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Effects of different agricultural management practices in soil microbiological properties in a semiarid Mediterranean agroecosystem

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Intensive agricultural practices could cause a loss of soil quality, particularly in Mediterranean agroecosystems. Soil microbial and biochemical parameters related to microbial activity and soil structure can be used as indicators of soil quality for assessing the sustainability of agricultural ecosystems. A field experiment was carried out in a semiarid agricultural Mediterranean area located at the "El Teularet" experimental field in the Sierra of Enguera (Valencia, southeast of Spain) to assess the influence of different agricultural management practices on indicators of soil biological quality and activity (FE and SIR microbial biomass C, basal respiration, C mineralization coefficients, qCO_2, respiratory quotient (RQ: moles CO_2 evolved / moles O_2 consumed), SIR-to-FE microbial ratio, water-soluble C and carbohydrates and dehydrogenase, urease, protease-BAA phosphatase and β-glucosidase activities), after a period of one year. The management practices assayed were as follows: application of contact herbicide, application of systemic herbicide, plough, planting of oats and vetch

and addition of crop residues, planting of *Medicago sativa*, addition of oats straw, addition of pruning residues, application of residual herbicide and geotextil cover. An adjacent soil under natural vegetation was used as a standard of local, high quality soil. The plots with addition of oats straw had higher values of enzymatic activities, microbial biomass and respiration, reaching similar values to soil under native vegetation. The lowest levels of soil biological quality indicators were observed in the plots with application of some type of herbicide and the plot with geotextil cover. Low values of the RQ were observed in these plots as consequence of the scarce-null inputs of organic matter, suggesting an increase in recalcitrance. The different agricultural management practices affected the quality and content of the soil organic matter. Clearly, these effects in the soil organic matter were the most relevant explaining modifications in the soil microbial activity.