EFFECT OF MODIFIED ATMOSPHERE ON MICROFLORA AND RESPIRATION OF CALIFORNIA PRUNES

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We investigated the possibility that California prunes stored in modified atmospheres will tolerate higher water activity (a_w) levels than those required at normal atmospheres and that the naturally occurring microfloral infection level on the prunes may generate the modified atmospheres that inhibit mold activity in airtight conditions. Dry prunes were moisturized to a range from 18 to 38% moisture content to acquire samples with water activities ranging from 0.575 to 0.858 a_w. In unsealed conditions at 35°C, there was a level of naturally occurring microorganisms (aerobic plate count, yeast count and mold count) that generally increased above 0.70 a_w. However, incubating these samples in a sealed container for 35 days at 35°C indicated that the naturally occurring microorganisms remained unchanged throughout the range of water activities. Microfloral respiration was determined as a function of temperature by incubating similarly moisturized prune samples at 25°, 30° and 35°C and then measuring the declining O_2 concentrations through time. Results showed that the higher the water activity and the higher the temperature, the more intense was the O_2 consumption by the product. A nearly linear relationship was observed between O_2 depletion and time. Anaerobic conditions were reached in less than 2 days at 25°C only at 0.858 aw, the highest water activity tested. At higher temperatures, anaerobic conditions were achieved at water activities of 0.824 and above. These results indicate that at aerobic conditions microorganisms can flourish and cause deterioration on prunes if the water activity of the fruit is above 0.7 (moisture content of 24.6%). However, under sealed conditions, prunes can tolerate a higher water activity without microorganism growth and deterioration of the fruit.