



# Making sense of spray drying

## Enhancing efficiency, yield and consistency

With up to 90% of molecules in the pipeline displaying low solubility,<sup>1</sup> spray drying is gaining popularity within the pharmaceutical industry for its ability to improve dissolution and bioavailability. Though spray drying has been widely used in the food industry and other areas for many years, compliance with GMP requirements and other challenges, have prevented its widespread adoption in pharma until recently. **Today, because of its ability to deliver precise particle size results efficiently and effectively, spray drying is becoming a fundamental technology in API development.**

The global market for spray drying equipment is expected to grow 1.5 times through 2030.<sup>2</sup>

**New possibilities for particle manipulation.**

As a continuous and automated process, spray drying reduces the number of steps required to achieve a product with the desired bioavailability and compressibility, without the extra time and effort of other methods.<sup>3</sup> Spray drying is especially promising as an alternative or supplemental technology where methods like lyophilisation, crystallisation and other drying or formulation techniques are less effective, such as for large volume projects and where particle engineering is necessary.<sup>4</sup>

**Did you know?**

Spray drying can achieve a particle size between 10 and 500 µm.<sup>3</sup>

## Why are scientists turning to spray drying over other methods?

Spray drying delivers a variety of advantages over other methods, some of which are especially promising for the efficiency-focused, quality-centred and highly regulated pharmaceutical space. **Let's take a closer look at some of the key benefits spray drying brings to a development and manufacturing programme.**

### Speed

With spray drying, it is possible to process feedstock through a spray dryer and get the desired results in a matter of hours, whereas recrystallisation and other approaches can take much longer. The large surface area of the feed enables drying to occur rapidly.<sup>4</sup> **By harnessing this technology, organisations can achieve their desired particle size and end result far more efficiently.**

### Versatility

**Spray drying can be used for multiple process considerations and routes of administration.** For example, fast drying at low temperatures can produce a desired amorphous solid dispersion with higher bioavailability, which can be compressed into tablets without added intermediate steps.<sup>4</sup> Spray drying is also widely used for injectables, as small fine powders can dissolve more easily, and it has potential applications on strips for dermal absorption.

### Precision

Spray dryers offer a high degree of process control compared to other particle engineering methods, including the ability to alter equipment configuration and other process parameters to achieve the desired results. **For example, scientists can manipulate properties like particle shape, bulk density, flow characteristics and more based on their target end result and route of administration to achieve maximum bioavailability.**<sup>4</sup>

### Reproducibility

**A natural extension of spray drying's precision is its reproducibility,** which enables strong quality and consistency at scale. Scientists can design spray drying processes for batches of just a few grams, and then adapt these processes to much larger instruments that can produce multiple metric tons of powder each hour on an ongoing basis.<sup>4</sup>

## Proven partnership to exceed your spray drying needs

At Sterling, we are committed to continual innovation to serve our customers' requirements as seamlessly and efficiently as possible. We work closely with customers to determine where spray drying may provide the most benefit in their projects. In addition, we apply years of solid state expertise to deliver a granular understanding of particle size changes.

### Service

Our approach to spray drying is marked by flexibility and adaptability to our customers' requirements, as we maintain close communication to meet their specific project objectives.

### Passion

We are continually advancing our approach to spray drying by exploring new technologies and applications, such as high-throughput screening for fine powders.

### Science

We pair our deep expertise in solid state chemistry with a robust approach to spray drying that enables us to achieve our customers' target particle size.



Want to learn how spray drying can bring new efficiency and quality to your programme?

Visit [www.sterlingpharmasolutions.com](http://www.sterlingpharmasolutions.com) to learn more.

1. Tiene, G. Spray Drying Enhances Solubility and Bioavailability. Pharma Manufacturing, 26 Jan. 2017. Retrieved from <https://www.pharmamanufacturing.com/sector/small-molecule/article/11312682/spray-drying-enhances-solubility-and-bioavailability>  
2. Spray Drying Equipment Market Size to Surpass US\$ 6.399.7 Million by 2030. GlobeNewsWire. <https://www.globenewswire.com/en/news-release/2022/06/13/2461244/0/en/Spray-Drying-Equipment-Market-Size-to-Surpass-US-6-399-7-Million-by-2030-CAGR-5-4-To-Increase-1-52X-times-during-the-Forecast-Period.html>  
3. Eijkelboom, N. et al. Particle structure development during spray drying from a single droplet to pilot-scale perspective. Journal of Food Engineering [Online], January 2023. ScienceDirect. Retrieved from <https://www.sciencedirect.com/science/article/pii/S026087742200276X>  
4. Schwartzbach, H. The possibilities and challenges of spray drying. Pharmaceutical Technology Europe, 5 May 2010. Retrieved from <https://www.pharmtech.com/view/possibilities-and-challenges-spray-drying>