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滴灌均匀系数和施氮量对白菜生长及产量和品质的影响

Effects of drip fertigation uniformity and nitrogen application level on growth, yield and quality of Chinese cabbage

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中文关键词: [灌溉](#) [土壤](#) [水分](#) [均匀系数](#) [白菜](#) [产量](#) [品质](#)

英文关键词: [irrigation](#) [soils](#) [moisture](#) [uniformity coefficient](#) [Chinese cabbage](#) [yield](#) [quality](#)

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中文摘要:

为了完善滴灌均匀系数设计与评价标准,在日光温室内研究了滴灌均匀系数和施氮量对白菜生长、氮素吸收、相对叶绿素含量(SPAD)、产量和品质的影响。试验中均匀系数设置0.62、0.80和0.96 3个水平,施氮量设置150和300 kg/hm² 2个水平。土壤多参数传感器Hydra Probe的监测结果表明,白菜生育期内不同处理的土壤含水率和温度变化动态基本一致,而不同处理间的土壤电导率的差异主要是由其初始值不同引起的。当滴灌均匀系数不大于80%时,白菜株高、干物质质量、吸氮量和产量的均匀系数大于灌水和施肥的均匀系数,且滴灌均匀系数对株高、干物质质量、相对叶绿素含量(SPAD)、吸氮量、产量及Vc含量、总糖、硝酸盐、纤维素等品质指标均值和均匀系数的影响均不显著($\alpha=0.05$)。因此采用过高的均匀系数,对提高产量和改善品质的作用不明显,采用现行滴灌均匀系数的设计和评价标准(均匀系数 $C_u \geq 0.80$)不会对白菜的生长、养分吸收和产量造成不利影响,可考虑适当降低。

英文摘要:

The effects of drip fertigation uniformity and nitrogen application level on crop growth, nitrogen uptake, chlorophyll meter reading (SPAD), yield and quality of Chinese cabbage were investigated in a solar greenhouse to determine the design and evaluation standard of drip irrigation uniformity. Three Christiansen uniformity coefficients of 0.62, 0.80 and 0.96 and two levels of nitrogen applied at 150 and 300 kg/hm² were used. The continuous measurements using TDR sensors of Hydra Probe demonstrated an approximately similar variation pattern of soil water content and temperature during the growing season of Chinese cabbage for all the treatments tested. The observed difference of soil bulk electrical conductivity (ECb) for different treatments could mainly attribute to the difference of the initial ECb values. Plant height, dry matter above ground, nitrogen uptake and yield with the drip irrigation system demonstrated a more uniform distribution than those with water and fertilizers applied at fertigation uniformity coefficient equal to or less than 0.80. It was found that the influence of fertigation uniformity on plant height, dry matter above ground, nitrogen uptake and yield was insignificant at a significance level of 0.05. The quality indexes of Chinese cabbage, including vitamin C, total sugar, nitrate and cellulose were also insignificantly affected by fertigation uniformity at the same significance level. Increasing fertigation uniformity might not necessarily result in an increased yield and an improved quality of Chinese cabbage. As no negative influence of fertigation uniformity on crop growth, nitrogen uptake and yield was observed, it is suggested that lower uniformity values of drip irrigation system below those recommended by the current standards can be considered.

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