



10/6/2015 - by Donna Berry

Focus on fermentation and flavor

Less is more in today's food industry. This includes how ingredients are sourced and commercially produced.

Fermentation technology is considered a clean label, natural process, as it relies on microorganisms and enzymes found in nature. They are isolated and used in a controlled manufacturing setting to naturally produce food ingredients. This includes dairy ingredients for flavoring dairy products as well as other foods. For example, cheddar cheese that has gone through a controlled fermentation process

gets converted into a cheddar cheese ingredient with an amplified cheddar flavor, as much as 20 times that of untreated cheddar cheese.

Food Business News spoke with dairy ingredients industry veteran Pam Gribou, director of research and development and applications at First Choice Ingredients, Germantown, Wis., to learn more about the use of fermentation technology.

Food Business News: Fermentation technology is all about using tools from Mother Nature. Please describe how this technology relates to dairy ingredients and how it has advanced since your years in the business.

Pam Gribou: "Fermentation is a natural process that has been utilized since ancient times as a means of preserving various foods, including milk products. The microorganisms initially responsible for dairy fermentations were 'wild' strains with little consistency in flavor characteristics. Over the centuries, the fermentation process became more standardized through a somewhat rudimentary understanding of the desired organisms and processing conditions.

"What started out as a natural way to preserve milk has now become a science with strong focus on understanding the chemical pathways of the enzymatically controlled reactions taking place. This enables scientists to enhance the reactions that generate desirable flavor, aroma and texture attributes, resulting in premium dairy ingredients.

"Flavor development of dairy ingredients through fermentation has been the area of greatest focus for me in the last several years and there have definitely been major advances in not only pinpointing the reactions responsible for producing flavor-specific compounds and their precursors



*Pam Gribou, director of research and development and applications
First Choice Ingredients, Germantown, Wis.*

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but also in directing the fermentations to produce elevated levels of desired products. This is accomplished through dairy substrate selection, culture and enzyme specificity, and focused processing conditions. We have progressed from what was a 'wild' fermentation to a much more laser-focused approach, all still within the natural dairy fermentation realm."

Fermentation technology has come a long way, but there's so much more to discover. What are some of the potentials for using cultures and enzymes in the dairy ingredients sector?

Ms. Gribou: "Dairy ingredients are powerhouses of nutrition. We already see the benefits of gut health from fermented dairy ingredients. This research will continue to more specific mechanisms around immunity benefits and other health and wellness associations.

"As consumers continue to look for healthier foods that taste better, fermentation of dairy ingredients is one way we will be able to satisfy this quest. For example, lower-fat foods often require assistance with delivering rich flavor and smooth mouthfeel. They can now use ingredients obtained from structured dairy fermentations rather than chemical-sounding ingredients."

How do dairy ingredients derived from fermentation differ from those produced synthetically?

Ms. Gribou: "The flavor produced in dairy ingredients via fermentation provides a much more authentic profile as opposed to replicating the major desired flavor components through the addition of purified aroma chemicals. Fermentation not only enhances specific flavor characteristic but at the same time there will be side activities of the fermentation happening, which also improve the overall end flavor.

"Synthetic chemicals cannot mimic the side activities and so they do not achieve the level of authenticity of flavor found in fermented dairy ingredients. This authenticity can also carry through to the food manufacturing process to deliver higher quality flavors than chemicals alone in finished foods. Further, for the savvy consumer, there is definitely a value play for cleaner labeling and more natural processing."

What about carbon footprint and sustainability? What are the benefits of using fermentation technology?

Ms. Gribou: "Fermentation for enhanced flavor development of dairy ingredients is definitely a benefit when you are talking sustainability and reducing carbon footprint. This is because the fermentation process naturally occurs in dairy ingredients, such as cheese, at a very slow pace. Months of aging to allow degradations of proteins and fats to produce a matured cheddar cheese flavor can be reduced to days or a few weeks when the biochemical pathways are targeted. This lowers the energy costs to deliver the flavor of dairy, naturally."