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Fruits and vegetables are exposed to several types of stress during different postharvest handling operations before they reach the consumer. Stress usually is categorized by environmental or biological factors that induce injury and quality degradation. Postharvest stress is induced by exposure to extremes in temperature or relative humidity, deviation in atmospheric gas composition from that of air and mechanical impacts. Understanding the effects of postharvest stress on the physiological process and an early detection of the stress injury would help in carrying out corrective measures before the injury becomes irreversible. Hence the present investigation was carried out with an objective of studying the effects of some postharvest stresses on the physiological properties and quality attributes of fresh fruits and vegetables. At 5°C, there was a steep increase in the respiration rate from first to 4th day followed by a plateau for 2 to 3 days and then a decline. In contrast to a gradual decrease in the respiration rate at 15°C, there was a gradual increase in the respiration rate of cucumber stored at 10°C after 4 days, which was doubled by the end of 9 days of storage. In cucumber the main low temperature stress symptoms observed were pitting and water soaked areas at 3.5 and 5°C, internal browning at 9°C and off flavour development in those stored below 9°C. Measurement of electrolyte leakage was found to be an effective tool for predicting the occurrence of chilling injury non-destructively in cucumber. Low temperature (5°C) stress conditions did not affect the respiratory behavior of tree ripe Irwin mangoes. The tree ripe mangoes were found to tolerate a low oxygen concentration of 5% at 5°C and up to 10% O₂ at 15°C. The main symptoms observed under low temperature and gas stress conditions in mango were loss of pulp firmness and off flavor development respectively. The tree ripe Irwin mangoes could be stored for 4 to 6 weeks at 5°C without any chilling injury and quality loss using modified atmosphere packaging.