A clear objective: to complete the nutrient cycle in the production system. Since the year 2000 the Olivarera Los Pedroches Soc. Coop. And has studied and worked toward the use of the alperujo (waste material from the olive oil extraction) from the almanzara (Olive Oil mill) as an organic fertilizer with ideal qualities for the fertilization of the olive grove.

If we consider the grinding process where the extra virgin olive oil is extracted from the olive (composed for the most part of fatty acids, that is to say, H, C or O joined by different types of bonds), we perceive that is in the alperujo where the macro and micro nutrients are accumulated (especially Nitrogen and Potassium), that is to say, the part that the olive needs for its development. This material, together with the olive leaves removed while cleaning the olive fruit, is employed to recover these nutrients and return them to the soil of the olive groves as an organic fertilizer, by means of a natural process of fermentation such as composting.

We fulfill two purposes with the development of our composting plant: to re-use the alperujo as a fertilizer, and to offer to our associates this organic fertilizer for their olive groves. We seek to reduce the cost of fertilization of the olive grove and, at the same time, use a high quality product. This closes the nutrient cycle of the production system of the organic olive grove.

The composting that we refer to is not recently invented; it is a very old technique. Columella in his book Res rustica described it as ?when the piles of harvest residues with animal dung are mixed with water it produces heat and transforms the mixture into a different product, an organic fertilizer?.

Composting is an organic process of fermentation that needs oxygen. This process consists of a series of stages characterized by the activity of different organisms, with a very close relationship between temperature, pH and the type of microorganism. In this way, although in the beginning of the process, the mixture is at ambient temperature, the microorganisms that it contains start an intense activity that makes the temperature increase to thermophilic values (more than 40 ºC) where bacteria are predominant. Then after a cooling stage, funguses become the primary agents of the process, and finally, there is the maturation or stabilization stage, where the mixture returns to ambient temperature.

Being a biological process, composting requires a number of environmental conditions for its adequate development: proper materials, humidity, ventilation, etc.

At the same time, with this composting project, the following environmental indicators are favoured:

1. **Management of a by-product of the olive oil mill.** This is one of our most important improvements, because olive oil mills do not normally manage their own by-products. As we have previously said, the alperujo from the grinding process used to go to the olive pomace industry, where it was dried out and [-] treated more as an industry waste rather than a by-product. In these olive pomace industries the remaining fat of the pomace is extracted, by means of consecutive high-temperature heatings and chemical processing, giving olive pomace oil and the remaining solid material is sent to an electric cogeneration plant. This drying process of the alperujo requires a large expenditure of electric energy. Our project radically modifies the approach to treating the ?waste?, considering it a by-product (the ideal name) or resource. This transformation occurs in a natural way and does not cause any kind of environmental pollution, as has been demonstrated in several studies. The management by the Cooperative of its own by-product is completely new and innovative, and also environmentally feasible and viable.

2. **The improvement of fertilization of the soils.** The main purpose of this product transformed into an organic fertilizer is to use it in organic olive groves. The application of organic matter will undoubtedly improve the soil conditions where the olive trees are cultivated. The direct consequences of the use of the organic fertilizer are: the improvement of the soil structure, the increase of its capacity for water retention, a better utilization of the soil?s elements on the part of the trees, the provision of further nutrients, etc. This will greatly improve poor soils, clearly strengthening the ?soil quality?
environmental indicator as a stratum or physic support of environmental diversity, and ensuring the preservation of natural resources.

3. **Potential for greater biodiversity.** As a consequence of the improvement of the soil, the biological diversity of the whole environment will be promoted. Many studies affirm the relationship existing between biodiversity and stability; if we tend to a stable system, it will always be an advantage for the environment. Vital to this biodiversity is the strengthening of the vegetation component, due to the improvement of the soils caused by the organic matter added in all ecosystems, the base on which other different types of organisms and relationships depend is the vegetation component.

4. **The reduction of erosive processes.** As a consequence of what we have previously said, in areas of steep slopes, the improvement of soil structures as well as the growing of ?weeds? will undoubtedly be a factor to take into consideration to avoid erosion and to improve the soil?s capacity to retain water and the trees? utilization of it.

5. **Potential for regeneration.** We try to estimate the possibility of restoring, in the future, the Mediterranean forests affected by inadequate management systems. Our agricultural system of the olive grove arises from the simplification of a natural system, the Mediterranean forest. We have proven that with the benefits caused by the contribution of organic fertilizer, this simplification will not be so intense as to hinder the restoration of the ecosystem to conditions very close to those existent before the human intervention. If we maintain and increase this potential for regeneration, we will avoid going beyond the threshold of irreversibility of existing damages. All of this leads us to a management system of natural resources that could be considered sustainable.

In addition to the environmental indicators as the basis of this project, social and economic indicators are also improved, given the higher quality of the product obtained, and increased productivity, profitability, self-reliance, organisation, creation of employment, etc.

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**Organic Extra Virgin Olive Oil - Olivarera Los Pedroches - We don?t only produce Organic Extra Virgin Olive Oil**

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