



X-RAY MICROSCOPY **X4 POSEIDON – Hard capsule with micro granules**

Application Report 4

The pharmaceutical industry plays a crucial role in the global health network. Two of the critical pillars of this industry is its Research and Development (R&D) and Quality Control (QC) processes. R&D is the driver behind development of new medications that are safe and effective, while QC ensures that products meet stringent quality standards throughout the manufacturing process.

This App Note highlights how XRM can be used to non-destructively inspect a manufactured capsule. The data can provide a high-resolution 3D image of both the external shell and internal micro granule components of the product. By utilizing the Geometric Magnification Plus (GEM Plus) functionality of the X4 POSEIDON it is possible to zoom into the individual granules. The improved magnification also offers a detailed view of the granule core.

The X4 POSEIDON microCT imaging workstation is a 3D imaging core facility on your desktop. The following settings were used for this study:

- 7 Mpixel Flat-panel X-ray camera
- 60 kV, 200 μ A
- Scan duration: 26 min
- Voxel resolution: 3.5 μ m

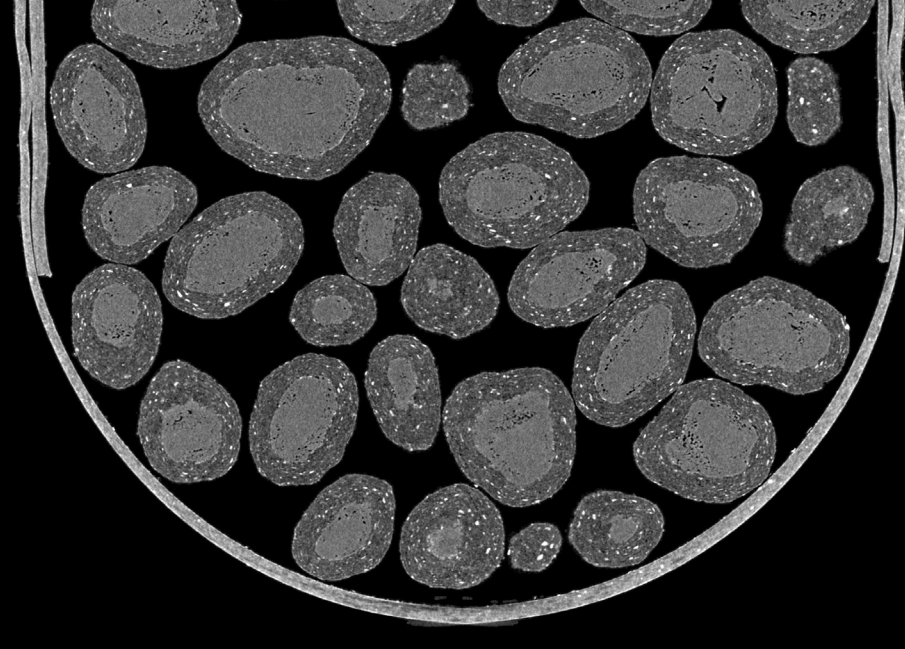


Figure 1
Orthogonal slice through the capsule.

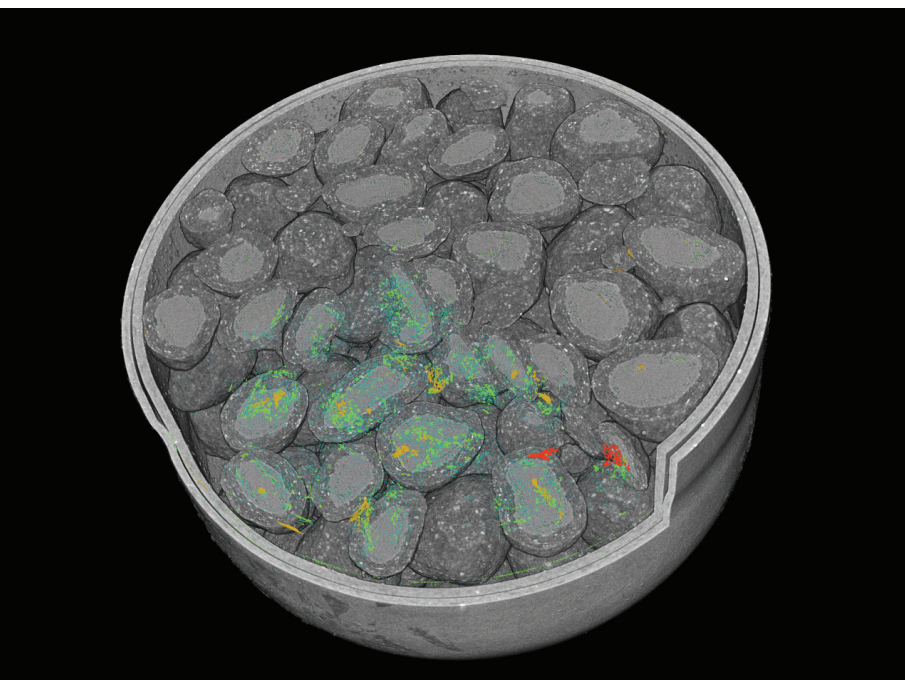


Figure 2
3D analysis of pores inside the micro granules.

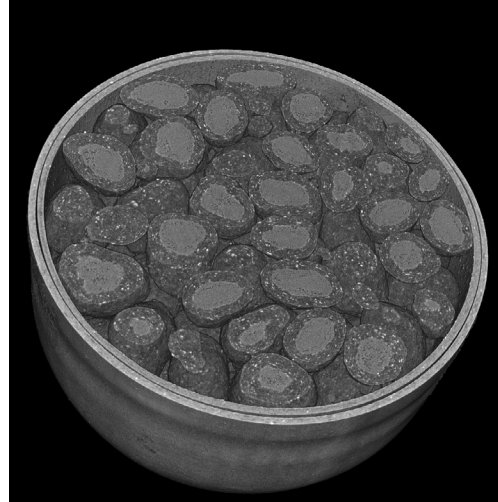


Figure 3
3D render of the micro-granules.

The orthogonal slice provides a detailed look at the individual micro-granules inside the capsule (Figure 1). The Flat-panel scan shows the functional layer coated on the tartaric acid core with crisp resolution. Even the pigment flakes inside the coating and the microporous structure of the core are very well visible.

With the 3D analysis software CT Analyzer (CTAn), it is possible to quantify the size of each of the individual pores and visualize their position in 3D relative to the scanned object (Figure 3).

Acknowledgement for supplying the scan data:
Markus Heneka, RJL Micro & Analytic GmbH

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