



IFPRI BRIEF TEMPLATE

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

Descriptive Title	
Working Title¹	Aeration and Deaeration of Geldart Group C Powder during Flow
Technical Area²	Dry, Characterization
Date	06/21/2021
Short Description	<p>Characterization of fluidization (aeration and deaeration) of fine-cohesive powder (Geldart Group C) has found to be difficult. More importantly cohesive powders have shown wide range of fluidization responses and unpredictable behavior in terms of packing rate and its consistency especially at large scale productions (100s to 1000s of kg per hour). The project should focus on developing reliable bulk characterization methods for Group C material that will enable prediction of packing behavior (rate and variability) when the material is fluidized/aerated during handling processes. The work should also investigate the effects of single particle and particle interactional properties (e.g. electrostatics, surface roughness, surface chemistry/van der Waals, density, PSD, etc.) that dominate the aeration/deaeration response of cohesive powders. Ideally the proposal should include a representative validation system.</p> <p>Definition of typical packing process:</p> <ul style="list-style-type: none"> - The material initially may not be in an aerated state. Aeration usually takes place through flow (e.g. gravity flow in a chute or in a high-speed screw conveyor). Aeration due to flow and handling processes must be investigated as opposed to controlled fluidization of the material. Hence the novelty of the work. - Deaeration can be due to residence time as well as compaction both of which should be considered in the proposal. - There are often external densification methods in packing processes (e.g. vibration or compaction). Although these are in-scope, the academic may decide not to include these in the study.

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"> - Package types include FIBCs/SBCs (flexible intermediate bulk container), 5 to 20 kgs bags, 1 to 2-liter bottles - Dosing into small packages is out of scope (e.g. die filling) since previous IFPRI research had attempted to address this. <p>Definition of In-scope Material:</p> <ul style="list-style-type: none"> - The material(s) chosen for the study must exhibit the true Group C behavior (e.g. channeling in a fluidization column). Easy to aerate Group A are out of the scope.
Objectives	
Scope	<p>In:</p> <ul style="list-style-type: none"> - Geldart Group C <p>Out:</p> <ul style="list-style-type: none"> - Geldart Groups A, B and D - Dosing

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