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Humidification of fresh produce: evaluating potential for reducing post-harvest losses and environmental impacts of food supply chains

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Reducing food losses along supply chains has become a priority in many countries, as it contributes to food security and plays an important role in reducing environmental impacts of food consumption stemming from agricultural production. The humidification of fresh harvested fruit and vegetables is one of the technologies that can reduce food losses by improving the efficiency of refrigerated storage in cold rooms, during transport and retailing. Humidifiers release a fine water mist on fresh produce, thereby maintaining an optimum humidity levels and cool temperatures of the air surrounding the produce. Biological deterioration and moisture loss are reduced and shelf-life of the produce extended, leading to an overall reduction of food losses. While the technology is expected to bring environmental benefits by reducing post-harvest losses, the environmental burden of production and operation of the humidifiers should also be considered in assessing the overall environmental performance of humidification systems. Therefore, life cycle assessment (LCA) was employed to evaluate the environmental performance of humidification technology as a potential technology to reduce post-harvest losses of fruits and vegetables, taking into account these potential trade-offs. To do so, supply chains of selected produce were analysed, from agricultural production, via transportation and distribution to the consumers, including food losses disposal.

When comparing conventional supply chains with the humidification-based, it was found that the humidification technology reduces many relevant environmental impacts, including climate change. The improvements are an effect of the reduction of post-harvest food losses caused by the technology, as this implies lower environmental impacts mainly from agriculture (due to reduced need for production). This means that the benefits from reducing food losses generally counterbalance the burdens caused by the humidifiers in terms of higher need for materials, energy, and water. Potential environmental benefits increase as the efficiency of the technology in reducing losses increases. The best environmental performance was obtained when supply chains had relatively high inherent losses (more than 24%), whereas differences in transport distances, location of food production and losses disposal were not found to be important factors. Overall, proper operation of humidification technology during post-harvest is recommended to reduce environmental impacts from food supply chains.

Fabbri S., Olsen S. I., Owsianiak M., (2018). Improving environmental performance of post-harvest supply chains of fruits and vegetables in Europe: Potential contribution from ultrasonic humidification. *J. Clean. Prod.* (Under Revision).

Stoessel F., Juraske R., Pfister S., Hellweg S., 2012. Life cycle inventory and carbon and water footprint of fruits and vegetables: application to a Swiss retailer. *Environ. Sci. Technol.* 46, 3253–3262.