

Effect of different mulch materials on the soil dehydrogenase activity (DHA) in an organic pepper crop

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The use biodegradable materials (biopolymers of different composition and papers) as an alternative to conventional mulches has increased considerably during the last years mainly for environmental reason. In order to assess the effect of these materials on the soil microbial activity during the season of a pepper crop organically grown in Central Spain, the soil dehydrogenase activity (DHA) was measured in laboratory. The mulch materials tested were: 1) black polyethylene (PE, 15 μm); black biopolymers (15 μm): 2) Mater-Bi[®] (corn starch based), 3) Sphere 4[®] (potato starch based), 4) Sphere 6[®] (potato starch based), 5) Bioflex[®] (polylactic acid based), 6) Ecovio[®] (polylactic acid based), 7) Mimgreen[®] (black paper, 85 g/m²). A randomized complete block design with four replications was adopted. The crop was drip irrigated following the water demand of each treatment. Soil samples (5-10 cm depth) under the different mulches were taken at different dates (at the beginning of the crop cycle and at different dates throughout the crop season). Additionally, samples of bare soil in a manual weeding and in an untreated control were taken.

The results obtained show the negative effect of black PE on the DHA activity, mainly as result of the higher temperature reached under the mulch and the reduction in the gas interchange between the soil and the atmosphere. The values corresponding to the biodegradable materials were variable, although highlighting the low DHA activity observed under Bioflex[®]. In general, the uncovered treatments showed higher values than those reached under mulches, especially in the untreated control.

Keywords: mulch, biodegradable, biopolymer, paper, dehydrogenase activity (DHA).

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