

Abstract

Recently Controlled Atmosphere (CA) and Modified Atmosphere Packaging (MAP) are the techniques, which can be used to extend the shelf life of fruit and vegetables. Especially CA Storage is very effective to keep apple quality by extending storage period, suppressing scald occurrence, and maintaining flesh firmness and titratable acidity. 'Fuji' apples have been widely cultivated in Korea but due to the internal break down, they have not stored under CA conditions. It is assume that the late harvest and CA gas composition is the reason to occur the internal break down. In this study, it is assume that internal break down of 'Fuji' apples is closely related to gas compositions during CA storage. If the gas composition of CA storage exceeds the limits of oxygen and carbon dioxide tolerance, anaerobic respiration will take place in which hexose sugars are converted to ethanol and CO₂. A shift to anaerobic respiration in 'Fuji' apples is undesirable because internal break down will be generated. If the ethanol vapor evolution increased with ethanol contents of flesh, the ethanol vapor evolution is regarded to important factor to control the gas composition during CA storage. First of all, the respiration characteristics (CO₂ evolution, O₂ consumption and ethanol vapor evolution) were measured by closed system and then the measuring data was analyzed using mathematical modeling. The control value of ethanol vapor evolution at 'Fuji' apples established as 0.9 µl/kg hr through the predicted value of the model equations. The storage experiment was carried out at three storage conditions, which were ethanol vapor control CA, regular CA and cold storage. For evaluating the storage quality of 'Fuji' apples, weight loss, flesh firmness, soluble solids and ethanol contents of flesh, the clear difference was not presented according to storage conditions. The internal break down is occurred at regular CA conditions after two months, but is not presented at ethanol vapor control CA and cold storage conditions. Therefore, it is possible for the methods of ethanol vapor CA to suppress the internal break down in CA storage of 'Fuji' apples.