

寿光大棚菜地土壤呼吸强度、酶活性、pH与EC的变化研究

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Changes of respiration, enzyme activities, pH and EC in greenhouse vegetable soils in Shouguang

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摘要 为防治土壤退化、促进农业可持续发展提供科学依据,以寿光地区露地土壤作对照,研究了连作1、5、8和12年大棚蔬菜(番茄)土壤有关生物学指标的变化。结果表明,土壤呼吸强度和脱氢酶活性棚内高于棚外,并随连作年限延长开始增强而后减弱,由于管理差异,12年棚龄土壤又回升。随着连作年限延长,土壤脲酶活性逐渐减弱,而过氧化氢酶活性逐渐增强;土壤呼吸强度和酶活性都由表层向底层逐渐减弱。土壤pH随连作年限增加逐渐下降,而EC逐渐增加,至12年棚龄时,与对照比0—20 cm土层pH下降了1.06单位,其他层次变化不显著。试验还表明,该地区表层土壤pH变化于6.45~7.51,EC< 0.5 mS/cm,能较好地满足作物生长需要,同时,EC是影响土壤pH及酶活性变化的重要因素。土壤EC及过氧化氢酶活性可作为反映大棚菜地土壤质量变化的参考指标。

关键词: 土壤呼吸强度 土壤酶活性 pH EC 大棚菜地 土壤呼吸强度 土壤酶活性 pH EC 大棚菜地

Abstract:

The intensive land use under greenhouse conditions resulted in adverse effect on the soil environmental quality, and soil respiration and enzyme activities are sensitive biological indices to reflect this variance. In order to provide the scientific basis of preventing soils from degradation and promoting agriculture sustainable development, soil respiration, enzyme activities, soil pH and EC were studied in the greenhouse vegetable (tomato) soils under different continuous cropping times (1, 5, 8 and 12 year) in Shouguang, Shandong with the open field soil as control. The result indicated that soil respiration intensity and dehydrogenase activity were higher in greenhouse vegetable soils than that in open field soil. Soil respiration intensity and dehydrogenase activity increased at the beginning, then decreased with the continuous cultivation years, then increased again in the soil of 12 year's continuous cropping. With continuous cultivation, soil urease activity reduced gradually, but catalase activity increased. Soil respiration and all of enzyme activities decreased with soil depths. Soil pH declined with the continuous cropping years while EC increased. Compared with the open field soil, soil pH in 0-20 cm layer under 12 continuous cropping years declined by 1.06 pH unit, however, no notable change was observed in other soil layers. Soil pH of the surface layer in the study area vary from 6.45 to 7.51 and EC values were less than 0.5 mS/cm, which was suitable for crop growth. Soil EC was an important factor affecting soil pH and enzyme activities, consequently, soil EC and catalase activity were proposed as potential indices to reflect the quality of greenhouse vegetable soils.

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