If you have a reliable supply of the necessary fresh animal blood, Alfa Laval can help you turn this source material into a high-value edible protein product.

Using animal blood as the source of such edible proteins requires specialist equipment as well as detailed know-how about both products and processes.
Raw blood into high-value products

It has long been standard practice for much of the blood from animal slaughterhouses to be coagulated, processed, and dried into blood meal, which is then sold as animal feed. However, blood that has been collected in a suitable hygienic manner can be processed to make it suitable for human consumption as a food ingredient. This represents considerably greater commercial value.

Animal blood consists of plasma and red cells (also called haematocrit). The plasma constitutes up to 60% of the raw blood and is a functional protein with commercial potential. The red blood cells are usually put to non-edible use, but can also be dried into functional and flavoured edible protein in powder form.

Gently does it

To be able to sell high-quality, edible proteins, edible proteins in the form of plasma powder or concentrated plasma must be processed with utmost care. This means removing as little water as possible, as well as avoiding any shear effect that might rupture red blood cells and turn plasma white.

Controlled temperature

Because of its high nutritional value, blood is particularly susceptible to bacterial growth. Rigorous control of the temperature of the raw blood and plasma is therefore necessary in order to ensure an end-product that meets the exceptionally stringent requirements associated with food-quality ingredients.

Know-how makes the difference

With years of experience in supplying processing systems for a vast range of different edible products, Alfa Laval has built up unparalleled know-how and experience in the use of proteins as added-value ingredients. We can now help your company move further up the protein value chain by turning raw animal blood into high-value products.

This makes us the natural choice for companies that want to establish an effective working relationship with an experienced specialist in this field.

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Benefits

An Alfa Laval ABBlood continuous blood processing system enables you to:
- Minimise your entry into new high value segments within the food industry
- Process raw blood and plasma via controlled processing
- Use less energy and water in processing operations, thus cutting costs and energy use
- Benefit from sanitisation standards that lead to maximum protein powder recovery
- Achieve maximum, high-value end-product quality
- Reduce the environmental impact of your plant operations.

An Alfa Laval ABBlood installation gives you the process, virtually at all levels of water-free, strained raw blood collected from veterinarian-approved pigs and cattle. This raw blood must be collected according to local regulations.

As soon as the blood has left the animal, an anti-coagulant is added to reduce the blood’s natural tendency to coagulate.

If the raw blood is to be transported to a central production facility, it must be cold-stored at 5 ± 3°C. The blood is then pumped to a specially designed high-speed centrifuge for separation into plasma and red cells.

The best separation is achieved when mean arterial pressure is kept as low as possible and there is no or little water in contact with the raw blood. This results in plasma with a yield of 52 – 60%.

The plasma is then fed to an intermediate tank and then coagulated to 3 – 6°C (37 – 39°C) prior to cleaning bacteria in the plasma. The membrane holds back the red cells, or dried using hot air. Drying reduces the tissue’s pH and is equipped with CIP modules enabling the end products being contaminated.

The processing of raw blood only involves heating to 35 – 60°C (95 – 113°F). Turning it into edible protein for human consumption or ingredients for pet food, while the aquaculture market therefore requires careful control of bacteria to prevent the end products being contaminated.

An Alfa Laval ABBlood system is designed to provide effective, extreme-end-to-end hygiene management, and is equipped with CIP modules for automatic cleaning of the most hygiene-critical parts of the installation.

Plasma separation with an Alfa Laval self-cleaning separator allows long running times and results in increased yield. The separator provides better control of the process and also features an automatic Cleaning In Place (CIP) facility that helps keep manpower costs down.

Diagram of a typical AlfaBlood installation for processing animal blood into edible proteins.

Processing advantages add up

An Alfa Laval ABBlood system ensures you:
- A highly versatile processing set-up
- Strong hygienic management
- With gentle processing, under controlled temperatures, avoiding the best possible protein functionality
- Plasma separation with an exceptionally high yield
- Control over peak production with effective removal of salts
- Easy upgrading to plasma process to enable you to cope with changing needs.

For automatic cleaning of the most hygiene-critical parts of the installation.

Concentration by hybrid membrane

In combination, nanofiltration and ultrafiltration can be used to concentrate animal blood proteins. Using this filtration process, the membrane holds back the desired amount of water, removes the water and increases the yield.

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