

## Innovation for quality, safety and sustainability in the wild food products (WFP) value-chains: reformulating artisanal stages of acorn processing

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### Context:

The use of acorn for human consumption, dates back several centuries and is well documented in the literature and archaeological findings in the Iberian Peninsula. However, nowadays, it is mainly used to feed livestock. In Montado Alentejano, where the oaks that produce them abound, acorns are potentially one of the most important resources for human consumption in various forms: dried and peeled, in flours or in processed foods such as breads, soups, hamburgers, crackers and cookies or pâtés.

This has been one of the main goals of HFM, which seeks to produce food in a sustainable way.

The main problems faced are: i) maintaining the quality of the product, especially in the grinding phase with great variations both in granulometry and in the presence of bark traces, ii) the slow, expensive, and artisanal process, which results in overvalued products, which might otherwise be more accessible, iii) the inter-annual variability of acorn production, with consequences on the unpredictability of the production, and iv) acorn harvesting process.

### Objective:

At HFM, the acorn processing is carried out in a micro factory whose unsophisticated equipment is suitable for small-scale manual work. This way, the flow of processed raw materials is slow, expensive, and inconsistent.

Once the difficulties and obstacles in this particular phase of acorn processing have been identified, the objective is to introduce one or more innovations that will make it more sustainable, safe and efficient.

By reformulating one of the most artisanal stages of acorn processing - flouring in manual mills, through the introduction of a semi-industrialized process in large-scale mills with greater capacity, we have improved an important part of the transformation chain.

Studying the acorn production and its relationship with edaphoclimatic and tree factors, we develop methods and tools that allow the monitoring and forecasting of production.

In the medium term, several tools used for stone pine at this time can be adapted - sampling in the field of quality and, if considered interesting, the amount; models for predicting production according to the climate, etc.

### Expected Results:

The expected results are: i) anticipating the production of the raw material, allowing for better planning of its destination (internal flows for production on the farm or sale abroad), ii) greater quantity of processed product available in reduced time; iii) decrease in the need for labor and consequent cost reduction; iv) homogeneity and consistency to obtain a finished product with higher quality and better value.



**Figure 1.** Acorn open air drying. After harvesting, acorns are placed on grids, on the floor, in a roofed and ventilated space. Credits: Cooperativa de Usuários do Freixo do Meio.



**Figure 2.** Acorn peel. Acorns are dumped continuously through a funnel and goes by a paddle mill that rotates high speed, breaking it and detaching it from shells. Credits: Cooperativa de Usuários do Freixo do Meio.



**Figure 3.** Acorn flour. One of the processed products its acorn flour made in a small electric mill. Credits: Cooperativa de Usuários do Freixo do Meio.