

高温干旱共胁迫下外源甜菜碱和CaCl<sub>2</sub>对烟草生理响应的影响卢军<sup>1</sup>, 邢小军<sup>1</sup>, 朱利泉<sup>2</sup>, 王勇<sup>1</sup>, 殷红<sup>1</sup>, 袁建君<sup>1</sup>

四川省凉山州烟草专卖局, 西昌 615000; 2西南大学植物生理生化实验室, 重庆 400716

Effects of exogenous glycine betaine and CaCl<sub>2</sub> on physiological responses of tobacco plants under stresses of heat and droughtLU Jun<sup>1</sup>, XING Xiao jun<sup>1</sup>, ZHU Li quan<sup>2</sup>, WANG Yong<sup>1</sup>, YIN Hong<sup>1</sup>, YUAN Jian jun<sup>1\*</sup>

1 Sichuan Liangshan Tobacco Monopoly Bureau, Xichang, Sichuan 615000, China; 2 Plant Physiology and Biochemistry Laboratory of Southwest University, Chongqing 400716, China

摘要

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**摘要** 以烤烟品种云烟85为材料, 采用盆栽试验研究了对高温干旱共胁迫的反应, 以及外源甜菜碱(GB)和CaCl<sub>2</sub>对烟草抗高温干旱共胁迫方面的作用。结果表明, 叶面喷施GB和CaCl<sub>2</sub>能显著提高烟草植株生物量。在高温干旱共胁迫下, 叶面喷施GB较蒸馏水处理能极显著提高烟草叶片叶绿素含量、SOD和POD活性, 维持较高的脯氨酸含量及较低的丙二醛(MDA)含量和质膜相对透性; 叶面喷施CaCl<sub>2</sub>较蒸馏水处理能极显著提高烟草叶片叶绿素含量、SOD和POD活性, 极显著降低质膜相对透性, 显著降低丙二醛(MDA)含量, 维持较高的脯氨酸含量。高温干旱共胁迫恢复生长后, GB、CaCl<sub>2</sub>和蒸馏水处理的烟草其叶绿素含量、SOD和POD活性均有不同程度回升, 丙二醛含量、脯氨酸含量、细胞质膜透性都有所下降。因此, GB和CaCl<sub>2</sub>对有效减轻双逆境胁迫引起的伤害, 提高烟草的抗高温干旱胁迫能力具有积极的作用。

**关键词:** 烟草 甜菜碱 CaCl<sub>2</sub> 高温干旱共胁迫

**Abstract:** To evaluate the effects of exogenous glycine betaine (GB) and CaCl<sub>2</sub> on some physiological indexes of tobacco plants in the condition of heat and drought stresses, a pot experiment was conducted. Yunyan 85 was selected as the tobacco cultivar. The results indicate that spraying exogenous GB and CaCl<sub>2</sub> could significantly increase the biomass of tobacco, and the exogenous GB treatment could significantly increase the content of chlorophyll, SOD and POD activities and maintain higher free proline content under heat and drought stresses, whereas the membrane permeability and MDA content in tobacco plant are low. The exogenous CaCl<sub>2</sub> treatment on tobacco leaves could significantly increase the content of chlorophyll, SOD and POD activities and sustain higher free proline content, and significantly decrease levels of membrane permeability and MDA content. After a period of recovery growth, the contents of chlorophyll, SOD and POD activities of Yunyan 85 tobacco plants with exogenous GB, CaCl<sub>2</sub> and H<sub>2</sub>O treatments are increased at different degrees, whereas MDA contents, free proline contents and membrane permeability are decreased. According to these results, it is thought that GB and CaCl<sub>2</sub> have constructive effects in decreasing the injury caused by co-stresses of heat and drought and increasing the heat and drought resistance of tobacco plant.

**Keywords:** tobacco exogenous glycine betaine CaCl<sub>2</sub> co-stresses of heat and drought

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Corresponding Authors: 卢军 Email: junlu200708@163.com

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