

Abstract

Postharvest diseases of fruits and vegetables represent one of the most severe sources of crop losses in Thailand. Fungal diseases are often the main type of deterioration which reduce the acceptability and cause spoilage of these commodities during postharvest storage and retail distribution. The objective of this investigation is to determine the effect of controlled atmospheres on the most important postharvest pathogens in vitro in several aspects without the possible bias of the influence of fruit quality to gain knowledge prior to using controlled atmosphere in practice. Growth of *Alternaria tenuissima*, *Botrytis cinerea*, *Cylindrocarpum mali*, *Gloeosporium album*, *G. fructigenum*, *G. perennans*, *Monilia fructigena*, and *Penicillium expansum* at 1°, 8°, and 20°C in the atmosphere of CO (5%) added to CA (2% O₂ + 2% CO₂) was compared to that in CA and in air. Aside from decreasing temperatures, CA, or CA + CO gave a retardation effect on growth most pronounced at 8° and 20°C. CO effectiveness seems to be pathogen dependent. The effect of various concentrations of O₂ on physiological characteristics of *Botrytis cinerea* was studied in vitro at 2°, 8°, 23°C. Growth inhibition caused by decreasing O₂ concentrations together with decreasing temperatures was generally exhibited by the induction of a lag period in the growth curve, reduction in growth rate and subsequent delay in sporulation. The effect of decreasing O₂ on respiration rate was temperature-related. In addition, it was clearly shown that *Botrytis cinerea* was able to produce ethylene (C₂H₄) in vitro. The highest amounts of C₂H₄ produced were detected in the range of 2-5% O₂, commonly used in controlled atmosphere. Furthermore, the effect of various concentrations of CO₂ was determined in vitro.