

NaHSO₃对姜叶片光合作用与活性氧及氮代谢关键酶活性的影响

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Effects of NaHSO₃ on Photosynthesis and Reactive Oxygen and Nitrogen Metabolism Enzyme Activity in Ginger Leaves

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摘要 采用光呼吸抑制剂NaHSO₃抑制光呼吸后, 测定了姜叶片光合作用相关参数、叶绿素荧光参数、米勒反应及氮代谢关键酶活性等的变化。结果表明, NaHSO₃处理姜叶片1 d后, 净光合速率较对照上升了19%, 但随后呈现下降趋势, 至处理后6 d时比对照降低了17%, 同时伴随着G_s及C_i的降低, NaHSO₃处理显著降低了F_v/F_m、Φ_{PSII}、q_p, 提高了NPO, 增强了米勒反应, 增加了过氧化氢含量, 降低了硝酸还原酶、谷氨酰胺合成酶和谷氨酸合酶活性, 表明NaHSO₃抑制姜叶片光呼吸的同时, 也显著抑制了碳氮代谢。

关键词: 姜 光呼吸 光能耗散 氮代谢

Abstract: Gas exchange, chlorophyll fluorescence, the Mehler reaction, and activities of nitrate reductase, glutamine synthetase, and glutamate synthase were measured after addition of the photorespiration inhibitor NaHSO₃ in ginger leaves. According to our results, after 1 day of NaHSO₃ treatment, the net photosynthetic rate increased by 19% compared with the control. The rate subsequently decreased and was reduced by 17% compared with the control on day 6. Meanwhile, stomatal conductance and the intercellular CO₂ concentration decreased. NaHSO₃ treatment significantly decreased the F_v/F_m, Φ_{PSII}, q_p, and activities of nitrate reductase, glutamine synthetase and glutamate synthase, and increased NPO, the Mehler reaction, and H₂O₂ concentration. These results show that carbon and nitrogen metabolism is reduced when NaHSO₃ inhibits photorespiration in ginger leaves.

Keywords: ginger, photorespiration, light energy allocation, nitrogen metabolism

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