IFPRI BRIEF TEMPLATE

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

Descriptive Title	Formulation and Production of Microencapsulates – a Review
Working Title[1]	
Technical Area[2]	Particle Formation
Date	6/14/23
Short Description	Microencapsulation represents a collection of particle formation techniques applied in a variety of industries to preserve, protect, and deliver a variety of high-value and high-performance materials, including nutraceuticals, flavorings, and active pharmaceutical ingredients. The wide range of techniques, including spray drying, freeze drying, complex coacervation, extrusion, inclusion complexation, etc., as well as the requirement for careful matching of the wall/shell material to the desired active material, creates considerable challenges when attempting to design or optimize a microencapsulated material. Much of the work conducted on microencapsulation tends to be segregated according to the industrial application, where material preferences/restrictions and differing performance criteria can make it difficult to extract generic strategies and mechanisms for microencapsulate formation.
Objectives	The objective of this brief would be to commission a review of microencapsulation technology, focusing on methods of forming these materials and the resulting structural and performance properties, with a perspective that allows for broad industrial application. This would include understanding the advantages and disadvantages of the various process approaches, as well as general trends/guidance on wall/shell material selection.
Scope	Out of scope would be a substantial focus on final application of the microencapsulates formed, as a review of this nature was previously completed for IFPRI by James Oxley.

[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

	Any materials of industrial interest, as well as any corresponding methods of formation, would be considered in scope. Also in scope would be commentary on how the wall/shell materials utilized in some microencapsulation processes may be subject to industrial regulation, for example, through documents such as Annex 15 that limit the use of plastic coatings in micromaterials.

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