

Fusiyah Worraadul 2009: Effects of Controlled Atmosphere Storage and Modified Atmosphere Packaging on Quality of Okra. Master of Science (Packaging Technology), Major Field: Packaging Technology, Department of Packaging Technology. Thesis Advisor: Associate Professor Vaneer Chonhenchob, Ph.D. 131 pages.

Okra (*Abelmoschus esculentus* Moench.) is a rich source of valuable nutrients. Nevertheless, okra has short shelf life (5-7 days at 10°C). It readily turns brown after harvest. The objective of this study was to extend the shelf life of okra by controlled atmosphere storage and modified atmosphere packaging using high gas permeable films. Oxygen tolerance limit of okras stored at 10°C was 2%O<sub>2</sub> (with Nitrogen balance), while carbon dioxide tolerance limit was 5% CO<sub>2</sub> (with air balance). Storage of okra in 10, 15, and 20%CO<sub>2</sub> caused carbon dioxide injury. The optimum controlled atmospheres of okras were 2-5%O<sub>2</sub>+5-7.5% CO<sub>2</sub>. Okras (150 g) were packed in the plastic trays sealed with three types of high gas permeable films (PE-1, PE-2, and PE-3) with various oxygen transmission rates (OTR = 8,700, 19,000 and 23,000 cm<sup>3</sup>/m<sup>2</sup>.day, respectively) and were compared with LDPE film and PVC wrapped film (OTR = 4,100 and 15,000 cm<sup>3</sup>/m<sup>2</sup>.day), commonly being used, and stored at 5°C and 10°C. Okras in PVC packages had highest weight loss. At 5°C, equilibrium modified atmosphere in the PE-3 and PVC packages were 2% O<sub>2</sub> + 5.4% CO<sub>2</sub> and 2.2% O<sub>2</sub> + 5% CO<sub>2</sub> respectively. PE-3 and PVC could maintain the quality of okras for 15-17 days. After 17 days of storage, okras showed chilling injury symptom with water soaking and discoloration. At 10°C, the equilibrium modified atmospheres in the PE-3, PE-2, and PVC packages were 3.4% O<sub>2</sub> + 4.3% CO<sub>2</sub>, 2.4% O<sub>2</sub> + 4.9% CO<sub>2</sub> and 2.3% O<sub>2</sub> + 2.8% CO<sub>2</sub> respectively. Shelf life of okras in the PE-3, PE-2, and PVC packages were 15-17 days. Okras in PE-3 showed the least browning at the end of storage. Gas concentration in the PE-1 and LDPE packages did not reach equilibrium, while carbon dioxide reached 20% and 31% at the end of storage and had the shelf life of 12-14 days and 9-11 days, respectively.

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Thesis Advisor's signature