Silk Stone Process™

Plant Ingredient Powder Processing Reimagined

Introduction

220KM has developed a revolutionary new zero-waste ingredient processing technology to produce nutritionally-rich, ultra-fine plant-based powders from oilseeds, legumes and pulses, whole grains, fruits and vegetables, plants, leaves, and flowers. Silk Stone Processing (SSP) opens up significant opportunities in the food, beverage, pharmaceutical, and cosmetic industries for companies focused on delivering the highest-quality products.

Why SSP?

The Silk Stone Process™ is a disruptor in ingredient processing technology that significantly impacts the way in which plant-based powders are produced. By activating endogenous enzymes naturally present in plants, this technology optimizes both primary and secondary metabolites. It enhances the nutritional content and functional properties within any ingredient, making it richer in essential compounds like amino acids, fatty acids, proteins, and fibers, as well as beneficial secondary metabolites such as carotenoids and flavonoids. With Silk Stone Processing, we can unlock the full potential of plant-derived nutrition, ensuring healthier and more sustainable products.

Plants contain a wide variety of naturally-occurring chemical compounds; these compounds can be classified as primary or secondary metabolites. Primary metabolites are “compounds directly involved in development, growth, and reproduction and include carbohydrates (sugar, starch), amino acids, fatty acids, proteins, and fibers. Secondary metabolites are compounds that are not directly involved in development, growth, and reproduction but still usually have an ecological function and include carotenoids, beta-glucan, phenols (flavonoids, tannins, lignans, phenolic acids), glycosides, and terpenes.

The composition of both primary and secondary metabolites determines the nutritional content of plants and their products. Plants and their products are not static in their metabolite content. They also contain endogenous enzymes, which are enzymes already present in the starting material. These enzymes, when activated, cause changes in the levels of metabolites, both primary and secondary, through their reactive pathways. The activation of these enzymes is a key factor in altering the final primary and secondary metabolite content and their profile.

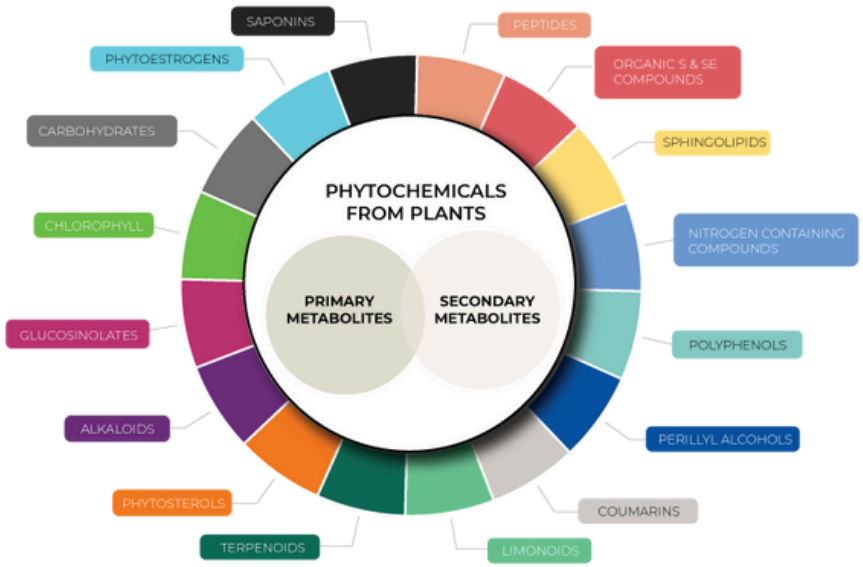
SSP optimizes primary and secondary metabolites to increase beneficial phytochemicals and reduce the allergenicity of specific ingredients, to deliver powders with a wealth of nutritional potential.

The Silk Stone Process™ significantly impacted the secondary metabolites on tested ingredients:

Whole Sweet Corn: **1275.63% Increase** in Carotenoids
Whole Barley: **35.20% Increase** in Beta-Glucan
Flaxseed: **90% Decrease** in Cyanogenic Glucoside
Flaxseed: **20.94% Increase** in Secoisolariciresinol Diglucoside (SDG)

**Tests conducted by accredited 3rd party laboratories*

Silk Stone Process™
Increases phytochemical availability found in any plant material



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Silk Stone can process a variety of ingredient types using only one method

- Oilseeds
- Legumes and Pulses
- Whole Grains
- Fruits and Vegetables
- Plants, Leaves, and Flowers

Key Benefits of Silk Stone Process™

CONVENTIONAL POWDER PROCESSING METHODS

Moisture Removal (Dehydrating/Freeze-drying)	Heating and freeze-drying are two standard techniques for dehydrating plant materials. Common issues associated with these methods are flavour and texture changes. Silk Stone takes full advantage of the fresh material and the endogenous enzymes present within the plant cell structure before removing moisture.
Milling or Grinding (Wet or Dry)	Milling and grinding mainly focus on particle size and the primary metabolites of any processed material. The gentle nature of SSP allows for the integration of the secondary metabolites along with the primary metabolites and desired particle size. Current milling/grinding techniques do not use the entirety of a material due to a variety of reasons, including shelf-life. SSP uniquely allows for all outer layers of the grains, which contain most of the fiber, vitamins, and minerals in the plant, to be fully incorporated into the process. This results in a far more nutritious final powder. SSP is able to effectively manage macro/micro nutrient content, dietary fiber, protein, starch, and fatty acid content, maintain a minimum of 1 year shelf life, and reduce cyanogenic glucosides.
Cold Pressing	Cold pressing is done on any material that is rich in oil. Once the oil is pressed out of the material, the cake that is left over is turned into a powder. SSP includes the oil and delivers a higher percentage of nutrients and primary and secondary metabolites, and can reduce allergenic potential in the final powder.

Conclusion

220KM's groundbreaking zero-waste ingredient processing technology, powered by our patent-pending Silk Stone Process™ (SSP), transcends ingredient categories and offers an unparalleled solution for producing nutritionally-rich, ultra-fine plant-based powders. By precisely controlling time, temperature, and moisture, SSP ensures that our powders surpass the nutritional qualities that traditional processing methods deliver, while eliminating chemical additives and waste. This innovation opens a world of possibilities across various industries for companies committed to delivering superior quality products.