

## THE LEGACY OF SOY BEANS

MODERN CONSUMERS ARE TRULY CONFUSED ABOUT THE POTENTIAL BENEFITS OF SOY BEANS—IS IT HEALTHY OR NOT? CONTRIBUTED BY **HENK HOOGENKAMP**, PROTEIN SPECIALIST & AUTHOR.

**FOR** many years, the soy plant protein industry bombarded its consumer base with conflicting health messages while loading up meat products with excessive amounts of soy protein inclusions in developing countries. For these applications, soy has never been really popular, particularly in the US, Canada and West European countries.

The pressure on soy protein is increasing because people associate it with allergies, the Amazon destruction and GMO—the latter still a formidable barrier. The zeitgeist has caught up with the soy protein industry, and perhaps the answer is to look into the growing trend towards natural food, and especially the huge growth of plant-based meat alternatives. Another interesting product category to watch is the introduction of so-called hybrid foods like blends of meat and plant protein that simulate traditional meat products such as chicken nuggets and burgers.

### WEIGHING PROS & CONS

Presently, the amount of food information sent out on a daily basis is huge. It is unfortunate that negative soy protein news flashes get circulated, much of which has not been properly substantiated or scientifically validated. Quite a large share of the information is repetitive and often conflicting. As a result, a majority of consumers are simply unable to sensibly internalise the content. They get confused when weighing the pros and cons, and subsequently cannot conclude what is true or false. It is a shame—and a curious thing—that the US-dominated soy protein industry has such a myopic view of its ingredient that it fails to communicate its advantage. This has a highly negative effect on consumer perception and trust.



### SOY MOVING FORWARD

Besides their health benefits, proteins are also greatly in demand for their ability to texturise, emulsify, gel, foam, stabilise, and provide structure. Protein ingredients are either of animal or plant origin (like cultivated algae). Innovative protein ingredients—usually the result of separation and purification from their original native source—are often additionally treated with enzymes. This is done to influence or modify specific amino acid sequences to obtain certain organoleptic and performance characteristics. All proteins are composed of a sequence or building blocks of amino acids, which determine a protein's physical properties like molecular size and charge, solubility, as well as isoelectric point. The specific protein's isoelectric point is the pH, at which the molecular charge is neutral and therefore no longer soluble in water-based solutions.

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Soy protein is also associated with the use of high amounts of clean water, hexane, and some chemicals during the purification process. The popularity of natural foods will have some damaging effects on the use of traditional soy protein ingredients. Instead, in-kind competition by modern fractioning technology to separate the plants components, i.e. protein, carbohydrates, and fibre are making rapid headway. Fractioning is a dry system in which neither water nor chemicals are needed to separate the nutritional components. Besides addressing the preferences of the consumers looking for natural food products, dry fractioning requires significantly less investment and typically allows a protein concentration between 50 and 60 percent.

### SOY'S INTRINSIC VALUE

"Once you have seen one protein, it does not mean that you have seen them all." Not all proteins are alike—some are digested and absorbed more rapidly while others may favourably impact metabolism and glucose control. Moreover, organoleptic and application performances are often hugely different with each type of protein possessing specific characteristics.

Protein, being complex and intriguing, will provide both challenges and solutions for innovative research and development. In formulated foods, proteins are usually part of a complex matrix of other macro-components such as fat, carbohydrates, fibre, and flavours. The interactions among these components ultimately deliver the desired product attributes. Different amino acids produce different results and, with all things being equal, can directly influence the desirable end product specifications.

The fact is that the main value of soy protein is related to its relative low-cost structure. This is not only

when compared to meat, egg and dairy proteins, but also related to other forms of plant protein ingredients such as those derived from pea, mung bean, fava, rice and wheat. The biggest advantage of the soybean is the significant presence of both protein and oil. This allows the soy industry to capture value from not one, but two important dietary components. For global food security and affordability, the low-cost advantage is the most important key benefit of soy protein, not its perceived health benefits.

### TRANSPARENCY

Leading food retailers are increasingly pushing for soy traceability, sustainability, and transparency in their supply chain. However, the drive towards transparency

for soy is only the beginning. The only way to accomplish sustainable sourcing is most likely through legally binding contractual long-term supplier engagement. Traceability and regionalisation of soybeans will be of key importance for premium branded foods such as Alpro's (Danone) soymilk and Impossible Foods, as well as for the rapidly growing popularity of plant-based meat alternatives.

To ease consumer concerns, it will be crucial to shorten the supply chain to limit transport footprint, as well as avoid reputational risks and social media backlash by the millennial consumers. After all, GM soy issues, health concerns related to soy's impact—fact or fiction—and deforestation are topics premium branded food and beverage companies rather





avoid to publicly discussing. Instead, companies using soy proteins tout the green credentials to create positive marketing awareness. Speaking of which, the Impossible Burger is now formulated using genetically engineered extruded soy protein concentrate and a genetically-engineered yeast to manufacture its star 'leghemoglobin' ingredient used for colouring and flavouring.

#### CHALLENGES

The upside of soy is that the crop contains the highest protein and oil content. The downside is that soy has only four main harvest regions—US, Brazil, Argentina, and Paraguay—mostly due to climate restrictions.

A vast area of virgin forest is lost to the unrelenting expansion of soy agriculture in environmentally-sensitive areas. The forest covers about 30 percent of the planet's landmass—but they are disappearing at an alarming rate. For example: between 1990 and 2020, there has been an approximately 4 percent decline in forested land globally—that equates 1.3 million square kilometers, or an area roughly the size of South Africa.

Increasing meat consumption is the main driver of soy farming expansion. Depending on geographic region, a staggering 75 to 95 percent of the world's soy crop goes into animal feed. Over 90 percent of the soy imported into Europe is used for livestock feed.

The ongoing heated GMO debate makes matters more complicated, though there are clear signs of a change of focus towards an ecological and sound sustainability agenda. **APFI**

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