

Title A new real-time automated method for measuring in situ respiration rates of fresh produce
Author Emma Collings, Juan A. Garcia Cas, Jose J. Ordaz Ortiz, Leon A. Terry
Citation Abstracts of 7th International Postharvest Symposium 2012 (IPS2012). 25-29 June, 2012. Putra World Trade Centre (PWTC), Kuala Lumpur, Malaysia. 238 pages.
Keywords Real time respiration rates; Sable Respirometry System

Abstract

The majority of methods used for measuring respiration rate in fresh produce are usually based on a static model whereby gas is manually sampled from a hermetically sealed chamber after a nominal incubation period and the evolution of carbon dioxide measured using by gas chromatography. In addition to this being time consuming, as a closed system, this can create a modified atmosphere (MA). Furthermore, analysis is usually performed on fruit samples after removal from in-situ experimental conditions. Given these apparent weaknesses, a new automated real time respiration method has been developed for the dynamic measurement of in-situ respiration rates of fresh produce in multiple chambers. Fruit in standard fruit trays were stored within 18 storage chambers of 320 L capacity. Controlled continuous air flow was ventilated into the chambers (7 L/min) using a blower pump which prevented the development of a MA. Gas was automatically subsampled directly from each chamber via a 'pull mode' set up and analysed using a Sable Respirometry System (Sable System, NY., USA). Sequencing was controlled by an MUX flow multiplexer. Gas measurements were recorded simultaneously using a CA-10 carbon dioxide, FC-10 oxygen and RH-300 water vapour pressure detector. Simultaneously, flow rate and barometric pressure was recorded which were later used in software calculations. Sampling times ranged between 2.5 to 5 minutes per chamber and each chamber was analysed three times (cycles), allowing the acquisition of real-time respiration measurements. Despite the longer sampling time, respiration rates were found to be broadly in line with that reported by others. As an automated set up, with multiple chambers connected to the system, a continuous cycle of real time measurements can now be obtained by a single operator. The application of this new method to measure respiration rate of various fresh produce types will be discussed.