Abstract

Green bell peppers (*Capsicum annuum* cv. Cardio) were stored in open crates at 5 °C, using a novel system for maintenance of relative humidity (RH). A hollow fiber membrane contactor allowed adequate transfer of water vapor between the air in the storage room and a liquid desiccant. The membrane was made of polyetherimide (PEI), coated on the inside with a thin non-porous silicone layer. The desiccant was a dilute aqueous glycerol solution, which was pumped through the hollow fibers at a low flow rate. Produce was placed in ventilated 500 l containers with a closed lid. During the 3 weeks of the experiment, RH could be maintained within a narrow range each day (e.g. 90.5± 0.1%). RH could be changed by adjusting the glycerol concentration and/or the temperature of the desiccant. The control was a 550 l container connected to the hollow fiber membrane set up which had no glycerol solution (average RH 93%). The contactor thus removed water vapor in this set up.

The quality of the bell peppers (visible peel shrivelling and fungus development), after 3 weeks of storage, was highly dependent on RH. Compared with the control container and with packaging in conventional cardboard boxes for bell peppers (average RH 86%), the contactor system reduced fungus development without increasing shrivelling. The improvement compared with cardboard boxes was presumably due to reduction of local differences in RH. Such differences were avoided in the containers where the packaging was very open (open crates, with space in between them, and only two layers of fruit) and where the airflow was rather high.

In preliminary experiments with red currants and pears the contactor system also functioned well (a) at subzero temperatures, (b) when it was combined with controlled atmosphere (1.5% oxygen and 20% carbon dioxide), or (c) when it released water vapor. It is concluded that the system is promising for the large-scale storage of several fresh commodities.