

**Title** Improving sensory quality of iceberg lettuce by postharvest treatment with gibberellic acid and 1-methylcyclopropene

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**Keyword** iceberg lettuce; 1-MCP; gibberellic acid

### **Abstract**

Edible quality both sensorial and nutritional of iceberg lettuce declines rapidly after harvest and considerable losses may occur during storage. The aim of this research was to evaluate what role of ethylene may play in deteriorations of edible quality of the vegetable and efficacy of the postharvest treatment with gibberellic acid (GA3) or 1-Methylcyclopropene (1-MCP) on the quality, nutrition and enzymes of the vegetable during shelf life afterharvest. Results showed that sensory quality of the lettuce was reduced by ethylene but remarkably improved by the GA3 or 1-MCP treatment. Development of russet spot on the leaves was enhanced by ethylene whereas inhibited by 1-MCP or GA3. The rapid decline of soluble sugar content in lettuce leaves during storage at room temperature was further promoted by ethylene but retarded by the postharvest treatment with 200 nL/L<sup>-1</sup> 1-MCP for 24 h or with 0.1 mg/L GA3 spraying the whole head. The protein degradation in the lettuce leaves was strengthened by ethylene but dramatically inhibited by the 1-MCP or GA3 treatment. The treatment with 1-MCP or GA3 retarded accumulation of free amino acids in the leaves while the ethylene stimulated the accumulation. Biochemical determinations indicated that increase in activities of polyphenoloxidase (PPO) and peroxidase (POD) in the lettuce tissues were enhanced by ethylene but significantly inhibited by the 1-MCP or GA3 treatment during storage at room temperature. Furthermore, more effectiveness of improvement of the edible quality of the vegetable was found in the lettuce treated with 1-MCP than GA3 applied in this study. The present study revealed that ethylene promotes the decline of edible quality and senescence of the lettuce after harvest. 1-MCP or GA3 can effectively improve edible quality of the vegetable by inhibiting the ethylene action and provides a practical approach for controlling postharvest quality of vegetables.