Why humidification of fresh produce?

The evaporator of a cooling system withdraws moist from the air, by condensing water vapour on the cold surface of the evaporator. The amount of moist that is withdrawn depends on the quality of the evaporator. The higher the temperature difference (Δt) over the evaporator, the more moist is condensed.

In a cold store filled with unpacked fresh produce, the effect is not directly obvious. Humidity measurements give a rather high relative humidity. This is caused by transpiration of the fresh produce. Because of the water vapour differential pressure between the produce and the cooled air, moisture is leaving the produce into the surrounding air. Measurements taken in an empty cold store show a relative humidity of about 50 % of the ambient air.

Because of the loss of water content of the fresh produce, a number of effects occur:

- Change in appearance
- Discolorations
- Structural change (flabby salad, soft radish)

Weight loss:

- Spring-onions up till 40 % in 6 days
- See 5the graphs at the end of this chapter

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By adding humidification the negative effects are strongly diminished with the following advantages:

Increase of turnover:

- The produce has a fresher appearance and influences the buying
- It is not necessary, to reduce the price of a product when it does not look so well anymore, the product keeps its value.
- In the case of selling the product by weight, the value of the product stays constant. Some products even gain weight because they keep on growing by taking in moisture through the leaves, as a natural process.
- More expensive products with a lower turnover-rate, may be offered, without the risk of having to throw them away after one week (for example exclusive mushrooms).

Reduction of loss:

- More than 50 % of the vegetables and fruit that usually are thrown away because they have lost their fresh appearance can be saved.

Labour costs:

- It is not necessary any more to wrap up produce to prevent water loss.

Environment:

-Less waste
-Less packaging
-Less power consumption of the cooling compressors because of the evaporation cooling.

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Why ultrasonic humidification:

Ultrasonic humidifiers produce a fine mist of water particles of 1 micron. The water particles evaporate and withdraw evaporation energy from the surrounding air (adiabatic effect). Consequently the temperature of the surrounding air will drop.

The products don't become wet and don't feel wet. The humidifier contributes to the cooling process and uses very little energy. The humidifier reacts directly (no warming up) and produces no noise.

Alternatives to ultrasonic humidifiers are nozzles (spraying systems) and steam. Steam costs a lot of energy to produce (10x as much, compared to ultrasonic). The warm vapour has to be cooled again. Nozzle systems require a huge installation (compressor, high-pressure

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ASPARAGUS

Produce Fogging Shrink Test 13.10.97 - 20.10.97

BRUSSEL SPROUTS

Produce Fogging Shrink Test 13.10.97 - 20.10.97

FINE BEANS (LOOSE)

Produce Fogging Shrink Test 13.10.97 - 20.10.97

GREEN PEPPERS

Produce Fogging Shrink Test 13.10.97 - 20.10.97

LETTUCE ICEBERG

Produce Fogging Shrink Test 2.10.95 - 8.10.95

LETTUCE LITTLE GEM

Produce Fogging Shrink Test 2.10.95 - 8.10.95

RASPBERRIES

Produce Fogging Shrink Test 2.10.95 - 8.10.95

ROUND LETTUCE

Produce Fogging Shrink Test 13.10.97 - 20.10.97

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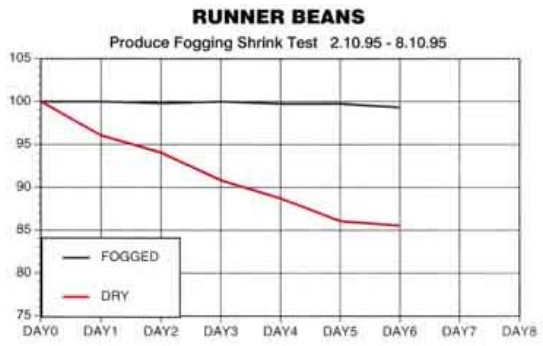

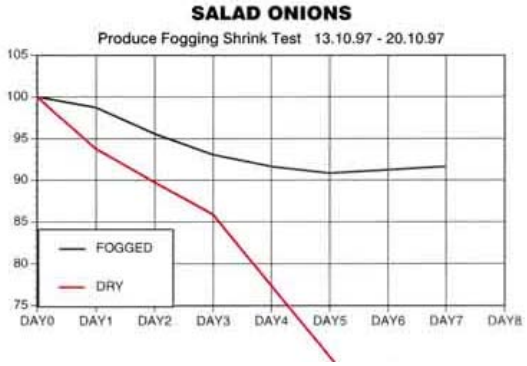

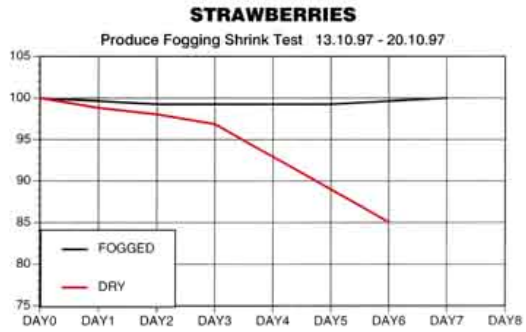

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Why Contronics humidifiers:

Hygiene:
It is absolutely necessary that no bacteria are added, and that favourable circumstances for bacteria are avoided.

Contronics took the following measures:
Design of the humidifier:

- The humidifiers are built of chemically polished stainless steel RVS316L, to make sure that bacteria can't hide in the pores of the material.
- A flushing program cleans the system on an hourly basis, and fills the unit again with fresh water.
- When the humidifier is switched off, no water remains behind. The reservoir is emptied by the drain.

Clean feed water:

- In combination with fresh produce, demineralised water should be used. Contronics builds an economical filter system, based on reversed osmosis. This system prevents bacteria and even viruses to enter the humidifier. Also all media for bacteria to feed on, are filtered out of the water. Furthermore, the filter system can be equipped with quality monitoring (Water Safe Guard). This guard continuously monitors the quality of the water produced. If the quality deteriorates, the humidification system connected shuts down entirely, long before any bacterial infection can take place.

Clean air and system:

- In most cases it is not necessary to purify the air. In places where bacteria are likely (meat products) or in places with high temperatures (bakeries) it makes sense to add air purification. Contronics uses Ozone generators, which are optionally built-in in the humidifier. During two hours in the night, ozone gas (O3) is flushed through the humidifier and the connected system. Ozone enters in the tiniest places and kills the bacteria. Ozone has a very short lifecycle. In a short time it converts to normal Oxygen (O2) without leaving a residue. In this way ozone is an efficient and safe detergent.

Environment:

- Fresh, bacteria free produce is good for your health.
  Ca. 50% less losses. Less good food ends up on the rubbish dump. Less transport.
- Positive energy balance:
- The humidifier uses only 80 watt to nebulize 1000 gr of water.
  The adiabatic cooling effect produces 700 watt of energy when evaporating 1000 gr. of water. You save 620 watt per 1000 gr. evaporated water. For an average installation this means 16.000 KW per year, a CO2 reduction of 12 tons!

Award winning development:

- The Contronics humidification system is the only system in the world especially developed for fresh produce. This innovation and its success on the world market was awarded with the prestigious Eureka Lynx Award in 2002.

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