

研究论文

施氮对墨西哥玉米植株硝态氮累积及产量的影响

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摘要 采用微区试验研究了2个施氮水平(中氮, 300 kg/hm²; 高氮, 600 kg/hm²)下2种施肥方式(一次基施和平均3次分施)对墨西哥玉米(*Euchlaena mexicana*)植株硝态氮(NO₃⁻-N)累积及产量的影响。结果表明, 墨西哥玉米叶片中NO₃⁻-N含量以新生叶较高, 全展叶较低, 老叶居中; 茎鞘和根系的NO₃⁻-N含量在不同收获期表现为第一收获期低于叶片, 第二期仅比新生叶低, 第三期则高于叶片。随着收获次数增加, NO₃⁻-N含量在叶片中呈降低趋势, 在茎鞘和根系中先降后升。高氮水平和分次施肥是造成同一类型叶片NO₃⁻-N累积的主要原因; 高氮分次施肥处理(N2-3)第二期收获的新生叶NO₃⁻-N含量最高, 为92.66 mg/g, 这一数值尚未达动物摄食的潜在致毒剂量。氮素用量增加, 其生产效率降低, 但高氮(600 kg/hm²)一次性基施处理的干物质产量和粗蛋白质产量均显著高于其他处理。综上所述, 较高的氮肥用量一次性基施能够实现墨西哥玉米的高产且不会影响其产品安全性。

关键词 [墨西哥玉米](#) [施氮量](#) [施氮方式](#) [硝态氮](#) [产量](#)

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Effects of Nitrogen Application on Nitrate Accumulation and Yield of *Euchlaena mexicana*

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Abstract *Euchlaena mexicana* is one of forage crops with high yield and high quality, which has been introduced from Japan since 1979. In forage cultivation, mass nitrogen fertilizer are generally applied in order to gain high yield, but over-use of nitrogen will reduce the quality of forage crops, and cause negative effects to the environment as well. A micro-plot experiment was carried out to study the effects of nitrogen application on nitrate (NO₃⁻-N) accumulation and yield of *E. mexicana*. In this experiment, four treatments induced two levels of nitrogen rate (the middle level of 300 kg/ha and the high level of 600 kg/ha), and two modes of nitrogen application (all nitrogen applied as basic fertilizer, and another applied averagely at three times). During the whole growth season, the plants were mowed three times on August 10th (H1), September 11th (H2) and October 12th (H3), respectively, and the plant height was about 110 cm at every harvest stage. Nitrogen fertilizer was applied as dressing at H1 and H2 after mowing. The NO₃⁻-N concentrations of the newly leaves, fully expanded leaves, old leaves, stalks and roots were determined. The results showed that the NO₃⁻-N concentration was high in the newly leaves, low in the fully expanded leaves and middle in the old leaves. The concentrations of NO₃⁻-N in both stalks and roots were lower than those in all the leaves on H1 and in newly leaves on H2, but higher than those in all leaves on H3. With the increase of harvest times, the concentration of NO₃⁻-N was decreased in all leaves. However, the concentrations of NO₃⁻-N in stalks and roots were decreased on H2 and increased on H3. The treatment of high nitrogen and applied averagely three times led to NO₃⁻-N accumulation largely in the same type of leaves. In the treatment of N2-3 (600 kg/ha averagely applied three times), the NO₃⁻-N concentration of the newly leaves was 92.66 mg/g, which was the highest in the three types of leaves on H2, and was still lower than the potential toxicosis dose for animals. With the increase of nitrogen rate, the nitrogen utilization efficiency (NUE) reduced, but the dry matter yield and crude protein yield of high nitrogen treatment (600 kg/ha, applied as basic fertilizer) were significantly higher than that of any other treatment. It comes to a conclusion in *E. mexicana* production practice, high basic nitrogen fertilizer may tend to high forage yield and be safe to livestock.

Key words [Euchlaena mexicana](#) [Nitrogen rate](#) [Mode of nitrogen application](#) [Nitrate](#) [Yield](#)

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