

A FUTURE PROTEIN SOURCE – THANKS TO SEPAR

Separation technology, an important cornerstone in the gentle processing of

lupines — The year 2010—with no particular fanfare in the media, employees of the Fraunhofer Institute found Prolupin. It starts a success story that, thanks to great innovation and strong partners, was awarded the 2014 German Zukunftspreis (Future Prize). And always close at the scientist's side—separator specialist Flottweg. Because only the latest in separation technology solutions can make the processing of lupines possible at an industrial scale.

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Lupines, also called wolf beans, are several species of plants in the legume family. Their seeds contain protein which can be used instead of soy in animal fodder or human foods. Due to the protein's high-quality and a fat percentage of just a few percent, they are a valuable foodstuff with a high content in essential amino acids. Further advantages are that the plant can be grown outstandingly well in Central Europe, and its nitrogen-fixing roots lead to a natural soil improvement. The lupine is thus perfect for sustainable, resource-friendly agriculture.

The idea of using lupines for food production came about over ten years ago—But developing a technology to separate the seed's component materials fully from one

another proved to be a big challenge for the researchers. Until now, despite their many advantages, lupines were not interesting for the consumer market because bitter materials made them unsavory. Thanks to a new method, unpleasant odor and taste substances can be identified and removed.

To ensure a sustainable economic lupine fractionation, the target yield for all fractions is over 90%. But how can "sensorily neutral" proteins be obtained from the seed? First, the grains are shelled and rolled to extremely thin flakes. Oil is then extracted from the flakes using supercritical CO₂: At a pressure of over 74 bar and temperatures greater than 31°C, CO₂ takes on liquid-like properties. The majority of the oils and accompanying materials are thus dissolve. The de-oiled flakes are mashed in stirring tanks, then taken to a Flottweg Decanter, which separates

fibers and proteins. The liquid phase containing bitter compounds, carbohydrates, sugar and other soluble flavoring materials is discarded in the waste water.

The solid phase, however, is pumped into another tank. There, its pH value is increased to render the proteins soluble. From there, the mash is put into another Flottweg Decanter to separate insoluble fibers from the solid phase out of the mixture. These are later used in the animal fodder industry. The clear phase is placed acidified in a final tank. Since the remaining dry substance is only a small volume, the proteins can be separated well using a Flottweg Sedicater.

Great Task for a Small Unit

To process particularly soft sediments such as lupine protein, Flottweg produces a special decanter centrifuge. The patented Sedicater can get optimum results with this type of processing: Where a standard decanter achieves a maximum centrifugal acceleration of

PROCESS-Tip

- **Achema:** Hall 5.0, Stand A86.
- Discover more about **decanter**s on www.process-worldwide.com — search for "Flottweg".

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6000 g, the Sedicanter, at 10,000 g, breaks through to values that have heretofore only been possible with disk stack centrifuges.

"We decided on the Sedicanter as it combines the advantages of a disk stack centrifuges with those of a decanter. Thanks to its high speed, this machine gets outstanding separation results while simultaneously processing large quantities of solids," explains Marc Zillmann, Head of Production and Product Development at Prolupin. With its adjustable impeller, the Sedicanter can react to fluctuating feed volumes, guaranteeing optimum separation. And due to its hygienic design and CIP capability, it's predestined the food industry.

The processing of lupines is a challenge for people and machines alike. With the innovative spirit of Prolupin and the latest separation technology from Flottweg, it is now possible to use lupines economically as a food additive. For 2015, a new food product line will appear under the umbrella brand "Made with LUVE" (LUpine + VEgan). These tasty products will be enthusiastically received not only by vegans and vegetarians, but will also represents a healthy, high-fiber alternative for many other people.

A Flottweg Sedicanter is used to process lupines at Prolupin.