

COLD CHAIN MANAGEMENT.

Cold chain management is the management of produce temperature and the atmosphere around it, from post harvest through to the consumer, to maintain the quality of the product.

Successful cold chain management results in the end consumer receiving produce of a higher quality, leading to greater satisfaction and demand.

However, if it goes wrong, the repercussions can be extremely costly...the result is produce can suffer from weight loss, softening, bruising, unwanted ripening, changes in color, texture degradation, and/or the development of rot or mould.

Export of fresh produce involves long journey times and frequent handling of cargo, which makes cold chain management more difficult, but all the more essential.

Fresh fruit and vegetables are living products, and as such, after harvest continue the process of respiration – producing carbon dioxide, water and heat, which determines the rate of deterioration, and can never be completely stopped.

The heat results in warming the product, produce which is kept cool however, will have both low respiration and limited heat production, leading to reducing the rate of deterioration.

Among those with a high perishable rating are: asparagus, beans, broccoli, mushrooms, peas, sweet corn and berries.

To make matters worse, many perishable products produce ethylene gas, which can also trigger ripening and deterioration. Refrigeration also lessens the chance of ethylene contamination.

It is important to remember that a refrigerated container is designed to maintain temperature, not to bring the product down to the required carriage temperature.

If the product temperature is not close to the required carriage temperature, before being loaded into the reefer then nothing will assist in a quality product out turn.

It is therefore imperative to have correct cold chain management from the moment the fruit is picked and sent to a land based cold storage facility.

This is where the produce is inspected and post harvest procedures including cold storage begin.

Preparation of the reefer for transport has to be exact. The box needs to be the right size and type, and capable of operating at the appropriate temperature with sufficient ventilation.

Packing the container needs to be done as quickly as possible to avoid compromising the load out temperature.

Care must be taken in stowage, and loads braced so that that air flows are not impeded. Temperature logging devices are used in the container to monitor air and/or produce temperature.

It is also important that the recording devices are strategically located throughout the load to give a more accurate guide to the temperature.

Correct rates of ventilation are vital to ensure ethylene and carbon dioxide levels do not increase and speed the deterioration of the produce.

Too much ventilation can result in excessive condensation – leading to ice forming and blocking the air flow.

Vent settings vary depending on the product - eg: apples only require about 5 cubic metres per hr, lemons 10, and avocados 30 and for this reason mixed loads are avoided wherever possible.

When it is necessary the products must be compatible in terms of carriage temp, ethylene production, and/or sensitivity and resistance to contamination by odour.

Reefers that sit on site before transportation to port, need to be placed on power until departure, and journeys by road to port usually require a refrigeration unit to be attached.

Once at port, the reefer needs to be checked again and the product temperature stabilized before loading on the ship. If sitting on the wharf, reefer will need to be on power while waiting to be loaded.

Exporting by sea is more economical, but the transit times involved make it imperative that the cold chain is correctly managed.