IFPRI BRIEF TEMPLATE

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

Descriptive Title	Selection Criteria for Flow Aids to Improve Flowability of Cohesive Powders
Working Title[1]	Selection of Flow-aids
Technical Area[2]	Dry Systems
Date	25th June 2019
Short Description	- Poor flowability because of cohesion is one of the biggest problems of the solids processing operations. - One of the methods to improve flowability of cohesive powders is using dry powder coating. - Even though there are several options for flow aids, there is very minimal understanding of the intrinsic relationship between the properties of the host and guest particles to aid in the selection of the flow aids. - The main goal is to understand the relationship of the properties and develop a selection criteria based on the properties to minimize the number of trial and error experiments required to optimize the flow aid.
Objectives	- Address various contributions of types of cohesion on the overall cohesivity of the powder - Identify the key surface and bulk properties of both host and guest particles to determine the choice of flow aid needed for cohesive powders - Understand the effect of particle properties and the coating process parameters on the coating effectiveness - Identify and evaluate measurement techniques for the above properties - Develop a quantitative selection rule for selecting flowaids based on the characteristics of the product. - Validate the selection rule with example cohesive powders by powder coating and comparing flowability (with and without powder coating)

[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

Scope	- In scope: Vander-Waal forces, electro-static (tribocharged particles), liquid bridging - It is recommended to use a low intensity mixer (ex: Turbula mixer) and a high intensity mixer (ex: MAIC – Magnetically Assisted Impact Coater) to understand the effect of coating process on the coating effectiveness - Experimental and theorical approaches - Industries relevant: Foods, Pharma, Consumer Care, Chemical, and others - Out of scope: Modeling only

Recommended Contractors (2 or 3)		
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References:

- Sunkara &Capece, 2018, Influence of material properties on the effectiveness of glidants used to improve the flowability of cohesive pharmaceutical powders.
- Kingsly, 2010, Caking of DDGS, PhD Thesis, Purdue University.
- Fulchini et al., 2017, Relationship between surface area coverage of flow-aids and flowability of cohesive particles.