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Shear Gap Granulation

The Shear Gap Granulator is a modular mixer-granulator system designed for rapidly developing granular prototypes at various batch sizes, which can be extended to continuous, easy-to-monitor production across pharmaceuticals, agriculture, and other industries.

Researchers at Purdue University have developed a mixer-granulator system, termed the Shear Gap Granulator (SGG), that granulates fine powders and a binder liquid into granules. Current granulation methods are difficult to scale and control when making granules with desired structures and narrow size distributions. SGG instead uses a modular design to rapidly test formulations at varying batch sizes while offering easy customization and cleaning. Purdue's approach can also be extended to use in continuous production. This technology has applications across a wide range of industries, including agriculture, pharmaceuticals, chemicals, and building materials.

Advantages

-Production of prototypes at varying batch sizes

-Extendable to continuous production

-Easy operation and process monitoring

-Easily disassembled for cleaning or part changes

Applications

-Prototype production of granules

-Agriculture

-Pharmaceuticals

-Chemical

-Energetics

Technology Validation:

Technology ID

2023-MORT-70068

Category

Agriculture, Nutrition, & AgTech/Precision Agriculture & Smart Farming
Pharmaceuticals/Pharmaceutical Packaging & Delivery Systems
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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This technology has been validated through fabrication of a prototype SGG.

TRL: 3

Intellectual Property:

Provisional-Patent, 2023-04-20, United States | Utility Patent, 2024-04-22, United States

Keywords: Shear Gap Granulator, SGG, mixer-granulator system, fine powders granulation, binder liquid, modular design, continuous production, granule prototype production, high-shear mixer, wet granulation, Binder, Formulation, Granulation, granules, Materials and Manufacturing, ordered-mixing, paste, powder processing, production, prototype, scale-up