

## Valorisation of two-phase olive mill solid waste for biogas production

CSIC and the University Pablo de Olavide have developed an improved procedure for obtaining biogas from the anaerobic co-digestion of two-phase olive mill solid waste (“alperujo”), the main by-product generated in the production of olive oil, with a microalga. This procedure allows increasing both the methane yield in the biogas and the rate at which it is produced.

Industrial partners dedicated to the treatment of wastes and by-products by means of anaerobic digestion, are being sought to collaborate through a patent licence agreement.

### *An offer for Patent Licensing*

#### Circular Economy in the olive oil industry

Alperujo is the main by-product resulting from the extraction of olive oil in oil mills. It is an organic by-product of lignocellulosic nature and deficient in nitrogen, which slows down its potential decomposition by anaerobic microorganisms.

The treatment of alperujo in anaerobic co-digestion with biomass from a species of microalga, in a suitable proportion, complements the lack of nitrogen in the alperujo, and by controlling other fundamental factors of the process (type of inoculum, trace elements in the mixture, temperature, agitation of the mixture in the digester, etc.) the metabolism of the microorganisms is improved and the final amount of methane obtained and its production rate is increased.

The biogas produced in this anaerobic co-digestion represents an energy benefit in form of methane, which could be used in cogeneration engines to produce heat and electricity for the own mill or industry where the process is carried out and to reduce external energy consumption.



Alperujo storage pond.



Anaerobic digester for biogas production.

#### Main innovations and advantages

- The anaerobic co-digestion alperujo-microalga increases a 29% the methane production yield and a 35% the methane production rate compared to the digestion of alperujo (individually)
- The anaerobic co-digestion alperujo-microalga improves the treatment of this by-product that, due to its recalcitrant nature and large quantities produced annually, is an environmental and logistical problem for olive oil mills)
- No pre-treatment is required.

#### Patent Status

Priority patent application filed suitable for international extension.

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