

# Improvement of the productivity and quality of the oil used for Terra Alta Protected Designation of Origin (PDO) Olive Oil

## Summary

The 'Improvement of the productivity and quality of oil used for Terra Alta Protected Designation of Origin (PDO) Olive Oil' project will implement an experimental design to obtain extra virgin oil of maximum organoleptic and physical and chemical quality in line with the preferences and needs of the various consumers in each sector.

Current agronomic practices (related to irrigation, fertilisation and harvesting) and individualised production methods at oil mills (using different extraction conditions) do not produce extra virgin oil with the requisite levels of consistency and quality. The aim of this study, which includes the participation of Terra Alta PDO olive oil cooperatives, is to control and optimise the majority of the aforementioned conditions in order to obtain extra virgin oil with the quality level required by the market.

## Objectives

The level of concern shown by the olive oil producers most representative of the 'Terra Alta PDO' justifies the need for a rural agriculture project designed to improve the olive oil sector in their geographical area. The development model needs to be more profitable, environmentally sustainable and capable of not only recovering traditional agricultural practices, but also improving them with modern technology in order to optimise all the product harvesting, transportation, production and marketing processes. The ultimate aim is to recover a high-value extra virgin olive oil that is more homogeneous and presents the organoleptic and physical and chemical properties required by current quality standards. The innovative work done to increase the proportion of oil considered to be high quality with respect to the entire production of Terra Alta may constitute a benchmark for other areas as well as a step forward in olive oil production methodology.

## Description of initiatives outlined in the project

The experimental design will consist of the following activities:

- A. Market research to determine at first hand consumers' preferences in relation to the organoleptic and physical and chemical qualities of extra virgin olive oil.
- B. Selection of four plots representative of the territorial scope of each cooperative participating in the project (a total of 16). Each one will be located in a different municipality and three will be of the Empeltre variety and one of the Arbequina variety. Moreover, three plots that use the dry farming system and one that uses irrigation will be selected. Different harvesting periods will be established for each plot in accordance with the maturation of the olives. Representative samples will be harvested in three periods of maturation and then transported as quickly as possible to the oil mill.
- C. The physical and chemical properties of the olives of each batch will be analysed prior to their arrival at the oil mill and the pressing characteristics that most improve the quality of the oil will be studied, taking into account different oil extraction and purification variables and analysing the oil obtained.
- D. The results of the project will be used to draft a protocol of good agronomic, transport, extraction and purification practices to improve Terra Alta PDO olive oil.

A. Market research

The inputs received by the sales departments of Terra Alta PDO oil mills in recent seasons indicate that consumers prefer maximum quality oils with intense fruity notes. The objective of this part of the project is to conduct market research that definitively confirms the preferences of the consumers in the various sectors involved: hospitality establishments, restaurants and end consumers. This research will be outsourced to a specialist company and will be based on supervised tastings, interviews, and reports issued by commercial agents.

## B. Plot selection

The geographic scope of Terra Alta is highly diverse in terms of terrain, climate and cultivation techniques and could be considered a determining factor in the production of high-quality olive oil. Given that the sector is open to adopting innovative cultivation techniques in order to ensure that its plantations produce the best quality raw material, the first step consists of intensively monitoring the entire olive cultivation cycle:

- winter rest
- flowering
- pollination or fruit formation
- fruit growth
- maturation at the olive oil farms in the various municipalities.

A technical expert will be hired to select the most suitable and representative estates, monitor the crops, and coordinate the tasks to be carried out at each plot in conjunction with each cooperative:

- soil analyses
- determination of the necessary level of fertilisation
- control of pests and diseases that affect each crop, focussing on the ones most commonly found in Terra Alta (olive fruit flies, scale insects, olive moths, olive thrips and olive peacock spot), determining the phytosanitary treatment thresholds (products, doses and safety periods to prevent residue in the oils).

16 plots will be selected for the study (four from each cooperative). Three harvesting periods will be established for each one of the 16 plots in accordance with the maturation of the olives.

## C. Olive oil production

A protocol will be prepared to ensure delivery of the olives in a uniform and hygienic manner, establishing the optimal frequency calendar to achieve maximum quality in the reception of the raw material at the oil mill where extraction will be carried out. All the 500 kg batches harvested from the 16 plots distributed among the four cooperatives participating in the project in the various maturation periods (82 in total) will be transported in accordance with this protocol.

Preliminary analyses will be conducted on the expected yield and maturation index of each olive batch. Once at the mill, the most suitable characteristics to improve the quality of the oil will be studied, taking into account the following variables: batch quantity, water, talc, olive variety, paste malaxation temperature and time, and purification or phase separation (vertical centrifugation and/or decanting).

The extraction and separation techniques will be especially studied for olives harvested at the time of optimal maturation, whose quantity will be triple that of the other periods (three 500 kg batches).

The organoleptic properties (oil category, fruitiness levels, aromatic notes...) and the physical and chemical characteristics (acidity level, peroxide index, K270 index, humidity, impurities...) of the different oils will be studied to determine their quality. Moreover, the EURECAT Technology Centre will conduct complex analyses using an innovative nuclear magnetic resonance (1H NMR) method.

This extremely useful analysis identifies and quantifies a wide variety of lipid species present in olive oil.

In olive oil it is also possible to analyse typical compounds like fatty acids and triglycerides, sterols, volatile compounds, phenolics, phospholipids and trace metals. Fingerprint or profile analyses can also be conducted to determine, without any prior knowledge of which compounds are to be analysed, the characteristics of a sample in order to certify its identity. It should be stated that 1H NMR analyses can also be used to monitor the oxidation of vegetable oils and their derivatives, given that it poses a major risk to quality and may lead to the deterioration of the oil. It is possible to detect primary oxidation products, such as hydroperoxides, and secondary oxidation products, such as aldehydes.

D. Preparation of a good practice guide and dissemination of the results.

## Expected results and practical recommendations

---

Good practice guides will be prepared based on the results. Firstly, an agronomic protocol will be produced to provide guidelines on the field level to guarantee that the tasks carried out through to the harvesting of the olives and their transportation to the oil mill are optimal in order to ensure raw materials of the best possible quality. Secondly, a protocol will be produced on the optimal extraction and centrifugation conditions to obtain the best Terra Alta PDO olive oil.

By applying the soil, phytosanitary, irrigation and optimal harvesting good practices, producers can ensure that more high-quality oil is extracted from their annual olive production.

These good practice guides could be adapted to other olive oil production areas.

### Task force leader

---

Entity: **UNIÓ FRUITS, SCCL**

Contact e-mail:

**f.rovira@unio.coop**

Typology of entity:

**Agri-food company**

---

### Task force coordinator

---

Entity: **CONSELL REGULADOR DOP OLI TERRA ALTA**

Contact e-mail:

**info@dopoliterraalta.com**

Typology of entity:

**Agri-food company**

---

### Other task force members (grant beneficiaries)

---

Entity: **AGRICOLA DE CORBERA D'EBRE, SCCL**

Contact e-mail:

**administracio@agricolacorbera.com**

Typology of entity:

**Cooperative**

---

Entity: **AGRICOLA SANT ISIDRE DE LA FATARELLA, SCCL**

Contact e-mail:

**fatacoop@hotmail.com**

Typology of entity:

**Agricultural company**

---

Entity: **AGRICOLA SANT SALVADOR D'HORTA, SCCL**

Contact e-mail:

**coop.horta@tinet.cat**

Typology of entity:

**Agricultural company**

---

Entity: **COVILALBA, SCCL**

Contact e-mail:

**covilalba@covilalba.com**

Typology of entity:

**Agri-food company**

---

## Other task force members

---

Entity: **EURECAT**

Contact e-mail:  
[nuria.canela@eurecat.org](mailto:nuria.canela@eurecat.org)

Typology of entity:  
**Technology centre**

---

### Subject area(s) of application

Agricultural production system  
Farming practice  
Food quality/processing and nutrition  
Pest/disease control  
Soil management/functionality  
Water management

### Geographical area(s) of application

<b>Province(s)</b>	<b>Region(s)</b>
Tarragona	Ribera d'Ebre Terra Alta

---

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

---

- Meetings with company directors
- Informative seminars for the producer partners responsible for the project's experimentation plots.
- Informative seminars for the partners of the cooperatives taking part in the project.
- Informative seminars on the results of the studies and the project.
- Press articles to disseminate the project.

### Project website

---

<http://www.unio.coop/ca/projectes.html>

### More information on the project

---

#### Project dates

Starting date (month-year): June 2018

Completion date (month-year):

Current status: *Underway*

#### Budget approved

**Total budget: €209,340.00**

DARP funding: €85,544.46

EU funding: €64,533.54

Own funding: €59,262.00

### With funding from:

---



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



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

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 of grants for cooperation for innovation through the promotion of the creation of European Association for Innovation task forces in terms of agricultural productivity and sustainability and the execution of innovative pilot projects by these groups.*

*Resolution ARP/1868/2017, of 20 July, calling for applications for grants for the year 2017.*

Project ID: 017\_2017