

研究论文

干旱条件下单用草甘膦或添加营养元素作为甘蔗化学催熟剂的效应

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摘要 中熟甘蔗品种桂糖15号在生长后期分别用草甘膦、草甘膦+KH2PO4、草甘膦+H3BO3和草甘膦+KH2PO4+H3BO3进行叶面喷施。结果表明:在严重干旱的条件下,单用草甘膦处理对甘蔗生长和蔗茎糖分积累都不利,而添加营养元素的处理,尤其是草甘膦+H3BO3处理,可缓解草甘膦对生长代谢的抑制效应,使叶片Mg2+-ATP酶和NADP-苹果酸酶活性以及水分和叶绿素含量下降的幅度减小,而进一步抑制了酸性转化酶活性,提高过氧化物酶、多酚氧化酶和中性转化酶活性以及无机磷和蔗糖含量,显著提高甘蔗蔗糖分,改良甘蔗品质,并促进宿根蔗的萌芽发株。

关键词 甘蔗 化学催熟剂 草甘膦 营养元素 代谢 蔗糖积累

分类号

The Effects of Sole Glyphosate or Adding Nutrient as Chemical Ripener in Sugarcanne (Saccharum officinarum L.) under Drought Condition

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Abstract Foliar spray with glyphosate, glyphosate+KH2PO4, glyphosate+H3BO3 and glyphosate+KH2PO4+H3BO3 was conducted respectively at the late growth stage of Guitang 16 an intermediate cultivar of sugarcane (Saccharum officinarum L.). The results showed that the treatment with sole glyphosate was unfavourable for both growth and sugar accumulation of sugarcane and the germination of next ratoon crop under the serious drought condition. Adding KH2PO4 and/or H3BO3 into glyphosate alleviated the inhibition of metabolism related to growth due to glyphosate, and the treatment of glyphosate+H3BO3 was the best in the study. This treatment increased the activities of Mg2+-ATPase and NADP-malic enzyme, and the contents of water and chlorophyll but decreased the activity of acid invertase in the leaves as compared with the treatment by sole glyphosate alone. It also showed higher activities of peroxidase, polyphenol oxidase and neutral invertase, and higher contents of inorganic Pi and sucrose in the leaves as compared with the control and all treatments. As a result, it significantly increased the sucrose content in cane, improved the quality of cane while keeping the same yield of cane, and promoted the germination of ratoon crop as compared with the control.

Key words Sugarcane (Saccharum officinarum L.) Chemical ripener Glyphosate Nutrient Metabolism Sugar accumulation

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