



Cynara cardunculus suitability as energetic crop in the south east of Spain using compost as amendment

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Global warming demands urgent actions to reduce problems derivated from it. In this sense, fossil fuels should be replaced gradually with renewable energy sources, like energetic crops, to decrease or at least maintain CO₂ levels in the atmosphere. For example, net carbon emissions from generation of a unit of bioenergy are 10 to 20 times lower than emissions from fossil fuel based generation. Compared with fossil fuels, the use of lignocellulosic feedstocks has greenhouse gas reduction potential and highly positive net energy returns because of low input demand and high yields per unit land area. In addition, conversion of degraded agricultural soils to perennial crops can improve soil quality by increasing C sequestration due to their perenniarity, high biomass production, and deep root systems. For all these reasons, the aim of this study is to ascertain *Cynara cardunculus* sp suitability as energetic crop in the south-east of Spain, using compost as organic amendment.

Five compost treatments were applied to the soil: 0 (D₁), 20 (D₂), 40 (D₃), 60 (D₄) and 80 (D₅) t of compost/ha. The experiment lasted 5 months, sampling 3 times (January; April and June). Twelve *Cynara Cardunculus* plants were placed in each plot (4x7 m); half of them were collected at the end of the experiment. Treated sewage water was used to irrigate the crop. Organic carbon in soil and above ground biomass were studied.

Dry weight yield production was between 494 (D₄) to 740 kg/ha (D₃). Considering that 45 to 50 % of plant dry weight matter could be assumed as carbon, carbon sequestration range from 0.8 to 1.2 t of CO₂/ha for a short period of 5 months. Soil Organic carbon levels, at the end of the experiment, increased in each compost treatment compared with control value as follow: 16% (D₂); 33% (D₃); 43% (D₄) and 73% (D₅).

The results show that *Cynara cardunculus* sp could be used as energetic crop in the south east of Spain, as it was suggested by the European Environmental Agency. However, further studies are needed with longer test time to set production potential of biomass, organic matter evolution and nature, carbon sequestration balance and compost influence in these properties.

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