

Process Development & Scale-up: A Case study

Preserving Excellence: Your Global Partner for Freeze Dried & Liquid Formulations

CUSTOMER CHALLENGE

Having completed formulation and cycle development at a laboratory scale, the customer wanted our help to scale up their processes, to production level.

SCALING-UP

Biopharma Group developed a research-scale freeze drying cycle and wherever possible made the cycle suitable for scaling up, while considering possible deviations when transferring a process from one freeze dryer to another. Even when both systems have similar capabilities on paper, differences in scale, dimension and hardware can affect the way freeze drying progresses.

Biopharma Group discussed with the customer:



Transfer of cycle parameters into the production system



Monitoring of product temperature

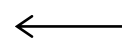
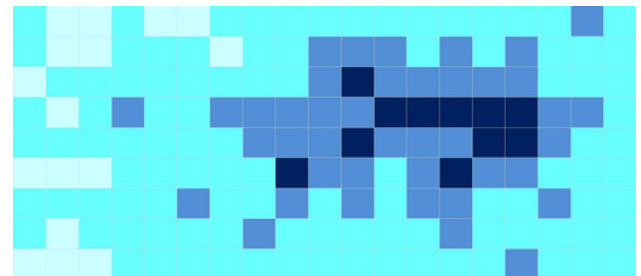


Moisture analysis of samples

ENSURING SUCCESSFUL PROCESSING

In order to ensure the freeze drying cycle was performing as required, a test cycle was run and a number of samples were collected from various locations and tested for residual moisture. A Headspace Moisture Analysis (HMA) was conducted using Karl Fischer and Frequency Modulated Spectroscopy (FMS) to enable testing of a large number of samples quickly and non-destructively.

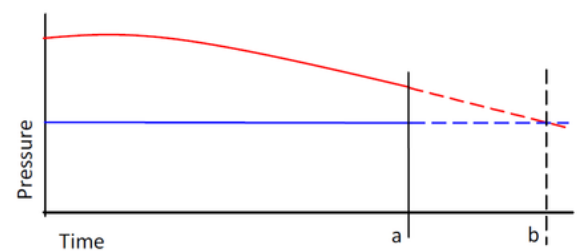
Results of shelf mapping—moisture levels after freeze drying



Front of freeze dryer

0-0.5%	1.1-1.9%
0.6-1.0%	2.0%+

Using pressure sensors to determine end of primary drying



The HMA showed that there was a difference in moisture between the products at the outer edges of the trays and those in the centre.

The production system was fitted with both capacitance manometer and pirani gauge. Comparing the two results gives an indication of moisture present in the remaining chamber atmosphere, and therefore the point at which to progress to primary drying. In this instance it was seen that primary drying needed to be slightly extended. A second cycle was run and moisture analyses confirmed that the product was now consistently meeting the specified moisture levels.

CONCLUSION

Biopharma Group guided the customer through the process of transferring a freeze drying cycle from one system to another, and adjusted the cycle to account for equipment differences. The customer thereafter was able to progress to production quickly and smoothly.