



Moisture Sorption of Coffee Granules Studied using the DVS- μ Scope

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This application note describes the moisture sorption properties of coffee granules, using the combined techniques of DVS and in-situ video microscopy.

Introduction

The moisture sorption properties of food materials are fundamental considerations for development and enhancement of food products, since they may influence the stability and performance during processing, storage and product use.

Method

Samples were analysed on a DVS μ Scope gravimetric vapour sorption analyser with integrated video microscope described elsewhere [1]. All measurements were made at 25°C on a sample size of approximately 30mg and using a x100 objective lens for the video microscope.

Results

Figure 1 shows a humidity ramping experiment performed on freeze dried coffee granules at 25°C. The initial drying stage at 0% RH shows a small loss of moisture corresponding to less than 1% of the 'dry' mass of the sample. In the sorption segment of the ramping experiment very little moisture uptake is observed below 60% RH. Above this the sample starts to gain moisture rapidly and appears to deliquesce at high humidities. The desorption segment of the experiment shows a maximum in the sample

mass at approximately 75% RH indicating that the deliquescence point of the soluble components of the coffee must be above 75% RH.

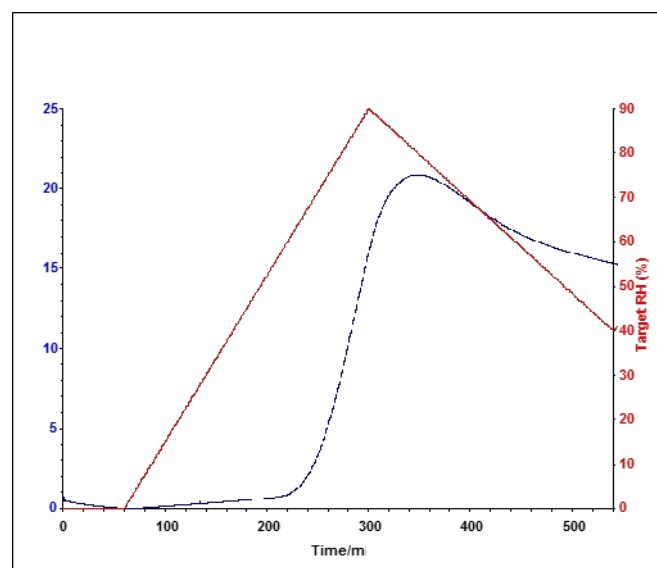


Figure 1. Humidity ramping experiment for coffee granules at 25 °C.

Figure 2 shows *in-situ* video micrographs of coffee granules at the indicated humidities on the sorption segment. It is clear from these images that there is a gross morphological change in going from 60% RH to 90% RH, where the onset of deliquescence can be clearly observed.



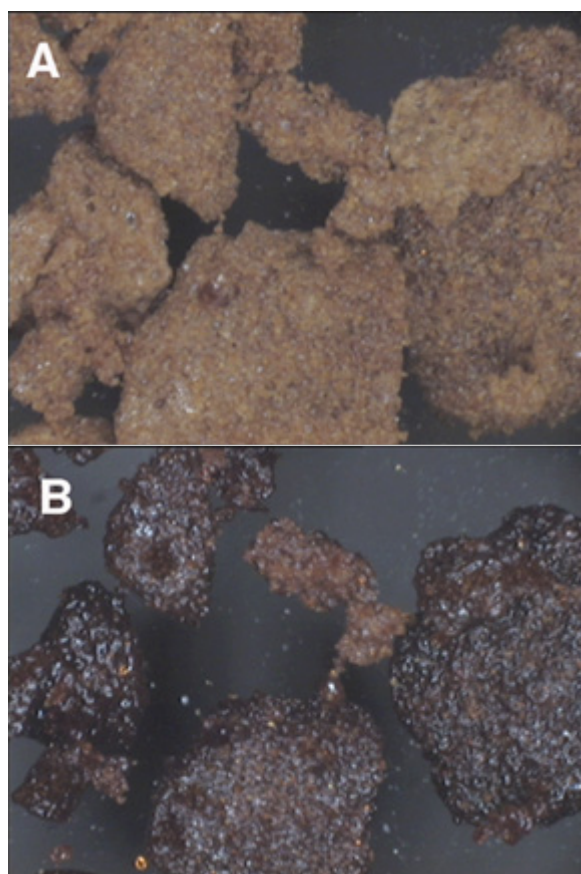


Figure 2. Colour video micrographs of coffee granules at (A) 60% RH and (B) 90% RH.

Conclusion

The combined DVS sorption data and in-situ video images of coffee granules show a morphological change between 60 to 90% RH, indicating that the deliquescence of the soluble components of the coffee must be above 75% RH.

Acknowledgement:

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References

[1]C.L.Levoguer, App. Note 10, Surface Measurement Systems, 1997.

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