

**Title** Modified atmosphere packaging and postharvest quality of pigeon pea  
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### **Abstract**

Pigeon peas are the most important leguminous crop in Puerto Rico, as they are the most highly consumed. Puerto Ricans prefer to consume fresh pigeon peas rather than canned or frozen peas; however, their shelf-life is shorter than processed pigeon peas, so the use of modified atmosphere packaging (MAP) can play an important role in extending their shelf-life. Therefore, the purpose of this research was to develop a MAP system for fresh pigeon peas to increase their shelf-life and also provide knowledge of the postharvest quality. Pigeon peas were stored at 0, 5, 10, 15 and 20°C, in order to characterize their postharvest quality. Changes in respiration rate, mass loss, titratable acidity (TA), pH, solid soluble content (SSC), texture and color were assessed as quality indicators. Two Cryovac films (PD 941 and PD 961) were evaluated at 0 and 20°C. The treatments were MAP 1 (PD 941 air headspace), MAP 2 (PD 941 2% O<sub>2</sub> + 5% CO<sub>2</sub> + 93% N<sub>2</sub> headspace), MAP 3 (PD 961 with 6 hole punctures of 1mm in diameter) and MAP 4 (PD 961 air headspace). Measurements of %CO<sub>2</sub> were performed at 0, 7 and 21 days. Mass loss, TA, pH, SSC, color, texture and microbiological analysis were assessed at 7, 14 and 21 days. Storing pigeon peas at 15 and 20°C was detrimental to their overall quality, as evidenced by higher respiration rates, greater mass losses, yellowing and decay. In addition, at 0, 5, and 10°C, there were observed minor changes in all indicators of quality, however, chilling injury was found at 0 and 5°C, therefore, 10°C was the optimum temperature for storage. Furthermore, MAP 1 had minor changes in all indicators of quality reaching a shelf-life of 14 days at 0°C, which represents an increase of 100% in comparison to air storage at 0°C in addition to an enhanced green color of the seed. Finally, under temperature abuse of 20°C no off-odor or extensive decay was observed using the film PD941.