SCHULE
YOUR PARTNER IN MILLING

PLANT BASED PROTEINS

schulefood.com

OVER 130 YEARS OF EXPERIENCE

in the processing of grain and legumes

The continuous development of machines and plants makes SCHULE Mühlenbau a competent partner when it comes to processing rice, grain, legumes and much more.

Processing legumes requires many different production steps. In addition to cleaning and sorting, this includes shelling, separating, fine grinding and sifting into protein-rich and starch-rich fractions. SCHULE manufactures all the machines required for legume processing at its central factory in Reinbek near Hamburg, which is certified according to DIN EN ISO 9001. So they are "Made in Germany". Since 1892, SCHULE Mühlenbau has been familiar with grain-producing countries and corresponding processing methods worldwide.

SCHULE
MÜHLENBAU

CONTENTS

PROTEIN SHIFTING

Maximum shelling degree with minimum percentage of broken grains

Due to global population growth – there will be 10 billion people by 2050 – and the increasing demand for healthy and sustainably produced food, the need for high-quality proteins will continue to rise.

Since animal proteins found in fish or meat alone cannot meet this demand, high-quality plant-based proteins are needed as healthy alternatives.

These proteins are often obtained from yellow peas, chickpeas, lentils and various types of beans due to their sensory properties and their aptitude for processing. They are used to make plant-based dairy alternatives, meat substitutes, baked goods, snacks and bars.

Advantages of the process

- Maximum yield
- Increase of the bulk density to reduce the volume in the silos
- Significant increase of the protein content
- Improved handling due to more compact storage

Products

↑ Raw peas

↑ Shelled peas

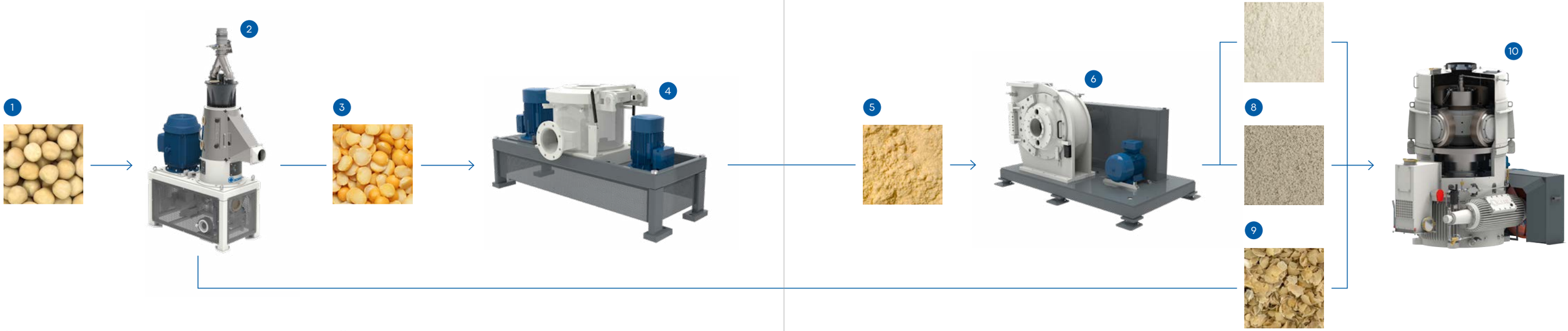
↑ Pea shell fraction

↑ Pea starch flour

↑ Pea protein concentrate

PROCESS

Shelling → **Ultra fine grinding** → **Sifting** → **Pelleting** →



1. Raw peas
2. Verticone
3. Shelled peas
4. Fine grinding mill
5. Ground peas
6. Fine sifter
7. Starch flour
8. Protein concentrate
9. Shell fraction
10. Pellet mill

During shelling, the kernel of the product is separated from the shell. The removed shell fraction is extracted directly at the pearler and conveyed to the shell silo. Depending on the composition of the shell fraction, processing may be useful to increase the kernel yield by returning kernel fragments. This by-product, the shell fraction, is used in various formulations by the animal feed industry and is processed into feed pellets.

After shelling, the kernels are finely ground and separated into a protein-rich and a starch-rich fraction using classifying systems. The resulting protein concentrate can then be further processed into the popular vegan products. It is also commonly used in foods such as high-protein sports nutrition products.

Final product

↑ Pellets from the protein fraction

↑ Pellets from the starch fraction

↑ Pellets from the shell fraction

VERTICONE

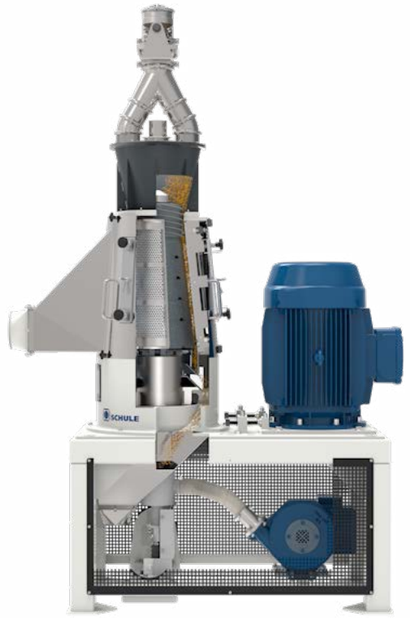
Maximum yield with minimum losses

The Verticone VPC ensures intensive treatment of the product surface with a low proportion of broken grains. A feed screw conveys the product to be shelled into the working chamber of the machine. In the working chamber, a set of stones is located on a hollow shaft, surrounded by a screen basket. Brake bars that can be variably adjusted in the pearling chamber enhance the pearling effect. The outlet of the working chamber is equipped with a plate, the counterpressure of which can be adjusted by springs. The product passes through this working chamber and is pearled by the set of stones. Depending on the setting, the surface of the legume is pearled more or less intensively, thus all adhering shell fragments are removed without the kernels being damaged. The resulting pearling bran is extracted via the screen basket through a separate aspiration connection on the side. Air cools the product during the pearling process and at the same time facilitates the discharge of pearling bran.

Advantages

- Gentle product treatment
- Uniform surface treatment
- Variable gap adjustment
- Variable application possibilities

Compared to other shelling technologies, which mostly use cylindrical shelling systems, conical shelling machines ensure the highest yield with the lowest loss. Shelling peas can, for example, significantly increase the protein content of the end product. This is a decisive advantage, particularly for price-sensitive products such as plant-based proteins. Another advantage over conventional plants is their wide range of applications. Since the gap can be adjusted not only to the desired shelling degree but also to the respective type of raw material, a machine with conical shelling stones can be used for various types of legumes. Even lupins, which cannot be shelled using conventional processes, can be shelled with SCHULE's high-precision process. A protein content of over 60% in the end product can be achieved. This allows companies to process a wide range of products in a flexible and cost-effective manner using a single shelling plant.



↑ Peas after processing by VPC

↑ Beans after processing by VPC

REFERENCES

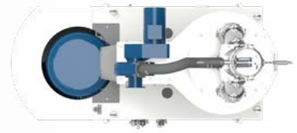
Golden Fields Alternative Protein
Liepāja, Latvia

Reference plant

TECHNICHAL DATA

Extract from the machine portfolio

Verticone	**VPC**
Capacity t/h	up to 10
Motor power of main drive kW	up to 90
Motor power of fan kW	1.5
Power of servomotor kW	0.5
Aspiration m³/min	up to 100

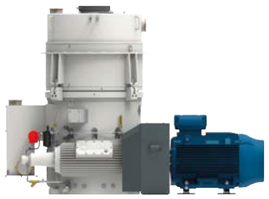


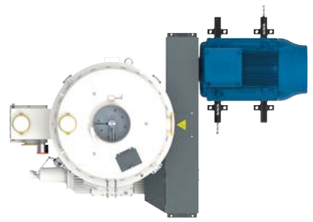
Fine grinding mill	**FSM**
Capacity t/h	4 – 5
Motor power kW	355+45
Aspiration m³/min	300

Fine sifter	**FFS**
Capacity t/h	4 – 5
Motor power kW	90
Aspiration m³/min	300

Pellet mill	**39 – 1000***
Die diameter mm	1000
Roller diameter/width mm	350/up to 154 or 450/up to 154
Number of rollers	3 – 5
Roller speed m/s	2.5
Drive motor kW/min-1	160 – 200/1500

*Other types of pellet mills may be used.





SCHULE
YOUR PARTNER IN MILLING

F. H. SCHULE Mühlenbau GmbH
Dieselstrasse 5 – 9
21465 Reinbek
Germany

+49 (0)40 727 71-0
info@schulefood.com
schulefood.com

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