

**Title** Quality changes due to different doses of radiation in Mexican garlic from the Bajío

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### **Abstract**

When garlic is stored, significant quality loss takes place due to dormancy breaking, which alters the structure and visual quality of the product. Irradiation limits sprouting in fresh garlic but there has been little study of its effects on the quality characteristics of the product. The purpose of this study was to determine the effects of different doses of  $\gamma$  radiation on the sprouting and quality of Mexican garlic from the Bajío during storage at room temperature and at 15°C. Batches of 120 heads of garlic were submitted to 0, 40, 60, 80, 100, 120, 200, 400, and 600 Gy of  $^{60}\text{Co}$ ; each was divided into two sub-batches for storage at room temperature (RT) and at 15°C. The sprouting index (SI), penetration force, whiteness index (WI), and pungency were measured periodically. After 140 days at 15°C, sprouting occurred in the control garlic. At 600 Gy sprouting was inhibited (25% SI) and at intermediate doses it was partially inhibited (50% SI), without significant statistical differences among these doses. The garlic irradiated at 600 Gy and stored at RT lost more weight (13%), while the weight loss was similar for all the treatments stored at 15°C (14%). The WI was less at 600 Gy (69 WI). The penetration force decreased at 15°C (18.5 to 12.5 N). Irradiation increased the pungency after 70 days of storage at RT (from 0.62 to 2.91 mmol piruvate g<sup>-1</sup> fresh weight (FW) and from 0.77 to 2.52  $\mu\text{mol}$  piruvate g<sup>-1</sup>FW at 15°C.) It is better to not store garlic at 15°C because sprouting is induced and firmness decreases. Irradiation inhibited sprouting and increased pungency levels, which is an aspect to be taken advantage of in the future. Doses of 60 to 80 Gy are recommended so as to avoid radiation damage.