

**Title** Land transportation of fresh fruits and vegetables: an update  
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### **Abstract**

**Purpose of review:** In the past five years, research has been conducted to improve refrigerated transportation systems in order to better maintain the quality of perishable products, including fresh fruits and vegetables, during trans-continental and short to medium distance land transportation. Research has focused on improving refrigerated transport vehicles by optimizing the operation of the refrigeration units, studying the air distribution in the vehicles and minimizing physical damage due to vibration, resolving some of the challenges of transporting mixed loads and addressing environmental issues related to the phase-out of ozone depleting substances and the lowering of greenhouse gas emissions.

**Findings:** Research on refrigeration units has identified the factors that need to be considered to ensure proper temperature control of single compartment and multi-compartment vehicles, to ensure better energy efficiencies during part-load operations, to reduce the effect of aging on the refrigeration capacity and to minimize negative impact on the environment. Recently developed and validated numerical models can be used as tools for the design of air circulation systems especially to take into account the load and any accessories that could affect the performance of the system. Research on the use of smoother suspension systems has shown that vibration damage is still present. Proper design and use of protective packaging materials are therefore important factors to reduce physical damage during transport and handling.

**Limitations/implications:** Research reported in this review is not limited only to the transport of fresh fruits and vegetables. Much of the reported research was conducted to improve the transport of other perishable foods (either frozen or chilled); however some of the findings would be valuable for the transport of fresh produce.

**Directions for future research:** Several refrigeration systems using non-ozone depleting substances have been designed and tested in the past five years. Continued research in this field will eventually lead to more energy efficient, environmentally responsible, refrigerated transport systems.