



Biosolarization in garlic crop

Concepcion Fabeiro, Manuela Andres, and Consuelo Wic

Higher Technical School of Agricultural Engineering, Albacete, Spain (concepcion.fabeiro@uclm.es)

One of the most important limitations of garlic cultivation is the presence of various soil pathogens. *Fusarium proliferatum* and *Sclerotinium cepivorum* and nematode *Ditilenchus dipsaci* cause such problems that prevent the repetition of the crop in the same field for at least 5 -8 years or soil disinfection is necessary. Chemical disinfection treatments have an uncertain future, in the European Union are reviewing their use, due to the effect on the non-pathogenic soil fauna. This situation causes a itinerant cultivation to avoid the limitations imposed by soil diseases, thereby increasing production costs.

The Santa Monica Cooperative (Albacete, Spain) requested advice on possible alternative techniques, solarization and biosolarization. For which a trial was conducted to evaluate the effectiveness on the riverside area of the municipality. This place has recently authorized irrigation, which would allow the repeated cultivation of garlic if the incidence of soil diseases and the consequent soil fatigue could be avoided. Additionally, this work will serve to promote the cultivation of organic garlic. Last, but not least, the biosolarization technique allows to use waste from wineries, oil mills and mushroom crops. (Bello et al. 2003).

The essay should serve as demonstrative proof for farmers' cooperative members. The specific objective for this first year is to assess, the effect on the global soil biota, on the final garlic production and quality and the effect of biosolarization to control soil pathogens.

The trial is set on a cooperative's plot previously cultivated with corn. 5 treatments were set, defined by different amounts of organic matter applied, 7.5, 5, 2.5 kg m⁻², a solarized with no organic matter, and a control without any treatment. The plot has inground sprinkler for full coverage with four sprinkler lines demarcating the five bands of differential treatment, randomly arranged.

Organic matter was incorporated the August 14, 2013, then thoroughly watered until field capacity and covered with clear plastic (160 gauges). Plastic remained until 28 October. There have been two soil sampling, July 24 and November 4. Garlic bulbs were planted in December 23. Selected "Morado" variety, obtained free virus by in vitro culture by the own Cooperative was used. The culture will run until July, following homogeneous organic practices for the 5 treatments.

The microbiological activity of a soil directly influences the stability and fertility of a crop. The most common indices used to measure the metabolic activity of the soil are, apart from the net nitrogen mineralization, microbial respiration, soil enzyme activities and the energy involved in the processes (Brookes, 1995; Nanipieri, 1994).

Soil samples taken in the different experimental conditions were cleaned, sieved and kept in the laboratory at 4° C for immediate analysis of respiration, biomass carbon and enzyme activities (β -glucosidase, phosphatase, urease and dehydrogenase). They were then dried for analysis of physico-chemical parameters, total carbon and nitrogen, phosphorus, conductivity, pH and carbonates.

At the time of this summary, biosolarization shows to be effective in controlling weeds before crop planting. The results of soil analysis show a significant effect on the indicators studied.