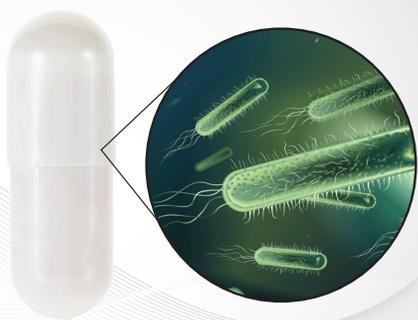


SYLOID® FP SILICAS

Multifunctional Additives for Better Stability of Botanical and Probiotic Formulations



Probiotics are “live” organisms that present several processing, compatibility, and stability challenges in formulations.

Main Formulation Challenges

The natural product market has experienced tremendous growth in recent years. Botanicals and probiotics are growing more popular today as people seek out natural remedies to health conditions. Probiotics are “live” organisms, from the formulations perspective key challenges are related to:

- Formulation stability over time
- Ability to withstand challenging processing conditions
- Compatibility with other formulation ingredients

Grace SYLOID® FP silica products contribute significantly in mitigating/resolving these key challenges.

Moisture and Hygroscopicity

Plant extracts and probiotics tend to be hygroscopic in nature, they can absorb moisture from environment, cake together or adhere to equipment depending on the Relative Humidity (RH). SYLOID® FP silica is a highly porous, micronized silica powder. When added to a formulation, the high porosity of SYLOID® FP silica is capable of adsorbing a considerable amount of moisture, keeping the active ingredient dry and improving stability. (See Figure. 1)

Improving Compatibility and Stability

In addition to flow improvement, SYLOID® FP porous silica gel, can also help improve the stability of other moisture sensitive ingredients like prebiotics and vitamins by absorbing moisture present in the final formulation to prevent degradation, premature activation, and incompatibility.

- SYLOID® 244 FP – first choice as glidant (up to 2%)
- SYLOID® AL-1 FP/63 FP – first choice for protection from moisture (up to 10%)
- SYLOID® XDP – first choice for LBDDS (Lipid Base Drug Delivery)

To know more about product characteristics and advantages offered by formulating with the SYLOID® silica range don't hesitate to contact our Nutraceutical and Pharmaceutical technical experts.

Internal Porosity Gives Greater Adsorptive Capacity

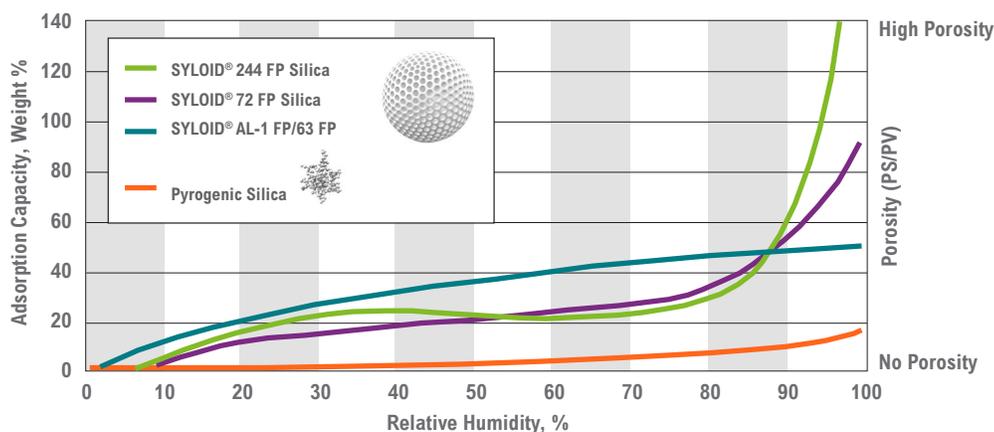


Figure 1: The higher surface area and internal porosity gives SYLOID® FP silicas greater moisture adsorption than other silicon dioxide excipients.

Probiotics processing

Characteristics of ingredients, how they interact with each other, the surfaces they come in contact with, and various environmental factors can all affect the flow behavior of a formulation. Common flow challenges include:

- caking
- static charges behavior
- temperature
- polar groups
- molecular interactions

A successful formulation requires producing a blend that is both free-flowing and compressible, which can be challenging. Techniques such as 2-step glidant mixing can be highly effective at both optimizing flow properties for direct compression while maintaining the homogeneity and stability of the formulation. To learn more about this processing technology and advantages offered by the usage of SYLOID® FP silica, don't hesitate to contact us and/or request our white paper.

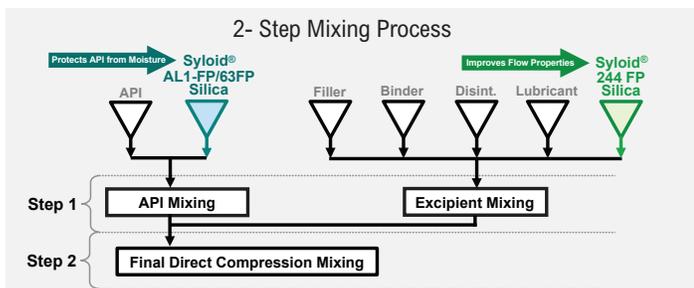


Figure 2: SYLOID® FP Silicas can be used in both steps of a 2-step mixing process. SYLOID® 244 FP silica is used as a glidant in the excipient part of the formulation. It has the capacity to take up excessive moisture from the other excipients while maintaining plasticizing properties. SYLOID® AL-1 FP/63 FP silica, which is effective for moisture control of sensitive molecules, is mixed with the active ingredients to absorb moisture and provide maximum stability to the formulation mix.

Regulatory Compliance

SYLOID® FP silica products are manufactured and certified to meet the tests requirements as published in the latest USP-NF edition for silicon dioxide; JPE for hydrated silicon dioxide; EP for silica, colloidal hydrated as well as silica, dental type, and the Chinese National standard GB25576-2010 Class III.

All FP products also meet the food additive standard such as the Food Chemical Codex (FCC); the requirements for E551 as specified by the EU Directive No. 231/2012; D326 of the Japanese Specification and Standards for Food Additives and JECFA requirements for Silicon Dioxide, Amorphous.

Grace is a leading global supplier of catalysts, engineered and packaging materials specialty construction chemicals and building materials. The company's three industry leading business segments—Grace Catalysts Technologies, Grace Materials Technologies and Grace Construction Products, provide innovative products, technologies and services that enhance the quality of life.

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Compression Force

It is known in the industry that increasing compression force during tablet production negatively impacts the viability of fragile probiotic organisms. Using SYLOID® silica in probiotic formulations can reduce the compression force required for tableting while still achieving optimal tablet hardness with reduced friability.

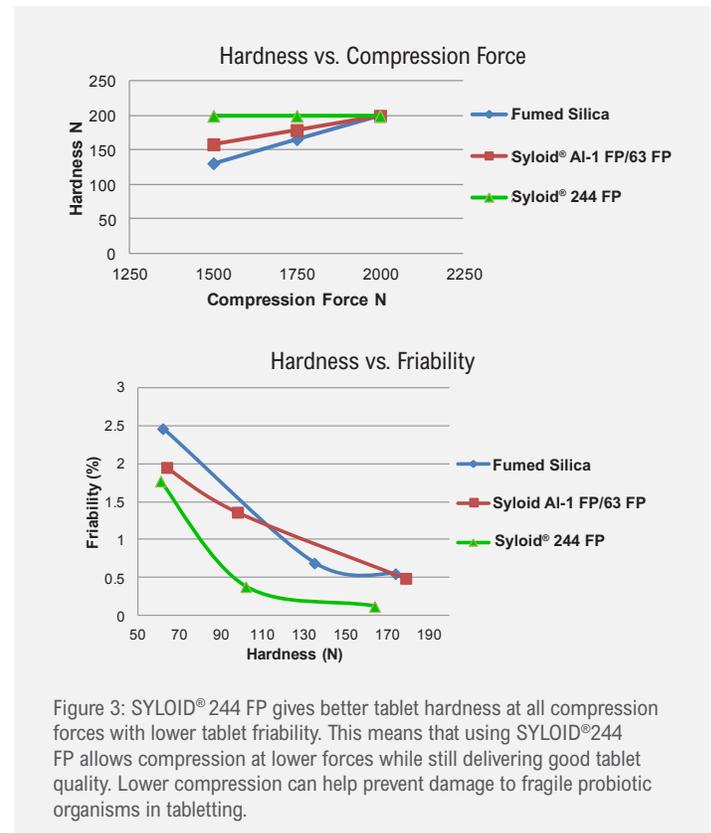


Figure 3: SYLOID® 244 FP gives better tablet hardness at all compression forces with lower tablet friability. This means that using SYLOID® 244 FP allows compression at lower forces while still delivering good tablet quality. Lower compression can help prevent damage to fragile probiotic organisms in tableting.

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