Cold-pressed Camelina Tancant cercles (Closing Circles, PrefreCa Project)

Summary

Camelina (*Camelina sativa* (L.) Crantz) is an oleaginous crop in the cruciferous family whose biological properties make it viable for rain-fed crop rotation, thus helping meet Common Agricultural Policy requirements in terms of crop diversification to favour sustainable agricultural production. However, uneven yields from one year to the next mean farmers are hesitant over planting and growing it. However, the cold-pressed camelina products made in Lleida have proven to be high quality. Camelina oil has a high percentage of mono- and polyunsaturated fatty acids (>88%) and low saturated fatty acids (<12%), with a very high percentage of omega-3 (>33%) and antioxidants (13-20 mg kg^{-1}). In addition, the cold-pressed cake has a high protein (40-44%) and low ash content (residues, 6%), and an notable fat content (9-12%), making it a potential ingredient for animal feed. Since the key to a sustainable cycle in agricultural systems is the proximity of its stakeholders (in relation to raw materials and end products), the aim is to associate camelina farming with the production of animal feed via the cake. However, the large number of farms in Lleida means excessive organic waste (slurry and manure) is produced, which can affect the productivity and quality of camelina. Thus there is a pressing need to determine the extent to which the type of fertiliser might influence both camelina yields and the quality of camelina products. If the results are positive, then the objective of creating a circular economy will have been partly achieved, contributing to a locally produced animal feed crop, thus avoiding major imports of foreign protein sources and organic waste as crop fertiliser, while increasing the added value of camelina farming, partly compensating for its lower crop yield compared to cereals.

Objectives

The general objective of this project is to obtain a local product, with added value in terms of quality, optimising the camelina farming production system. The study will be broad and consider three particular relevant aspects, in terms of both product development and dissemination in the sector:

1. Determining the physical-chemical and nutritional characteristics of products produced by cold pressing (oil and cake) under industrial conditions, using the most suitable fertiliser sources for selected camelina varieties in line with soil and climatic conditions.
2. Studying alterations to the physical-chemical characteristics of camelina cake under storage conditions for inclusion in animal feed.
3. Informing farmers and cooperatives in the area about camelina cultivation through information days on demonstration plots.

Description of the actions carried out in the project

Summer 2022: Selection of varieties based on previous studies and the literature.
August-September 2022: selection of the fields where the experiments will be implemented.
October 2022: preparation of fields for sowing. Marking the fields and application of the different fertiliser sources in trial 1.
November 2022: Marking the plots (trial 2) and sowing the three varieties in the two selected fields (trials 1 and 2) in the semi-arid zone of La Noguera and the sub-humid zone in north La Noguera. Analysis of soil samples from the fields.
January 2023: Marking and sowing the three varieties on the second date in one of the fields: the north La Noguera sub-humid area.
December 2022-March 2023: Field experiment management and maintenance: herbicide, insecticide or fungicide treatments, if necessary; redefinition of the plots with herbicide application hood. In this stage, additional measurements, such as the cover and height of camelina varieties, may also be taken to establish development and growth parameters.

May 2023: Harvest and production estimate. Completion of trials 1 and 2. Cataloguing and coordinating shipment of samples to the Roviroli company for processing and obtaining the final cold-pressed product.
May-June 2023: Sample pressing. Return of the products to the University of Lleida (trial 1) and Cotécnica (trial 2). For each variety, three replicate analyses will be carried out, one for each experimental unit (plot) in the field.
June-October 2023: Laboratory analyses (oil and cake).
July 2023-December 2024: nutritional value and digestibility testing in monogastric animals and ruminants
July 2023-December 2024: accelerated and long-term cake stability testing
November 2023-May 2024: repetition of field trials.
January 2024-March 2024: data analysis and drawing up analytical results.
January 2024-March 2024: long-term cake stability testing.
April 2024-June 2024: long-term cake stability testing.
May 2024-August 2024: Dissemination of the results. Participation in transfer sessions in the sector. Presentation of communications at technical meetings and national congresses. Dissemination of the results through the media provided by the European Innovation Partnership (EIP).

Final results and practical recommendations

The expected general and immediate results are:

1. Confirmation of the quality of camelina oil and cake produced in dry and semi-arid climates, with a high content of healthy fatty acid (oil), antioxidants (oil) and proteins (cake).
   This project will also assess:
2. Firstly, the effect of applying different fertilisers standardised to the same level of nitrogen on the crop yield and quality of the derived products (oil and cake). Application of any type of fertiliser is expected to improve crop yield over the unfertilised control. Ideally, the lack of difference between oil and cake quality would mean the farmer could use the most readily available fertiliser source and help reuse of animal waste, maintaining the circular economy.
3. Secondly, the demonstration trials are intended to raise awareness of camelina farming among stakeholders in the primary sector (farmers, technicians, agricultural cooperative societies) and demonstrate that camelina can become a viable crop in the lands of Lleida.
4. Finally, storage stability tests are expected to provide data demonstrating that camelina cake can indeed be stored without loss of quality for the time required for its use as an ingredient in animal feed.

Leader of the Operational Group

ORGANISATION: ROVIROLI, SL

Coordinator of the Operational Group

ORGANISATION: UNIVERSITY OF LLEIDA

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

ORGANISATION: COTÉCNICA, SCCL
ORGANISATION: COMERCIAL AGRICOLA J.PERERA

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)
Lleida - Ebro depression (by extension)	Garrigues and Noguera

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

Dissemination of the results will be targeted at their recipients. Thus, project managers and coordinators will disseminate them among the **internal direct target groups** through regular meetings of all members and participants (participating companies, research groups, farmers and collaborating companies). **The direct external recipients** will be farmers, technicians, advisors, agricultural companies, animal feed production companies, companies that consume cold-pressed vegetable oils, technology centres and universities. Dissemination among these target groups will be carried out through publications in agricultural journals (Phytoma, Vida Rural, Tierras, etc.), participation in working groups and technical meetings of different societies (The Spanish Weed Science Society (SEMh)); Phytoma Technical Conference; Spanish Confederation of Compound Animal Feed Manufacturers (CESFAC); and Spanish Federation for the Development of Animal Nutrition (FEDNA). Reports in the form of technical documents (specifications sheets, contributions to newsletters, etc.) will also be considered.

Finally, the **general target groups** will be organisations, companies and public and private institutions (Spanish National Research Council (CSIC) and National Institute for Agricultural and Food Research and Technology (INIA)), the media and society in general, for whom panel debates and presentations (workshops, science week, science and agriculture programmes, TV, radio and written press) on news and dissemination websites are planned.

Project website

More information on the project

PROJECT DATES	TOTAL BUDGET
Starting date: July 2021	**Total budget:** €200,040.00

	DACC funding:	€91,218.24
Current status: Under way	**EU funding:**	€68,813.76
	Own funding:	€40,008.00

With funding from:

Project funded through Operation 16.01.01 (Cooperation for Innovation) through the Catalan Rural Development Programme 2014-2022.

Order ARP/113/2021 of 20 May, 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 ACC/1660/2021, of 27 May, 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