



IFPRI BRIEF TEMPLATE

Check One: **Project** **Review** **Collaboration**
 Workshop **Other**

Descriptive Title	Analytical Techniques for Porosity and Pore Saturation Characterization of Porous Granular Materials (Granules, Tablets and Ribbons). What is the state of the art, what new techniques are available, and what should we use when?
Working Title¹	Porosity and Pore Saturation Characterisation
Technical Area²	Characterisation and Formation
Date	14/06/22
Short Description	<p>Modern techniques to characterize porosity and pore saturation (i.e. volume of liquid in pores) in granules, tablets and ribbons are often time-consuming and give inaccurate and non-reproducible results. Accurate measures of porosity are essential for robust tech transfer, process design, model verification and validation and process scale up in pharmaceutical processes (and other industries).</p> <p>We request a comprehensive review of available techniques to assess porosity and pore saturation in granules, ribbons and tablets. It is important to include an assessment of lab techniques, potential in/at line and more expensive imaging/tomographic techniques. Also of interest are potential surrogate methods (e.g. compaction curves).</p> <p>All types of pharmaceutical intermediates and final products should be included in the review, including weak, hollow or core shell agglomerates, ribbons, fine granules, and tablets, and provide recommendation for techniques to use for different forms and circumstances in an accessible visual tool (e.g. graph, table, matrix). Additionally, cutting edge and new horizon techniques should be evaluated for future potential use.</p>
Objectives	<ul style="list-style-type: none"> - Produce a review of porosity and pore saturation assessment methods for granular materials (See above) - Provide recommendations for use of methods
Scope	<p>The review should encompass:</p> <ul style="list-style-type: none"> - Definition of pore types to be evaluated

¹ Title used in meeting agendas and file archives

² One or more from the following list: W = wet systems; D = dry systems; F = particle formation; SR = size reduction; M = modeling; SE = systems engineering

	<ul style="list-style-type: none"> - Modern techniques for porosity and pore saturation measurement <ul style="list-style-type: none"> o Imaging o X-ray tomography/MRI o Mercury porosimetry o Dry powder pycnometry o Liquid displacement techniques o New/cutting edge (OCT, THz) o NIR o Any other technique relevant in the opinion of the reviewer - Sample types <ul style="list-style-type: none"> o Granules, including but not limited to weak/hollow/core shell and fragile granules o Pharmaceutical ribbons o Tablets - Impact of sampling, as it applies to the technique - Consideration should be given to the resolution of intra- and inter- particle porosity and pore saturation

Recommended Contractors (2 or 3)		
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