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烤烟氮素营养诊断及精准施肥模式研究

Research on nitrogen nutrition diagnosis and precision fertilizing model for flue-cured tobacco

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中文摘要:

为解决烤烟生产中存在过高施氮或不合理的施肥技术措施致使烟叶产质量下降和氮素利用效率低下等突出问题, 该研究于2008—2010年在广东韶关烟草产区以烤烟品种K326为材料, 研究不同施氮水平下不同叶位及叶片不同位置上的叶绿素仪测定值(SPAD值)、叶绿素含量、总氮含量的变化特征及其与产质量的相互关系, 分析实时氮肥管理(RTNM)模式下不同SPAD施肥阈值对烟草产质量及氮肥利用率的影响, 结果表明: 顶三叶的叶中位置SPAD值与叶片叶绿素含量、总氮含量的相关性最好, 且变异系数小, 是较为理想的指示叶或参照叶; 获得较好产质量烤烟时的SPAD值在伸根期和旺长期的阈值范围为38.3~47.2。在设置不同SPAD阈值的RTNM模式下, SPAD阈值40.5~43范围内(氮肥用量为75~110 kg/hm²)能获得较高的烟叶产量、产值, 最高产量和产值分别为2 844.09 kg/hm²和26 989.24元/hm², 烟叶化学成分较为协调。此外, 通过与农民习惯施肥模式(167.8 kg/hm²)相比较, 在SPAD设定阈值为43的RTNM模式下, 相应的氮肥用量为110 kg/hm², 氮肥农学利用率和吸收利用率分别提高53.0%、46.5%, 产值提高了7.4%, 调制后烟叶的淀粉、总氮、烟碱含量显著下降, 烟叶化学成分更为协调, 内在质量较好。

英文摘要:

Application of nitrogen (N) fertilizer in tobacco production is well known to increased yield. However, low fertilizer-nitrogen use efficiency (FNUE) and inferior quality of cured-tobacco leaves is a serious problem in tobacco production in China. According to this problem, taking variety K326 as study object, field experiments were conducted in production area of Shaoguan, Guangdong province from 2008 to 2010. Different N levels were designed to study the relation between SPAD value with chlorophyll contents, the change characteristics of N contents and their influences on yield and quality at different leaf orders and different detecting position. The effects of different SPAD values on yield and quality and FNUE of flue-cured tobacco were analyzed by the SPAD-based N-treatment. The results showed that, the third fully-expanded leaf from the top was more suitable for SPAD detection, which could obtain good relativity of SPAD with chlorophyll content and N content. The greater yield and quality of flue-cured tobacco were gained with SPAD value from 38.3 to 47.2 at root extending stage and fast growing stage. In the SPAS-based N-treatment, the high yield and output value of flue-cured tobacco could be achieved when the SPAD threshold was designed within 40.5-43 (N rate was 75-110 kg/hm²), and were 27844.09 kg/hm² and 26989.24 yuan/hm² respectively. Moreover, compared to the conventional application of fertilizer by farmer, the fertilizer-N agronomic efficiency and recovery efficiency were increased by 53.0% and 46.5% respectively, and the output value increased by 7.4% when SPAD value was 43 in the SPAS-based N-treatment (N rate was 110 kg/hm²). The starch, total nitrogen, tobacco nicotine contents in flue-cured tobacco leaves were decreased significantly. When compared to the conventional application of fertilizer by farmer, the chemical components and intrinsic quality in flue-cured tobacco were also improved under real-time nitrogen management.

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