



# Pulses

## An ancient crop making a comeback to address modern day challenges

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**T**he quest for alternative proteins has never been more intense. With the rising awareness of global warming and other environmental crises, more and more consumers want to do their part and contribute to a sustainable future. A vital pillar in this big picture is the shift from animal-derived to plant-based protein.

As such, the variety of meat, sausage, fish, cheese and other dairy product substitutes continues to rise. Innovative ingredients that contribute to appealing end products and combine a good nutritional profile, outstanding taste and a clear conscience are very much in demand.

A raw material that seamlessly packages both tradition and

innovation is pulses. They are among the world's most ancient commodities; in fact, archaeological excavations suggest that they date back more than 11,000 years.

Yet, they still remain relevant today. Their minimal requirements in terms of cultivation and their excellent nutritional composition makes them a must-have ingredient for contemporary food concepts.

Germany-based Müller's Mühle focuses on the procurement, processing and refinement of pulses. The company has recently invested €14.5 million (US\$16.8 million) in new refining technology for legume concentrates. And, with the help of a modern air separation plant, functional flours with a protein content of up to 65 percent can now be produced, facilitating the enrichment and nutritional optimisation of many foods.

With this investment, Müller's Mühle is now well positioned to shape the skyrocketing plant-based market as their high-protein concentrates are the perfect base for meat, dairy and egg substitutes, and are ideally placed to serve the burgeoning gluten-free segment.

### Cutting-edge technology

Previously using conventional milling equipment to process native legume flours, the company has now installed state-of-the-art technology to separate the high-protein from the low-protein fractions. With this process, Müller's Mühle aims to achieve both the highest possible protein content and high yields. This is a tricky task as the ingredient composition of different legume varieties differ considerably; and there are also harvest-related fluctuations to be considered.

Hence, the experts are continuously adjusting the operational parameters to meet the specific requirements of each batch. Thanks to a nearly 130-year pedigree of legume experience, though, Müller's Mühle is well-placed to overcome this challenging task. Depending on the raw material, concentrates with a protein content of 40 to 65 percent can be achieved.

### Sustainable raw materials

For its range of SMART Pulses Pro high protein functional flours, Müller's Mühle uses chickpeas, fava beans, yellow peas and red lentils, making the whole process chain as holistic and sustainable as possible. Regarding cultivation, legumes have very low water requirements. Furthermore, they bind nitrogen from the air into the soil and, as a consequence, naturally increase soil fertility without the need for nitrogenous fertilisers.

Whether a raw material can be considered to be sustainable



also depends on transport routes; the company attaches great importance to responsible procurement, their raw materials are sourced from Germany and neighbouring European countries whenever possible.

Currently, red lentils are the only items obtained from overseas,





but the company is working on a European solution. Last but not least, 100 percent of the raw material is utilised during production — from functional and native flours to the food industry to by-products (such as the legume shell) to the feed sector.

On the subject of nutritional physiology, legume concentrates are true all-rounders. In addition to their high protein content — and being far superior to protein isolates — they also contain fibre and minerals, B vitamins and trace elements.

Furthermore, they are low-glycaemic. Their impressive credentials also have a positive effect on nutri-score labels, which are becoming increasingly valued by health-conscious Europeans. In addition, they are clean-label ingredients and naturally free from gluten and soy.

### **An endless list of potential applications**

A core application field is alternative products as it can be used as a base for meat substitutes or hybrid products, the company's flours are converted into texturised vegetable protein (TVP) using an extrusion process. Even in their natural state, though, these flours can be used as emulsifiers and binding agents in the alternative "meat" segment.

They also work well for plant-based dairy-like products such as drinks, yoghurts, desserts and cheese. Thanks to their emulsifying properties, legume flours can also act as egg replacements in baking formulations.

In this context, the company currently conducts trials in collaboration with an independent research service provider (ttz Bremerhaven) and does end product-oriented R&D in the field of egg substitution in different doughs and applications.

Another lucrative sector is the high protein market. Previously dominated by animal-derived whey ingredients, the demand for 100 percent plant proteins is on the rise according to market research company MarketsandMarkets, the global plant-based protein market is expected to reach a value of US\$15.6 billion by 2026 (recording a CAGR of 7.2% from 2020).

So, whether they're positioned in the sports nutrition or weight management sector, or used to fortify everyday groceries such as yoghurts, baked goods or pasta, legume concentrates offer a convenient way to increase the protein content of a wide variety of foods while also improving technological properties such as texture.

The gluten-free sector is another promising field for pulse-based flours. GlobeNewswire expects this market to be worth US\$36 billion by 2026, increasing from approximately US\$22 billion in 2019. Legume flours are suitable as a base for baked goods, pasta, snacks, bars, breakfast products and cookies.

### **The potential for pulses is far from exhausted**

Pulses are the perfect example of an ancient crop making a comeback to address modern day challenges. Soon, there will be ten billion people to feed on a fragile planet with finite resources. Alternative proteins are therefore a crucial component in the quest for sustainability.

There are many routes to take and lots of raw materials that can be used to deliver a more sustainable protein supply. Even though they've been part of the human diet for thousands of years, proteins from legumes offer innovative solutions for contemporary food concepts and will enable manufacturers to participate on the booming market for alternative proteins.

The R&D team at Müller's Mühle conducts extensive work in plant-based cheese and egg substitutes. Compared with meat alternatives, these segments are still in their infancy and offer considerable market potential.

In the long term, Müller's Mühle intends to further expand their technology and incorporate additional refinement steps to offer customers even more targeted products for specific applications.

The potential for pulses is far from exhausted, and the experts at Müller's Mühle are eager to further establish raw materials such as beans and peas in this segment and continue to shape the market.

