

# Gest-Oli: using ITC in the olive oil industry

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## Abstract

Olive oil is one of the most representative products of the Mediterranean diet, and therefore it is not surprising that many producers focus their efforts on providing quality guarantees to their products. For the reason, in the Balearic Islands was established in 2002 the appellation of origin *Oli de Mallorca*. The regulatory bodies managing the oil produced under this flag establish a series of requisites, as well as defined protocols. In this way, the whole process has to meet health regulations, as well as oil traceability. This process was typically done on accounts books where all the oil was registered, so the process could be controlled by different regulatory bodies and Administration. This task was difficult, cumbersome and slow so a new project called Gest-Oli was launched. It aims to streamline the entire process of documentation and control of oil production. This project involves the development of a software application based on web environment where all actors involved in the production process (authorities, regulatory board, and companies producing olive oil, packers and traders) can monitor and control the evolution of the production, from collecting the olive to marketing. In this sense we can say that this control allows to know the status in real-time of the harvest and thus may provide effective control policies, promotion and marketing, as well as immediate control of traceability in the case of a health alert. Furthermore, the system integrates with e-government which offers the convenience to realize all mandatory paperwork from home. Finally it is important to mention that the system brings safety to the end consumer as it can show the traceability of the products on Internet automatically.

## Résumé

L'Huile d'olive est l'un des aliments les plus représentatifs de la diète méditerranéenne, il n'est donc pas surprenant que les différents producteurs doivent concentrer leurs efforts sur la fourniture de produits de marque de qualité. En ce sens, aux îles Baléares a été créé en 2002 l'appellation d'origine *Oli de Mallorca*. La législation régissant l'huile produite avec cette procédure dans une série de dossiers, ainsi que d'un pipeline déterminé. Tout comme son ensemble doit respecter les règlements de santé, et de traçabilité. Ce processus est généralement effectué par quelques grands livres, où tous les registres sont établis, le processus peut être contrôlé par des entités de production différentes. Cette tâche est difficile, lourde et lente qu'il a lancé un projet appelé Gest-Oli vise à rationaliser l'ensemble du processus de documentation et le contrôle de la production de l'huile. Grâce à ce projet qui implique le développement d'une application informatique basée sur l'environnement web tous les acteurs impliqués dans le processus de production (les autorités, le conseil de réglementation, et les sociétés produisant de l'huile d'olive, des emballeurs et des commerçants) peut surveiller et contrôler l'évolution de la production, de la collecte de l'huile à la commercialisation. Dans ce sens on peut dire que grâce à ce contrôle on peut connaître l'état de la récolte en temps réel et ainsi diriger des politiques de contrôle efficaces, la promotion et le marketing, ainsi que le contrôle immédiat de la traçabilité dans le cas d'une alerte sanitaire. Cette application s'intègre avec le système d'administration digitale que permet la réalisation de tous les documents officiels nécessaires à partir de son domicile. Enfin on remarque que le système permet la sécurité du consommateur final car elle peut montrer la traçabilité des produits par Internet automatiquement.

## Introduction

The area of olive on the island of Mallorca is about 1450 hectares in the 2008/2009 and produced a quantity of oil that allowed 118,217 liters of oil qualified by the DO (Denomination of Origin) *Oli de Mallorca*. There are 6 mills and 11 that allow bottlers the service to more than 400 olive producers. Expectations of future foresee a sustained output growth in the coming years and a gradual increase oil export to national and international level.

Regulation (EC) No 178/2002 of the European Parliament and Council laying down the principles and requirements of food law, article 18, introduces for the first time horizontally, for all food businesses and feed, the requirement to have from 1 January 2005 a system of traceability "of food, feed, animals for food production and any other substances to be incorporated into a food or feed, or is likely to be".

Thus, each company must have a document management system to identify and track products that enter, stay and leave your business in a flexible, fast and efficient, so that when faced with a loss of security product necessary action can be taken.

Moreover, the fact of creation in 2002 of the DO *Oli de Mallorca* forces, according to the regulation of oil producing companies and oil producers to maintain a complete set of records with the aim of allow both the regulatory council of oil as the regional administration, verification of compliance with all requirements of relevant regulations for obtaining the brand.

The companies involved in oil production process used a traceability system and manual records, based on different books that should be filling, which involves a significant consumption of time and possible errors in the generation of data entry in books. Moreover, in many cases, doubles much of the information entered since production claim should be made to different entities responsible, as the Regulatory Board or the Department of Agriculture of the Govern de les Illes Balears.

Also inspections by these entities is particularly laborious and liable to be followed throughout the process manually and in situ, since there is no access to books until they physically come to the mills. This means that the conduct of these inspections is too slow, thus damaging both for firms and institutions inspectors.

### Initial situation

Controlling oil production is done through a set of books and some forms of control that the agents of production must be completed.

The mills have 3 books and 1 pending registration in order to be able to monitor compliance with all current regulations.

These books are:

- Input control for oil.
- Input control for oil production.
- Stocks of oil.
- Processing of monthly statement of movements.

Meanwhile packaging firms and marketers must complete 2 books of record and 3 procedures, it is:

- Stocks of oil.
- Book of bottling.

- Labelling approval process.
- Order the labels for application process from the designation of origin.
- Processing of monthly statement of movements.

These books are difficult to fill, as an example in [Fig 1] shows the book stocks of oil. Moreover the data to fill in the books and procedures are often the same, which involves performing the same work several times and possible inconsistencies in the data from failed.

IN						OUT					
Date	Elaboration N°	Acidity	Liters	Deposit	Remarks	Date	Deposit	Liters	Acidity	Destination	Remarks

Fig. 1. Stocks of oil.

## Project Objectives Gest-Oli

The project's main objective is to improve competitiveness and productivity of companies in the oil sector through the implementation of a software application that allows to control the entire oil production process.

Through the development of the project is expected to get a tool to manage easily and integrated across the oil production process, interrelating with all stakeholders and facilitating the registration procedures and traceability inherent in the sector. Also, will optimize and perform all the procedures with the agencies responsible for the statements necessary to comply with current legislation, quality checks and have a rapid response in case of health alert.

It aims to achieve the main objective of the project by achieving the following objectives:

- Development of an application for the management of oil production process.
- Development of a module to control the olive harvest.
- Development of an electronic process module with the controlling entities.
- Incorporating an electronic card system based on RFID (Radio Frequency Identification) to facilitate the processes of buying and selling of olive.
- Using a digital signature system that gives legal certainty to the process.

Given the characteristics of the application to be developed, based on web technology, it is expected to incentive the use of Information and Communications Technologies, specifically the Internet and local networks in the field of oil producing companies and oil. Encouraging also the use of ICT solutions, such as the electronic card, to manage the sale and purchase processes for managing sales and inventory online.

It expects to get a final open and scalable system that can be easily adaptable to other agri-food sectors.

Finally, it is intended that the outcome of the work is not limited to the regional level of the Balearic Islands, but can be exported to other oil producing regions.

## Description

### Beneficiaries

This project is aimed primarily at two business groups:

- Olive producers. Using the application and incorporation of the module to support producers of oil RFID card system has improved competitiveness and productivity of these enterprises streamlining their production processes. Moreover, being an application based on a web environment, it seeks to promote the computerization and introduction of new technologies and the Internet for these companies.
- Oil producing companies. Using the application of these firms, improving their competitiveness and productivity, improving the management of their daily practice of oil production, traceability and paperwork with the appropriate regulatory agencies.

It should also be noted that the use of RFID card system allows a more fluid relationship between olive producers and oil producing companies, improving their processes of buying and selling, integrating, so these two groups.

Apart from business groups, other groups to whom the project is also targeted and benefit from its results:

- Control bodies: both the regulatory council of the appellation of origin of the olive oil and the public administration, have immediate access to production data, streamlining the various quality control procedures and enabling a rapid response in case of health alert.
- Consumers: the fact that all data on production processes are centralized, allows the actions of specific product promotion. For example, it can make a website which provide information on olive oil for their customers or send specific information production process through SMS messages to mobile phones.

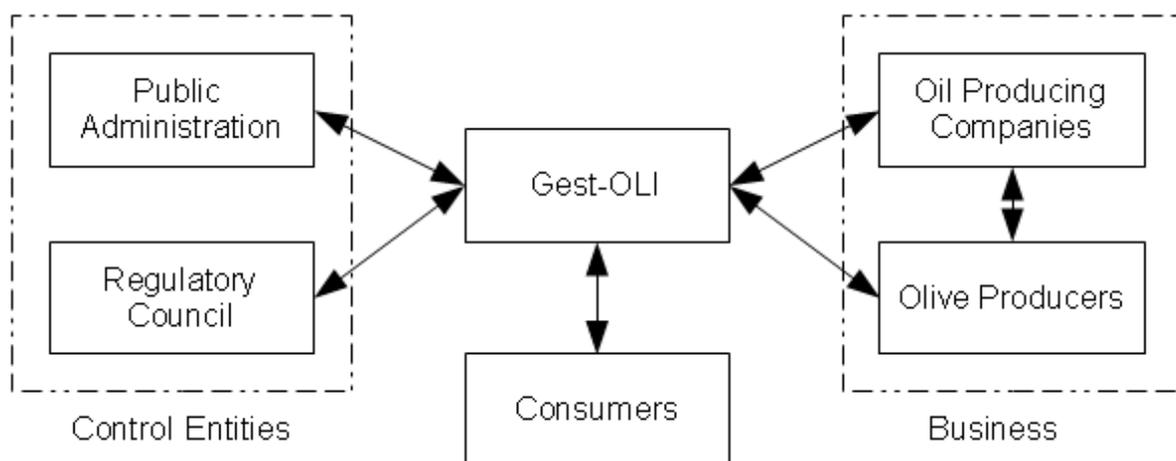


Fig. 2. Project beneficiaries

### Applications

The application is divided into several modules according to the users who use it.

#### *Administrator*

This user is directed to the competent authorities, in the Balearic Islands case corresponds to the

Regional Ministry of Agriculture and Fisheries. Its function is to control and most important acts to:

- See the traceability of a specific olive oil.
- Specific queries from a particular producer such as the oil quantity be produced, available oil, olive entry ...
- Get statistical queries from a global perspective, such as olive oil produced, olive harvest ...

### *Control Board*

The main task of this user is to control the production process and quality of oil marketed under the brand *Oli de Mallorca*. This user is composed of two profiles, one aimed to the management of those involved in the production process and other oriented to the control of oil quality.

Regarding the profile of the main actions that management can perform:

- Define and manage oil production harvest.
- Managing olive yards that can produce olive for the label "*Oli de Mallorca*".
- Managing land and olive production capacity.
- Manage mills and packaging mills that can produce and / or sale to the market the oil.
- Manage the users of the application.
- Manage production primers of the olive producers.
- Manage productivity, rates, etc..

For its part the actions to highlight the control profile are:

- Follow the traceability of a parcel.
- Enter an analytical performed in the system.
- Declaring a parcel as qualified or unqualified for the label "*Oli de Mallorca*".

### *Mills*

The functions of a mill will control the production process from the olives coming in until the oil goes to a packer or sold in bulk. For this reason, their functions available are:

- Configure the setting with all the tanks in use.
- Make entries of olives coming from olive producers to be identified by RFID tags.
- Perform the production of oil from existing in the olive in the mill.
- Transfer oil from one tank to another and allow mixes.
- Indicate losses of oil for different reasons.
- Disqualifying oil computed as DO.
- Shifting a tank to a packer.
- Perform setting oil output.
- Perform consultations on the information already entered in the mill.

### *Packing*

A packer can do the bottling and labeling process oil as part of an oil that arrives from a mill from its establishment and bottled, labeled and sold. Thus, its functions are:

- Configure the settings with all the real tanks available and used.
- Transfer oil from one tank to another and can make mixes.
- Indicate losses of oil for different reasons.
- Disqualifying oil we have is DO.
- Moving a tank to a mill.
- Bottling oil in bottles or jugs of different sizes.
- Labeling of the Regulatory Board to the oil bottled.
- Perform setting oil output.
- Perform various consultations on the information already entered in the mill.

### *Packaging Mill*

This type of user has all the features of the previous two. Therefore, an oil-filling may perform the process from input to output olives for oil bottles DO with labels.

### *Olive producers*

The user with the role of olive growers corresponds with the producer of olives. His actions in the application are few and are summarized as:

- User configuration
- Make entries of olives in a mill identified with an RFID card.
- Consult its production.

### *Consumer*

Consumers can benefit from the application by getting further information on the oil they have bought, in particular the most outstanding actions may be:

- Get product traceability information through Internet or SMS.
- Observe the plots where the olives come from and that have been used to produce the oil in a geopositioning system.

### *Processing system*

This module allows the producing and trading companies of olive oil with appellation of origin *Oli de Mallorca* realize on-line all the procedures with the Administration and the Regulatory Council. Additionally, the data introduced in Gest-Oli is automatically transferred in the forms affected by this information, thus ensuring that data retrieved from the system not be introduced again and thus avoiding possible errors in calculation.

Thus, a company shall have a pending tasks section which will be activated and deactivated the procedures to be performed at any time since the company starts itself the process, verify that the data is correctly entered in the application and send the process to the managing or regulatory board, this procedure is fast, agile and secure.



Fig. 3. Mill visit

## Advantages

Allows simplifying the bureaucratic tasks both olive growers, oil producers, packers and Regulatory Board.

- It is the first on-line system for oil management and accounting.
- It allows the mills and /or packaging companies to track its establishment anywhere in the world.
- Allows on-line statements related to oil Regulatory Board.
- Allows to avoid paperwork and to the procedure on-line, giving the same legal validity as those signed with the traditional system.
- It allows oil producers and packers, to show their clients and people at large, transparency of its system of traceability and control.

- Innovative traceability system, safe and easy. Data is available in real time to supervisors.
- Allows promotion and/or advertising actions through websites, sms, ...
- Statements to the regulatory board and administration will be sent online and this will greatly simplify the work of operators.

## Conclusions

With Gest-Oli you can have total control over the production process of the oil with appellation of origin *Oli de Mallorca* as each one of those involved in this process may be recording the actions they perform. This results in real-time control over the oil and the possibility of providing more information to the final consumer to ensure the quality of the product and more security. Moreover it provides administrative ease and control to the stakeholders thus improving productivity and efficiency of the production process.

## Acknowledgments

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