Platform vs. Bespoke: Choosing the Right Early Formulation Strategy for Your Molecule

The early stages of drug discovery and development involve making informed yet rapid decisions with high stakes. Every decision made from **lead optimization** through **clinical candidate selection,** to ultimately aiming to enter **first-in-human (FIH) clinical trials,** can have lasting implications for a molecule's future. One of the most critical choices at this stage is the formulation strategy. The key question at this stage is "How do we deliver meaningful exposure in both preclinical and clinical settings for a potential candidate?"

At this strategic crossroads, clients and sponsors face a key question: should we rely on classical platform approaches to accelerate progress or invest in a **fit-for-purpose bespoke formulation** tailored to the unique properties of our molecule? The answer isn't always obvious. Success often hinges on knowing when to exploit platform speed and when to pivot to a tailored approach.

At Aragen, our **Formulation Solutions** team plays a pivotal role in addressing this dilemma every sponsor goes through. We understand formulation is not just about making a molecule deliverable; it's about making it scalable, regulatory-ready, and clinically meaningful. With deep expertise spanning clinical candidate nomination, IND-enabling studies, and early-phase drug product development and supply, we partner with clients to strike the right balance between speed and precision.

Our formulation scientists bring not only technical depth but also a collaborative mindset, ensuring each solution aligns with the molecule's development goals and regulatory pathways. Our mission is to reduce risk, accelerate timelines, and build formulations with a clear path to success.

The Strategic Crossroads: Platform vs. Bespoke

Sponsors often find themselves at a strategic crossroads: should they choose the speed and simplicity of platform formulations or invest in the precision of a **fit-for-purpose** bespoke approach?

Platform formulations offer speed, efficiency, and scalability. By leveraging pre-validated excipient systems, standardized manufacturing processes (such as spray drying with well-characterized polymer carriers and ratios), or ready-to-use lipid-based systems, developers can quickly generate prototypes, assess pharmacokinetics (PK), and make timely go/no-go decisions. This approach is especially valuable during lead optimization and candidate nomination, when multiple compounds are screened. For example, a poorly soluble compound can be rapidly evaluated using a generic amorphous solid dispersion system to assess bioavailability potential without committing to full-scale development.

Bespoke formulations, on the other hand, are tailored to a molecule's unique characteristics. These strategies consider solubility and permeability profiles, chemical stability, target patient population, and intended route of administration. Although they require more upfront development time and resources, bespoke formulations can unlock improved pharmacokinetics, enhanced patient compliance, and higher chances of clinical success. For instance, a molecule with both permeability limitation and solubility challenges may benefit from a ternary spray drying composition; or a compound with pH-dependent solubility and a narrow therapeutic index might require a customized enteric-coated multiparticulate system. Such complexity may be beyond platform approaches. Similarly, a compound with rapid clearance can be formulated as controlled-release system to address specific pharmacokinetic liabilities.

The right choice depends on several factors:

- Physicochemical complexity of the molecule
- Development timelines and milestones
- Clinical strategy and target indication
- Budget and risk tolerance

In practice, many programs begin with platform formulations to gain early insights and de-risk the candidate. As the molecule progresses toward IND-enabling studies and clinical trials, the formulation often evolves into a bespoke solution aligned with long-term goals for scalability, patient-centricity, and regulatory success.

Enabling Technologies for Early Formulation

At Aragen, we leverage a suite of enabling technologies to address these challenges head-on, tailoring solutions to each molecule's unique needs. Key technologies include spray dried dispersions (SDDs), nanosuspensions, and lipid-based delivery systems, supported by salt/polymorph screening and solid-state optimization.

Spray Dried Dispersions (SDDs)

Spray drying is a widely utilized method for poorly soluble compounds. By embedding the drug in a polymer matrix, it creates an amorphous solid dispersion (ASD) that significantly enhances apparent solubility and bioavailability.

- **Platform use:** Established polymer systems like HPMC-AS or PVP/VA enable rapid application to new compounds for early feasibility and PK studies.
- **Bespoke use:** Custom polymer selection and drug-loading optimization are critical for molecules with unique solubility or stability profiles. For example, moisture-sensitive compounds may require a low-hygroscopic polymers, or enteric polymers may be used to stabilize molecular dispersions.

Nanosuspensions & Spray-Dried Nanosuspensions

For compounds where dissolution rate—rather than solubility—is the limiting factor, nanosuspensions provide a powerful solution by reducing particle size to the sub-micron range and stabilizing with surfactants or polymers. This dramatically increases surface area and dissolution rate.

- **Platform use:** Nano toolkits with pre-validated stabilizers allow rapid screening across multiple candidates.
- **Bespoke use:** Tailored nanosuspensions optimize particle size distribution, surfactant selection, and even solidification (eg., spray drying) to create stable oral or injectable dosage forms. For instance, a compound with rapid clearance might be formulated into a spray-dried nanosuspension embedded within a controlled-release matrix to extend its therapeutic window and reduce dosing frequency.

This approach supports oral and parenteral routes and adapts to diverse clinical strategies.

Complementary Approaches

To further optimize formulation performance, we integrate complementary strategies:

- **Salt screening and polymorph selection** help fine-tune solid-state properties for better manufacturability and stability.
- **Lipid-based formulations** improve absorption of highly lipophilic molecules or peptides via lymphatic transport.
- **Balancing crystalline vs. amorphous** forms tailors stability and exposure goals.

Mapping Strategy to Development Stage

Formulation strategies evolve with the molecule's development to maximize speed, reduce risk, and improve the probability of clinical success. At Aragen, we help sponsors map the right strategy to each stage, ensuring alignment with near-term milestones and long-term objectives. Our fit-for-purpose bespoke formulation strategy align from lead optimization till FIH development and supplies.

Lead Optimization

Goal: Rapidly prioritize candidates based on exposure potential.

At this stage, speed and efficiency are critical. Platform-based excipient toolkits, including spray dried dispersions (SDDs), nanosuspensions, and lipid systems, enable high-throughput feasibility studies using minimal material for early PK data and go/no-go decisions without over-investing in any single compound.

Clinical Candidate Nomination

Goal: Refine formulations to support PK/PD correlation and assess developability.

Formulation strategies begin to shift towards bespoke adjustments if early data shows solubility, stability, or absorption challenges. Preclinical bioavailability studies align with feasibility to ensure readiness for IND-enabling studies.

IND-Enabling Studies

Goal: Finalize a scalable formulation strategy for toxicology and clinical studies.

Focus moves to scalability and regulatory readiness. Process parameters are optimized for reproducibility and robustness, ensuring the formulation is manufacturable, stable, and suitable for regulatory filings.

Early Clinical Supplies

Goal: Deliver GMP clinical batches with consistent, patient-ready performance.

Transition from feasibility to GMP manufacturing is seamless. Bespoke fine-tuning ensures dosage forms are scalable and patient-centric, supporting dose flexibility, ease of administration, and adherence. These decisions directly impact clinical outcomes and future commercial viability.

Platform First, Bespoke When Needed

Speed is critical in advancing an optimized lead to clinical candidate and FIH studies. An effective formulation strategy often starts with a platform speed and evolves toward bespoke precision. Beginning with a platform approach enables rapid candidate screening, early PK data generation, and timely go/no-go decisions. As molecular characteristics become clearer, bespoke formulations address specific challenges such as stability, bioavailability, or manufacturability.

For example, during the development stage, one molecule initially showed promising exposure using a standard SDD platform. However, long-term stability studies revealed physical instability. Rather than starting over, the team shifted to a bespoke formulation combining a stabilizer and optimized drug loading, resulting in improved stability and better bioavailability in Phase I trials.

This kind of flexible, adaptive approach—from platform speed to bespoke precision—illustrates how experienced CDMOs such as Aragen accelerate development without compromising quality or long-term success.

How Aragen Adds Value

Choosing the right formulation partner is as critical as selecting the right formulation strategy. At Aragen, we offer:

- **Integrated capabilities:** End-to-end support from formulation R&D and analytical sciences to CMC, integrating Drug Substance (DS) and Drug Product (DP) development to minimize handoffs, accelerates timelines, and ensures lifecycle alignment.
- **Breadth of technologies:** Comprehensive formulation toolkit including SDDs, nanosuspensions, lipid-based delivery systems, and salt and polymorph screening to address solubility, limited dissolution, or absorption challenges.
- **Agility:** Ability to seamlessly pivot between platform and bespoke formulation strategies without delays.
- **Scalability:** Smooth transition from early feasibility batches to GMP-grade, IND-enabling clinical supplies, ensuring continuity from bench to clinic.
- **Experience:** Cross-functional teams spanning formulation, analytical, and CMC enable proactive risk mitigation and tight program alignment.

This integrated, end-to-end support is what transforms promising molecules into clinical successes.

Conclusion

At **Aragen**, we specialize in guiding sponsors through the formulation journey. Our expertise lies in identify when a bespoke formulation is necessary, leveraging enabling technologies such as spray dried dispersions, nanosuspensions, and lipid-based systems appropriately. Supported by integrated R&D and manufacturing capabilities—with formulation, analytical, and CMC functions under one roof, and the ability to align DS and DP development—we reduce handoffs, streamline communication, and accelerate progress.

Choosing the right strategy early and partnering with the right team can reduce risk, compress timelines, and set your molecule on a clear path to clinical and commercial success.

Get in touch with Aragen's experts today to tailor a formulation approach that balances speed, precision, and scalability for your molecule's success.

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Aragen is a trusted R&D and manufacturing partner to the global life sciences industry. From concept to commercial, we transform your ideas into solutions for better health. We have more than 20 years of experience providing a range of contract research, development and manufacturing services across the drug development continuum, with a focus on early-stage discovery and development of new molecular entities (NMEs). Whether large pharma or biotech, an agrochemical or animal health company, we provide you global resources and proven capabilities at every stage of the biopharma lifecycle, in small and large molecules. Our ability to offer end-to-end solutions or support standalone programs is underpinned by an innovation mindset, enabling technologies, and a partnership approach to every engagement.
At Aragen, we recognize your work is vital, urgent and impacts lives. Our purpose, 'In every molecule is the possibility for better health' motivates us to drive the success of your programs, so that we can together transform hope into health for millions of people around the world.

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