational Group

ORGANISATION: BELLOCH FORESTAL SL
CONTACT E-MAIL: mateu.sans@belloch.eu

Other members of the Operational Group (not recipients of the grant)

ORGANISATION: SAT 605 CAT
CONTACT E-MAIL: josep_serra@hotmail.com
ORGANISATION: XURRI TERRES VEGETALS
CONTACT E-MAIL: enric@tervex.com
ORGANISATION: IRTA
CONTACT E-MAIL: rafaela.caceres@irta.cat

Subject area(s) of application

☐	Agricultural production system
☐	Agricultural practice
☐	Agricultural equipment and machinery
☐	Livestock farming and animal welfare
☒	Vegetable production and horticulture
☐	Landscape / Territorial management
☐	Pest and disease control
☐	Fertilisation and nutrient management
☐	Soil management
☐	Genetic resources
☐	Forestry
☐	Water management
☐	Climate and Climate Change
☐	Energy management
☐	Waste and by-product management
☐	Biodiversity and environmental management
☐	Food quality/processing and nutrition
☐	Supply chain, marketing and consumption
☐	Competitiveness and agricultural and forestry diversification
☐	General

Geographical area(s) of application

PROVINCE(S)	REGION(S)
All	Those where nursery use is an important activity

Dissemination of the project (publications, seminars, multimedia, etc.)

- Working conference *"Adapt Biophilia: Local measures for adaptation to climate change in green areas of the province of Badajoz"*. 19 June 2019.
- Organised visits to the nursery: universities, associations linked to agriculture or urban greenery.
- The project was selected from a number of candidates for presentation at the final ROSEWOOD seminar held in Florence (Italy) on 15 and 16 January 2020. ROSEWOOD is a project that in the European Union Horizon 2020 research and innovation framework (https://ec.europa.eu/eip/agriculture/en/event/forest-innovation-workshop-and-rosewood-final).

- Article published on the Belloch Forestal website on the company's participation in the ROSEWOOD seminar:

https://www.bellochforestal.com/es/conocimiento/belloch-forestal-presenta-su-proyecto-sustratos-de-km-0-en-la-conferencia-final-del-proyecto-rosewood-en-florencia-italia/

- Presentation of the project on the Belloch Forestal website

https://www.bellochforestal.com/es/conocimiento/produccion-y-uso-de-sustratos-de-km-0/

- Project leaflet published
- Project poster published

More information on the project

PROJECT DATES	TOTAL BUDGET
Start date (month-year): June 2018	Total budget: €114,200.00
Completion date (month-year): September 2020	DARP funding: €45,565.80
Current status: Executed	EU funding: €34,374.20
	Own funding: €34,260.00

With funding from:

Project funded through Operation 16.01.01 (Cooperation for Innovation) through the Catalan Rural Development Programme 2014–2020.

Order ARP/133/2017 of 21 June, approving the regulatory bases for grants for cooperation for innovation by promoting the creation of European Association for Innovation operational groups in the areas of agricultural productivity and sustainability and the execution of innovative pilot projects by those groups, and Resolution ARP/1868/2017, of 20 June, announcing the call for the grant.

Generalitat de Catalunya
Departament d'Agricultura, Ramaderia, Pesca i Alimentació

Fons Europeu Agrícola de Desenvolupament Rural:
Europa inverteix en les zones rurals