THE FUTURE LIES IN PLANT PROTEIN

THE PROTEIN REVOLUTION

Just a few years ago, plant protein products led a sad niche existence on supermarket shelves. The manageable group of consumers at the time came from the vegans, who bought the product more for conviction than for reasons of enjoyment. Typical product examples are the well-known tofu made from soy protein and its counterpart seitan made from wheat protein. However, for the majority of the population in Western cultures, such products were not an alternative to animal products due to taste and consistency.

The founding of the now world-famous companies Beyond Meat and Impossible Foods in Silicon Valley in 2009 and 2011 represents a kind of big bang. With a lot of entrepreneurial skill and sophisticated marketing strategies, the seed companies progressed from small start-up to global players with plant-based burgers within a decade. The Impossible Burger is based on a recipe with soya and potato protein, the Beyond Burger relies on pea protein. Both products mimic their animal counterpart almost perfectly in terms of taste, consistency and appearance. What seems logical today was a brilliant move at the time. This made it possible to tap into a significantly larger consumer group, the so-called flexitarians. These are consumers who like to eat meat, but will also turn to plant-based alternatives at any time, as long as the taste and price are right. According to various studies, this group now accounts for a large part of the population.

Due to this commercial success and positive media coverage, countless startups have been founded worldwide since then. Investors are queuing up and

Several process steps are required for the extraction of plant proteins, and these are similar to the extraction of starch in the starch industry.

When processing particularly fine-grained, paste-like products, the use of a special decanter centrifuge, such as the Sedicanter, is recommended.

so there is now an unimaginable variety of plant-based alternatives, such as plant-based chicken, plant-based bacon, plant-based egg, plant-based fish, plant-based cheese, plant-based yoghurt, and so on. The well-known food companies have also long since got in on the act and are expanding their product portfolios. A logical consequence of this is an enormous increase in global demand for plant protein. Existing plant protein producers are responding to this demand and building new factories to gain market share in the global competitive market. They are now increasingly being joined by crossover entrants who want to share the success. These crossover entrants are mainly companies from the agricultural sector that already cultivate and sell the raw material (e.g. peas) and now want to extend their value chain. Another large group are the oil mills, where a high-protein press cake remains in the oil production process. In many cases, this protein is still sold below its value because it must be sold as livestock feed. Food companies that currently purchase plant-based protein are also increasingly interested in producing their own plant proteins. This variant is therefore particularly interesting because direct on-site processing can eliminate cost-intensive drying of the product and at the same time the undried protein has superior functional properties.

SUSTAINABLE DEVELOPMENT

The advances in product development described above are only one reason for the triumphal march of pea & Co. A number of other facts clearly speak for vegetable protein and are becoming increasingly important for many discerning consumers.

According to expert estimates, today's world population of approx. 7.6 billion will increase to approx. 9.8 billion (in 2050) and approx. 11.2 billion (in 2100). All these people are reliant on an adequate supply of protein. A food supply based purely on animal protein reaches its ecological and ethical limits here. The extraction of proteins directly from plants is significantly more resource-efficient than the route via livestock farming, where the plants merely act as feed and a large proportion of the nutrients they contain remain unused. The regional cultivation of peas, beans, lupines, rapeseed, etc. also brings a significant

improvement in biodiversity, as these flowering plants are also a source of food for the insect world. The moral dilemma of intensive livestock farming for meat production can also be resolved by the plant-based alternative. The sum of the above-mentioned facts points to a sustainable and long-term development. We can no longer speak of a short-term trend or hype.

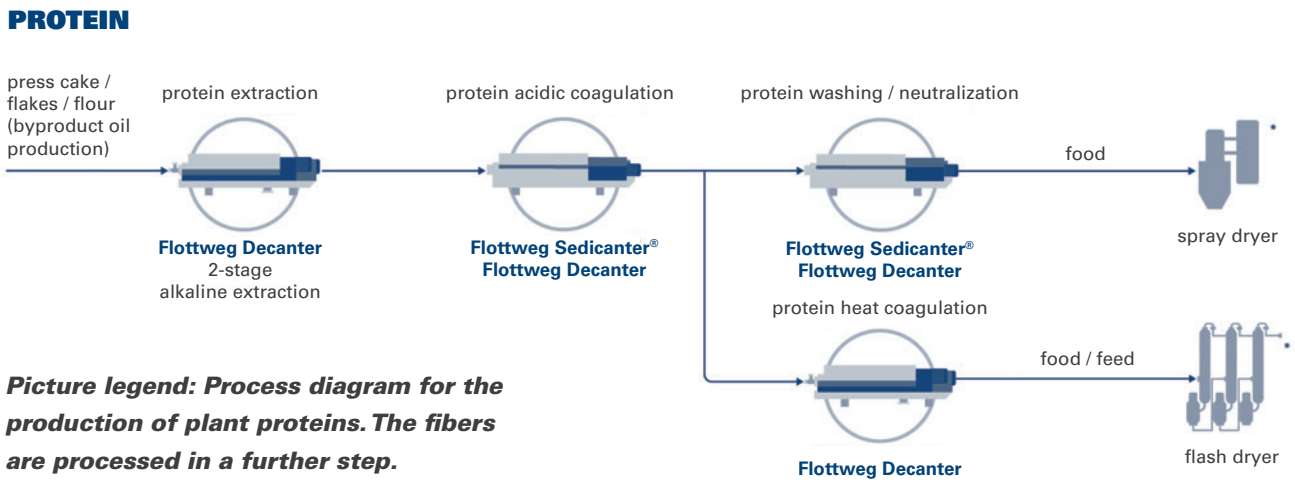
THE PROTEIN'S JOURNEY

Starch plants as well as oil plants can be used as a protein source. Typical starch plants include pea, broad bean, mung bean, lentil and many others. The group of oil plants includes soy, rapeseed, lupine, sunflower, linseed, etc. In processing both groups of raw materials, a natural property of proteins is exploited. The solubility of the proteins in aqueous medium depends on the pH value. Thus, in a first step, the protein can be extracted from the plant parts at high pH and separated from the remaining plant solids (fibers and starch) by means of decanters. In a second step, the liquid protein obtained becomes insoluble again due to a pH reduction and can therefore be separated from the rest of the solution with a second decanter. This precipitated protein is further concentrated by subsequent washing steps and thus becomes a so-called protein isolate.

As the name suggests, starch plants contain not only protein (approx. 20–25%), but also a significant proportion of starch and fibres. With the help of the separation process, all three highly pure components can be extracted. Thus, starch and fibers are by no means extraneous by-products, but can also be marketed as high-quality raw materials. In this process, fibers and starch are separated and concentrated by means of centrifugal screens, hydrocyclone unit, the Flottweg nozzle separator and Flottweg decanter. In the case of oil plants, the pressed cake produced during oil production is further processed. It is important that the preceding deoiling process is as gentle as possible, otherwise the protein is pre-damaged and can no longer be separated from the plant matrix.

Some of these plants contain so-called antinutritional factors (ANF). From a plant perspective, a large proportion of these ANFs function as natural protection of their progeny from predators. Consumers are familiar with this from everyday life, for example, when handling potatoes or beans. These cannot be eaten raw due to these very ANFs and must be cooked or at least blanched beforehand. Appropriate process design can selectively remove these substances and achieve high protein quality without undesirable side effects.

In some cases, an application does not require a high purity protein isolate quality of 80-90% purity and perhaps 50-70% is sufficient. In these cases, the protein is not dissolved and then precipitated. Instead, the plant product is only intensively washed until the concentration of the undesirable components has been sufficiently reduced.



Picture legend: Process diagram for the production of plant proteins. The fibers are processed in a further step.

* Dryers to be provided separately by Flottweg technology partners

CONCLUSION

The extraction of protein from potatoes is generally a well-established process that is to be further optimized so protein can also be used for human nutrition. To date, the demand for plant proteins has been met mainly by soy proteins. But the demand for non-genetically modified alternatives is strong. Currently, this is mainly covered by pea proteins, although potato could also be used more effectively in the future. The optimization of processing allows plant-based raw materials to be used even more effectively. Industrial centrifuges such as Flottweg decanters help to conserve valuable resources.

More than just a trend. As demand for protein increases, the importance of plant-based protein sources such as peas, canola and lupins grows steadily.

Production of lupin protein:
https://www.youtube.com/watch?v=lWH2CrZ_zxY

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DO YOU HAVE ANY QUESTIONS?
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