

Protein Innovation: A Market That's Here to Stay

By Gabriel Rivera, Contributing Editor

As the media reports on the health benefits of protein and consumers look to augment their protein intake, many companies are formulating a variety of product types with protein supplied from an increasingly diverse range of sources. Considered an essential ingredient to every cell within the body, protein is a building block for bones and muscles. It is also important for repairing tissue and muscles, producing hormones and enzymes, and enhancing muscularity. Considering its “macronutrient” status, having an adequate amount of protein is vital to sustain a healthy lifestyle.

There are many benefits associated with consuming adequate amounts of protein, which include building lean muscle mass, appetite control and maintaining a healthy body weight. While protein traditionally has come from milk, meat and eggs, consumers are increasingly getting their share of this powerful macronutrient from novel sources such as grains, plants and insects. Used across numerous categories such as sports nutrition, functional beverages and functional foods, brand marketers have plenty of protein options to choose from. Exploring each option's benefits will help in the decision-making process.

Animal Proteins

For years, protein derived from animal sources, particularly dairy proteins such as whey and casein, have been go-to options for athletes, body builders and for anyone looking to increase protein intake. These proteins boast high bioavailability and digestibility, along with a complete amino acid profile.

Derived from the milk of cows, whey was generated as a byproduct of the cheese-making process. There are three types of whey protein: whey protein concentrate, whey protein hydrolysate and whey protein isolate. Whey protein concentrate and whey isolate remain the most common forms. Whey protein concentrate is low in fat and carbohydrates. Depending on the concentration, protein can range from 30 percent to more than 90 percent. With whey protein isolate, protein content is usually on the high end at 90 percent, as all fat and lactose is removed. Whey protein aids in weight-loss, helps lower cholesterol, assists in improving lean muscle mass, and helps to lower blood pressure. Some of the pitfalls of whey that individuals may experience include stomach pains, nausea and cramps.

Casein is a protein found in milk that helps build muscle and improves muscle recovery. A study published in *Medicine and Science in Sport and Exercise* in 2004 found that subjects who ingested 20 g of either casein or whey protein after a resistance workout had increased muscle protein synthesis and muscle protein net balance, both of which are beneficial for muscle growth. A positive muscle protein net balance signifies the body is synthesizing more muscle than its breaking down (*Med Sci Sports Exerc.* 2004 Dec;36(12):2073-81). In addition, casein contains high amounts vitamin D, which helps to support bone health and help to reduce the risk of osteoporosis.

Beef is another animal-derived protein source with numerous benefits to health and performance. Beef provides the energizing amino acid creatine, making it an ideal protein source for muscle growth in bodybuilders, athletes and everyday fitness gurus. Consuming meat is one of the best ways to get adequate protein daily. Beef protein is also another alternative for those who are lactose-intolerant.

This protein source helps with bloating that may also occur while taking whey protein. Rich in iron, beef protein also has the ability to give the body energy from the nutrients it contains. Beef protein helps to keep testosterone levels high for maximum results. Certain beef products are leaner than others. For example, cuts from the loin are leaner and can assist with a healthy protein-to-fat ratio.

Chicken is another popular animal protein source, and provides 31 g protein per 100 g skinless, boneless breast meat, according to the National Chicken Council. What's more, chicken is naturally low in sodium and provides vitamins B3, B6 and B12 as well as iron. International Dehydrated Foods (IDF) offers the power of chicken protein in a powder form, which, according to Roger Dake, director of research and development at IDF, "is a complete protein that is also very efficient in meeting all the essential amino acids of IOM [Institute of Medicine] and FAO [Food and Agriculture Organization of the United Nations] 50-g reference standards with less than 50 g of powder, compared to much more soy, pea, or rice powder."

Another way to increase protein intake is via eggs. In addition to the 6 g protein per egg, eggs provide choline, vitamin B12, phosphorous and riboflavin.

Plant Proteins

Protein options derived from plant sources are gaining popularity, fueled by an increasing prevalence of food allergies and intolerances, environmental concerns and a host of diet trends, including vegetarian and free-from diets. Soy has long been a popular plant protein source, but options such as rice, pea and hemp proteins are also claiming a share of the market.

Rice protein, which is low in fat and cholesterol, contains essential amino acids necessary to build quality muscle. Considered to be a great meal replacement, rice protein is convenient for consumers to add into a meal or make into a nutritious shake. This protein source is also easy to digest for those struggling with gastrointestinal (GI) problems. Ideal for vegetarians, rice protein assists with weight management and helps with repairing muscle tissue after a strenuous workout, contributing to muscle gain. Rice protein contains both cystine and methionine, which are two important sulfur-containing amino acids that build new proteins important to muscle growth. Rice protein has also been shown to provide benefits similar to whey protein. In a study at the University of Tampa, researchers observed experienced bodybuilders on different diets over the course of eight weeks, and focused on four key metrics: recovery and soreness, muscle growth, change in body composition and strength improvement. Researchers found similar results across all four metrics in study participants who used plant-based rice protein as in those who used whey protein (*Nutr J.* 2013;12:86).

Popular among individuals with a sensitive digestive system and with allergies, pea protein is high in branched-chain amino acids (BCAAs). BCAAs sustain muscle gains daily, help reduce fat loss and increase lean body mass. This powerful protein contains an important amino acid, L-arginine, which aids in blood flow and helps overall cardiovascular health for the long haul. Packed with lysine, pea protein also contributes to biosynthesis of carnitine, which helps turn fatty acids into energy. Pea protein also helps formulate connective tissue within the body, helping to repair torn skin such as scars, wounds and cuts. Pea protein is also fat- and cholesterol-free, and helps to lower ghrelin levels. Ghrelin is a powerful source of protein that sends a message to the brain that signals the feeling of increased appetite and hunger.

Hemp seed is another plant-based protein source that is easily digested, allowing it to be utilized effectively within the body. Among its benefits are supporting the immune system and helping to fight

off fatigue. . In addition, there aren't any side effects associated with the intake of hemp protein. Known as one of the safest plant sources, protein powders and shakes are commonly fortified with hemp protein. The hemp seeds are packed with essential amino acids and allow for improved muscle gains and mental clarity. This powerful protein source also contains omega-3 fatty acids, which support heart health and promote bone, skin and hair growth.

Sourced from soybeans, soy protein has all the essential amino acids that are also in animal or meat protein and can provide a suitable option for individuals who are vegetarian and would want to consume a plant-based protein. With its ability to support healthy cholesterol levels, soy protein can also be beneficial to the heart. Regular consumption of soy protein lowers overall cholesterol and helps improve circulation, thus enhancing overall heart health. Furthermore, soy protein contains vitamins found in animal protein such as vitamin B12, which is vital to improve cardiovascular health. In addition, soy protein can help aid infants who cannot tolerate milk-based formulas. Infants, who are not able to tolerate lactose, can intake soy protein as an alternative for formula. This enables them to get adequate nutrition without the digestion problems.

Innovative Proteins

Consumer demand for more protein is part of a bigger trend: emphasis on health and wellness. Increasingly, consumers want products that are natural, nutritious and will support good health. So much so, they're willing to try just about anything to meet those needs—even insects.

Cricket protein has almost double the protein content of eggs. What's more, cricket "meat" provides a higher protein content than beef, making it one of the most protein-packed sources in the market today. This protein source offers many vitamins and minerals, and it is low in carbohydrates. Cricket protein is also packed with amino acids and potassium, and it also supplies an adequate amount of iron. Sourcing protein from crickets is also highly sustainable. Crickets are quick to reproduce, and require less land, feed, water and other resources compared to plant or animal sources.

Another innovative source of protein on the market today is quinoa. A seed eaten like a grain, quinoa is considered a pseudo-cereal and a healthy vegetarian source of many beneficial nutrients. A cup of uncooked quinoa contains 20 g of protein and provides all the essential amino acids necessary to enhance muscle growth and improve tissue repair. High in B-complex vitamins, quinoa can be cooked easily and safely within minutes to provide a quick and adequate amount of protein. This source is also high in fiber, as it contains 12 g per one uncooked cup of quinoa. An excellent plant protein option for vegetarians, quinoa provides a high dose of antioxidants, which helps fight off free radicals to promote a healthy body.

The Formulation Process of Protein

William Grand, marketing manager at Nutrifusion, said protein has become popular and trendy. "Sixty-two percent of consumers are seeking to eat more protein," he said, adding that the demand for protein has provided many opportunities for food processors. Nutrifusion offers protein options such as pea and potato to meet demands for plant-based options. "Many consumers are also moving to a plant-based diet due to the health benefits and perceived values. Getting sufficient protein is the primary consumer interest with health and ecological benefits satisfying the consumer's principles to have a positive impact on the environment," he said.

Maxsun Industries offers pea protein as well as numerous amino acids commonly used to build protein and muscles. These can be delivered as pure powders or can be used as supplements and vitamins, and are ideal for formulations targeting cholesterol management, tissue recovery and immune system benefits.

Indeed, protein continues to be top of mind for consumers. Many are aware of the benefits and understand how protein works. Dilez Uzunalioglu, business scientist at Ingredion Incorporated, said consumers are constantly buying protein products. “Nearly one in four consumers indicate that they go out of their way to obtain supplements, foods or beverages that contain protein. This is reflected in the fact that protein is one of the ingredients that consumers most report having increased consumption in the past two years,” he said.

Ingredion uses pulse (aka legume) proteins such as pea, lentil and fava bean varieties, which contain around 60 percent protein. These proteins are Non-GMO Project verified, gluten-free and are label friendly. Called VITESSENCE Pulse, its line of pulse-based proteins provide blending, water absorption and emulsification properties and can be added to many applications, including bakery, snacks, breakfast cereals, pasta, energy bars/supplements, protein shakes, powders and beverages. In addition, they’re rich in dietary fiber and provide carbohydrates that are slow to digest, which allows for the slow release of energy when utilized in particular formulations.

In a formulated system, measure and efficacy of the proteins should be considered during production. “Interaction with other ingredients in the formula including proteins, carbohydrates, salt, fat, minerals should be considered,” Uzunalioglu said. “The process conditions including time, temperature, [and] shear should be closely monitored which may result in denaturation of the proteins.”

Pulse proteins offer the added appeal of sustainability. “It takes 43 gallons of water to produce one pound of pulses, while it takes 1,857 gallons to produce one pound of beef,” Uzunalioglu continued. “This, coupled with the fact that all pulses used are sourced in the United States and Canada and processed in North Dakota, make pulse-based proteins incredibly sustainable ingredients,” he said.

Chicken protein powder also offers benefits for formulators. According to Dake, IDF’s shelf-stable chicken powder, which provides a light, savory flavor, can be mixed into protein blends for use in applications such as soups, sauces, pastas and snacks. “IDF’s CHX-ISO™ and ARC™ 70 protein ingredients allow formulators to increase protein in a variety of applications while contributing a low sodium, fairly neutral to a slightly savory flavor that enhances the flavor of a finished savory application with natural umami,” he said.

Another manufacturing company, Solabia, has utilized protein ingredients to boost weight control and muscle mass for supplement and functional food brands. Solabia offers plant hydrolysates such as ProNutral. Some of the plants involved with protein hydrolysates include pea, rice, soy and wheat. Laurent Lasalle, marketing director for Solabia, said there are many benefits that come with the ProNutral protein ingredients. “With a high content in di- and tri-peptides, ProNutral are absorbed faster by the organism than intact proteins. The major health benefits of the hydrolysates are to decrease blood cholesterol levels, to increase plasma insulin, to improve blood parameters, to decrease hungry sensation and to stimulate muscle mass development,” she said. Lasalle also stated they don’t encounter any difficulties during production, processing and formulation. “The protein hydrolysates appear to be stable even during cooking,” she said.

The protein trend continues to evolve. Staying afloat with the times and becoming innovative with protein sources is vital. With the growing popularity of protein and the variety of protein sources available, the future outlook for both the consumer and brand marketer seems to be nothing short of promising.