Our vision is driven by passion

TripleA is committed to supplying the very best in soy protein concentrates, specifically aimed at young and sensitive animals. Driven by a passion for quality in every aspect of animal feeding, from birth to slaughter, we decided to produce the proteins ourselves, benefiting customer and producer alike. And AX3® also profits from this passion.

Contact us for information about your options.

We develop and validate all ingredients thoroughly at our pilot processing plant before scale-up to commercial production and delivery to you.

TripleA a/s

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tripleA

AX3® Supreme proteins for animal feed

Our mission is to deliver best-in-class solutions
for the benefit of TripleA's customers and the planet

tripleA

Perspectives of protein feed

Production based on a new Danish patent

AX3® production is based on a new Danish patent, IGM BioProcessing, developed by researchers at the University of Copenhagen. It goes without saying that the modern production line is eco-friendly to satisfy growing environmental concerns. Since IGM BioProcessing is a holistic method, residual products are not an issue, and every fraction from production is value-added and is designed for specific uses.

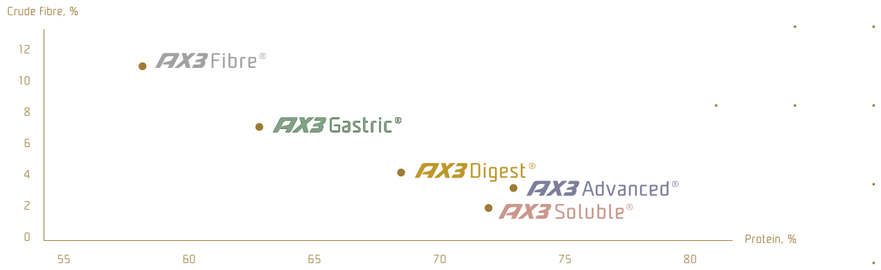
GMP+ Feed Safety Assurance

Quality is our overall focus

Quality is our primary focus. Quality of production, execution of orders and delivery is key to our quality management system. Consequently, we are GMP+ certified with a B2 permit. Our production facility is in Denmark, and therefore both production and AX3® products comply with European feed legislation.

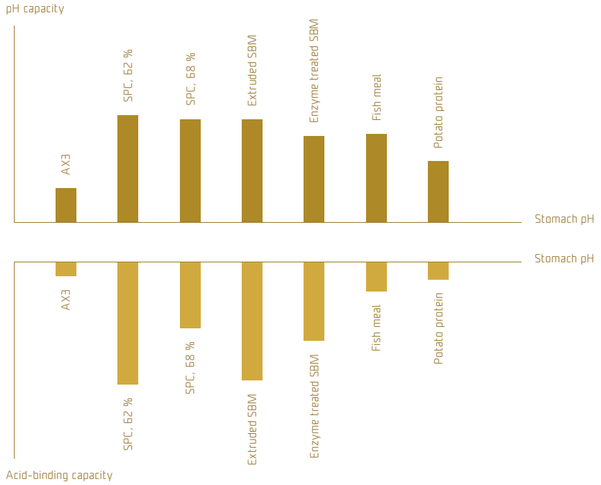
AX3® – advanced protein solutions

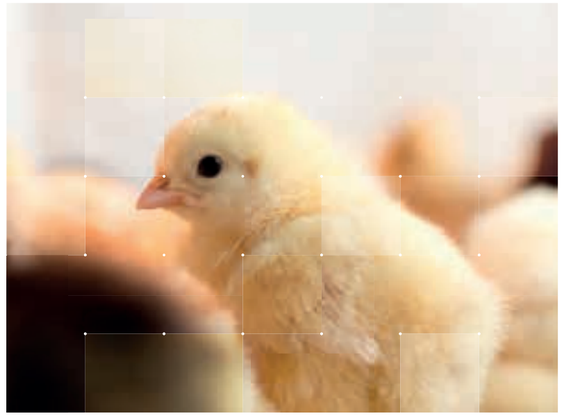
The AX3® product range is protein concentrates of vegetable origin with skimmed milk-like properties. The unique process involved reduces the most critical anti-nutritional factors to an insignificant level. Gentle treatment during processing and drying results in highly digestible proteins and optimal nutrition in the newborn's very first feed. Both technical properties and application performance are continually documented during feeding trials involving a variety of livestock and domestic animals.

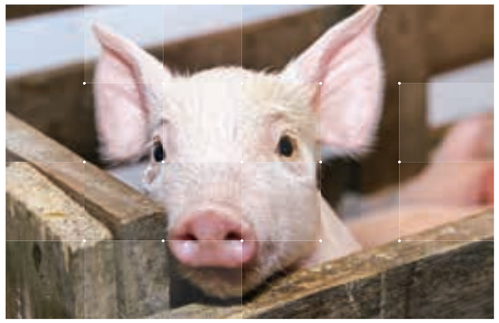


AX3® an advanced protein solution

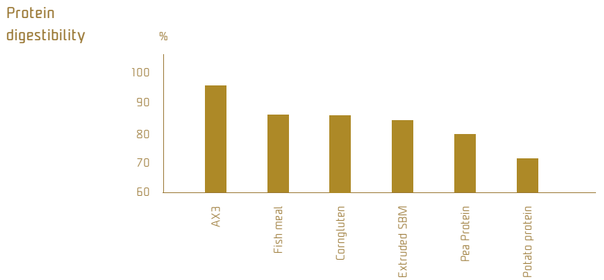
Infant animals have an undeveloped digestive system with low production of acid and digestive enzymes. The intestines are immature with high permeability and unstable microflora. Giving young animals a healthy start ensures welfare and productivity during their entire life span. To do this, we need to work with nature and not against it. Feed must be very digestible with low acid-binding capacity, and naturally it must have the right balance of amino acids, minerals and vitamins.







High digestibility ensures that the animal – and not the bacteria in its gut – benefits from the feed. Low acid-binding capacity helps young animals with naturally slow HCl production in their stomachs, reducing the need for acids to maintain correct pH. In the case of chickens and turkeys, it is also important to keep potassium levels low. Potassium binds water in faeces, creating wet litter which, in turn, increases the risk of foot pad lesions.



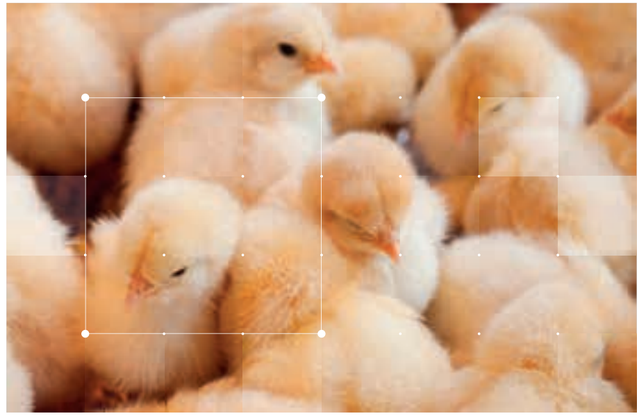
AX3® is the advanced protein solution for feed production to ensure infant animals the best start in life

AX3® High feed and water efficiency

In recent years, the interest in raising poultry without antibiotics has increased. Therefore, the successful start-up of newly hatched birds during their first 10 days of life gets even more important. Aside from management and feed additive measures to control litter quality and bird health, nutritional concepts are appreciated. Here the novel protein concentrate AX3® offers unique properties fitting these needs. Compared to a conventional feeding regime the AX3® highly digestible protein in conjunction with lower water consumption to grow a kg bird leads to a dryer litter. Thus, advantages are less bacterial pressure in the barn environment as well as the gut in newly hatched birds. Further, birds exhibit improved water and feed efficacy during the whole cycle.

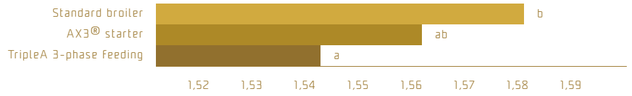
AX3® broiler trial
Holland 2015

Trial design
- Growth trial with Ross 308 birds
- All nine diets were Isocaloric and with equivalent nutrient levels
- Feed and water were available ad libitum
- The trial period was to 35 days of age



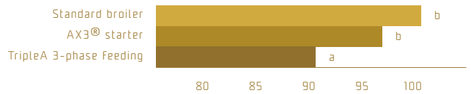
Diets	Standard broiler	AX3® starter	AX3® 3-phase feeding
Day 0-9, Starter	Wheat-Corn, 30.9% SBM Hipro	Wheat-Corn, 15% AX3®	Wheat-Corn, 15% AX3®
Day 10-24, Grower	Wheat-Corn, 28.6% SBM Hipro	Wheat-Corn, 28. 6%SBM Hipro	Wheat-Corn, 15% AX3®
Day 25-35, Finisher	Wheat-Corn, 25.9% SBM Hipro	Wheat-Corn, 25.9%SBM Hipro	Wheat-Corn, 15% AX3®

FCR, day 1-35



FCR: Feed conversion rate, kg meat produced / kg feed, P<0,014

Water intake, day 19-21



DWG: daily weight gain, P<0,002
DWG: different letters indicates significant difference between the groups

AX3®-fed chickens consume significantly less feed and water to produce 1 kg meat. Lower water excretion improves litter quality and reduces susceptibility to disease in poultry.

AX3® is a natural choice as an ingredient for coccidiostat-free feeding of poultry.

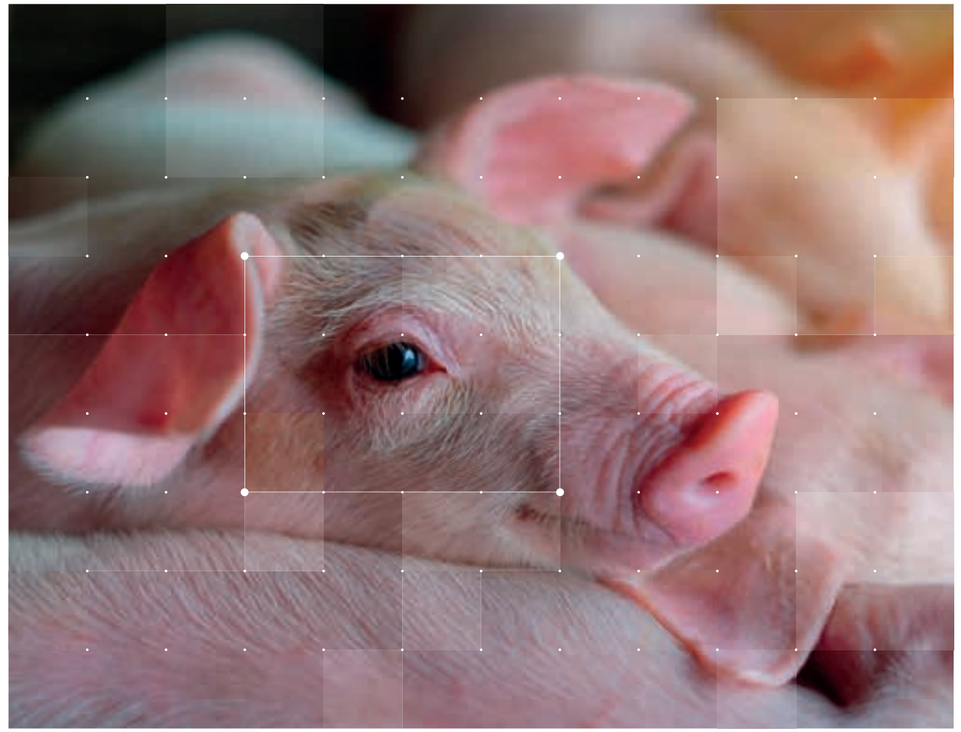
AX3® Powerful start up ingredient properties

One area of application for AX3® is piglet nutrition. Progress in breeding methods has led to more piglets per litter but lighter weight and vulnerable baby pigs that need high-quality proteins in order to make a good start. There are many ongoing livestock initiatives involving optimisation of animal wellbeing and performance to ensure farmers a decent income. One such initiative focuses on reducing the use of antibiotics – across all species – in the interest of public health. In pursuit of this goal, quality ingredients such as AX3® can provide us with a broader range of options for supporting successful neonate livestock nutrition. One of the cornerstones of AX3® is its superb digestibility.

Protein Concentrate	Ileal digestibility coefficient, %	Country
AX3®, Average	95.3	Germany, 2015 – Denmark, 2013, 14, 15
Fishmeal, super prime	96.0	Denmark, 2014/15*
Skim milk powder	96.0	Denmark, 2014/15*
Potato protein low solanin	90.0	Denmark, 2014/15*

* Danish Feed table

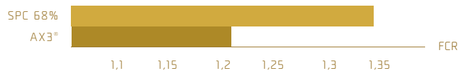
The table gives a summary of the most recent test results for AX3® digestibility coefficients compared with other high quality protein concentrats. These ileal protein digestibility figures underline the high bioavailability of the refined protein in AX3®.



AX3® gains top results in feeding trials in Holland

AX3® was tested at a commercial farm in Holland in 2016. Schothorst Feed Research performed data calculations and compiled statistics. Productivity in piglets fed with AX3® as an important source of protein over the first 16 days after weaning was compared with feed containing SPC 68%.

Diet 1



FCR: Feed conversion rate, P<0,041

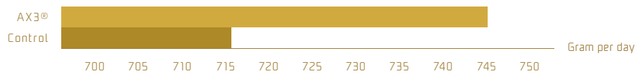
Trial design
- Topigs 20 X Pietrain weanling piglets
- Start weight, 6.3 kg at 25 days of age
- Diet 1, day 1 – 16, contained 10% AX3® or SPC 68%.
- All diets were balanced with respect to energy, lysine, lactose, etc.
- Overall health was moderate

AX3® leads to significant and improved feed efficiency. This result confirms that AX3® is an excellent product that will give young animals a good start in life.

AX3® vegetable skim milk properties

AX3® has been specifically manufactured for suitability in modern calf milk replacers (CMR). Therefor the protein is easily digestible and harmless to the young calf. AX3® was tested in collaboration with Aarhus University at the Danish Cattle Research Centre, Foulum.

Productivity trial with suckling calves.
(Daily grain, until day 65).



Score for dirtiness, average

* Score for dirtiness on the rear and tails of the calves. The scale runs from 0=clean to 5=very dirty with manure. Scores were recorded for each calf four times at two-week intervals.

The trial showed no statistically significant difference between AX3® and the control in consumption, growth, disease or score for dirtiness.

AX3® is an excellent soy protein concentrate for use in calf milk replacers.

Growth trial with AX3® in calf milk replacer

Trial design
- 40 Holstein calves – 20 females and 20 males
- Period: day one to eight weeks of age
- CMR contained 24% protein and 17% fat
- The ratio of CMR to water was 130 g/L
- 28% of the protein came from soy protein
- Control was Danpro A from Solae

We enable tomorrow's world to do more with less

In our opinion, our future depends on saving more energy and manufacturing new types of product using sustainable production techniques. Consequently, TripleA will continue to spend more resources on promoting all forms of sustainability within our company, to our customers and to our business partners. We know very well that, when it comes to feeding the world, we are in this together. And if we are to succeed, you must succeed.

AX3® Competitive fishmeal replacer

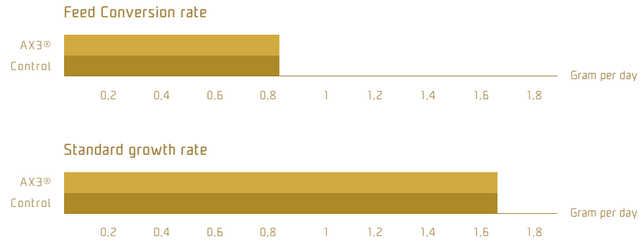
In developing AX3®, we have had several focus points: One was that the trypsin enzyme in fish is very effective, and therefore fish are very vulnerable to trypsin-inhibitors; another that palatability is very important in fish feed to avoid reduced growth rate; yet another that protein digestibility is important to reduce nitrogen-pollution of the environment; and finally, that the protein eases handling of the feed during processing.

Trial design

- Rainbow trouts
- Three times 5000 fish
- AX3® replaced fishmeal with 8% inclusion

Productivity trial in rainbow trout

Independent trials have indicated that fishmeal in feed for rainbow trout can be replaced by AX3® without affecting productivity or feed conversion rate. This trial was performed by Aller Aqua, Denmark.



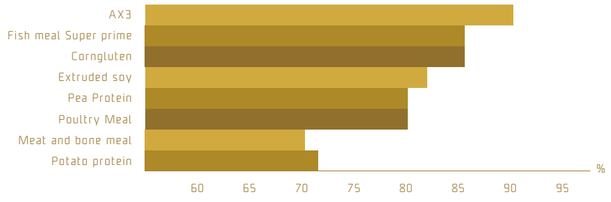
The trials showed that AX3® affected neither pelletizing of the feed nor pellet stability in water. Furthermore, the palatability of the feed did not change even though AX3® replaced fishmeal.

AX3® unique digestibility

Mink is a strict carnivore with a very short digestive tract. As the trypsin enzyme in mink is rather effective, mink is very vulnerable to trypsin-inhibitors; furthermore, the protein digestibility is important both to reduce the strain on the animal and to reduce nitrogen-pollution of the environment. AX3® is due to the special production method able to fulfil both requirements in addition to high water-binding capacity that eases handling of the feed during processing.

To be able to recommend the proper use of AX3® several trials have been performed at the Research Centre of Kopenhagen Research.

Comparison of digestibility for different protein sources in mink



Digestibility trial

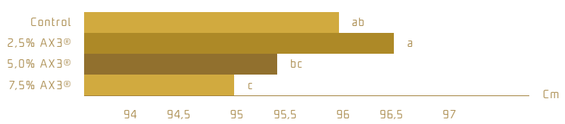
Trial design
- Genetics: Brown/Glow colour type
- Four X three adult males
- AX3® in feed from 0% to 47.6%

Mink growth trial

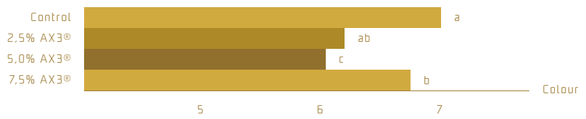
Trial design
- Wild type mink kits from weaning
- Control: mix of corn gluten, potato protein, Blosol
- Treatment: AX3® at 2.5%, 5.0%, 7.5% inclusion

Fur length and quality characteristics in mink kits fed increasing amounts of AX3®

Fur lenght



Fur quality



Quality: 1–12, 12 being the best and 1 the poorest, P<0,003
Different letters indicates significant difference between the groups

The use of 2.5% AX3® gives the same skin length as in the control. A 5% or 7.5% addition seems to result in slightly shorter fur than a 2.5% addition, and the poorest quality is found with the 5% addition.

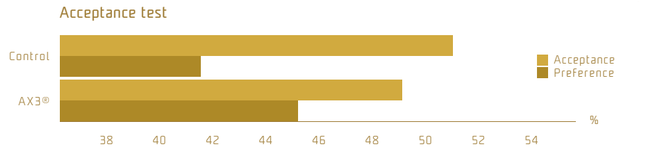
AX3® Good palatability

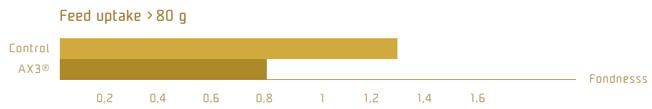
Cats are strictly carnivors and very sensitive to taste of the feed with a preference for acidic taste. Using vegetable protein in cat feed therefor depends on the digestibility and palatability of the product. As AX3® in mink has shown very high protein digestibility and as the product is acidic with a pH of 4.1 the product has also been tested in cats.

CAT

Acceptance test

VPG, Denmark has performed a test with adult cats to determine the effect on eating behaviour of including AX3® in the feed.





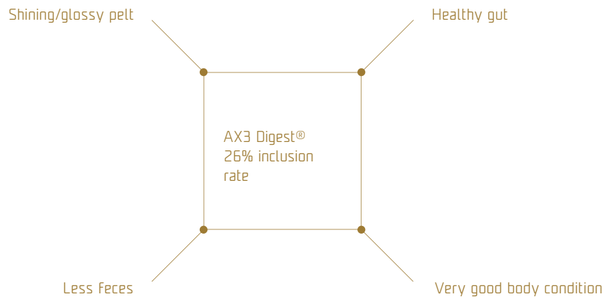
This trial shows that AX3® is very palatable to carnivores.

Trial design
- Period: 4 days
- Animals in test: 20
- AX3®, 10 % inclusion
- Parallel feeding of single pelts
- Observing feeding behaviour
- Determining feed intake

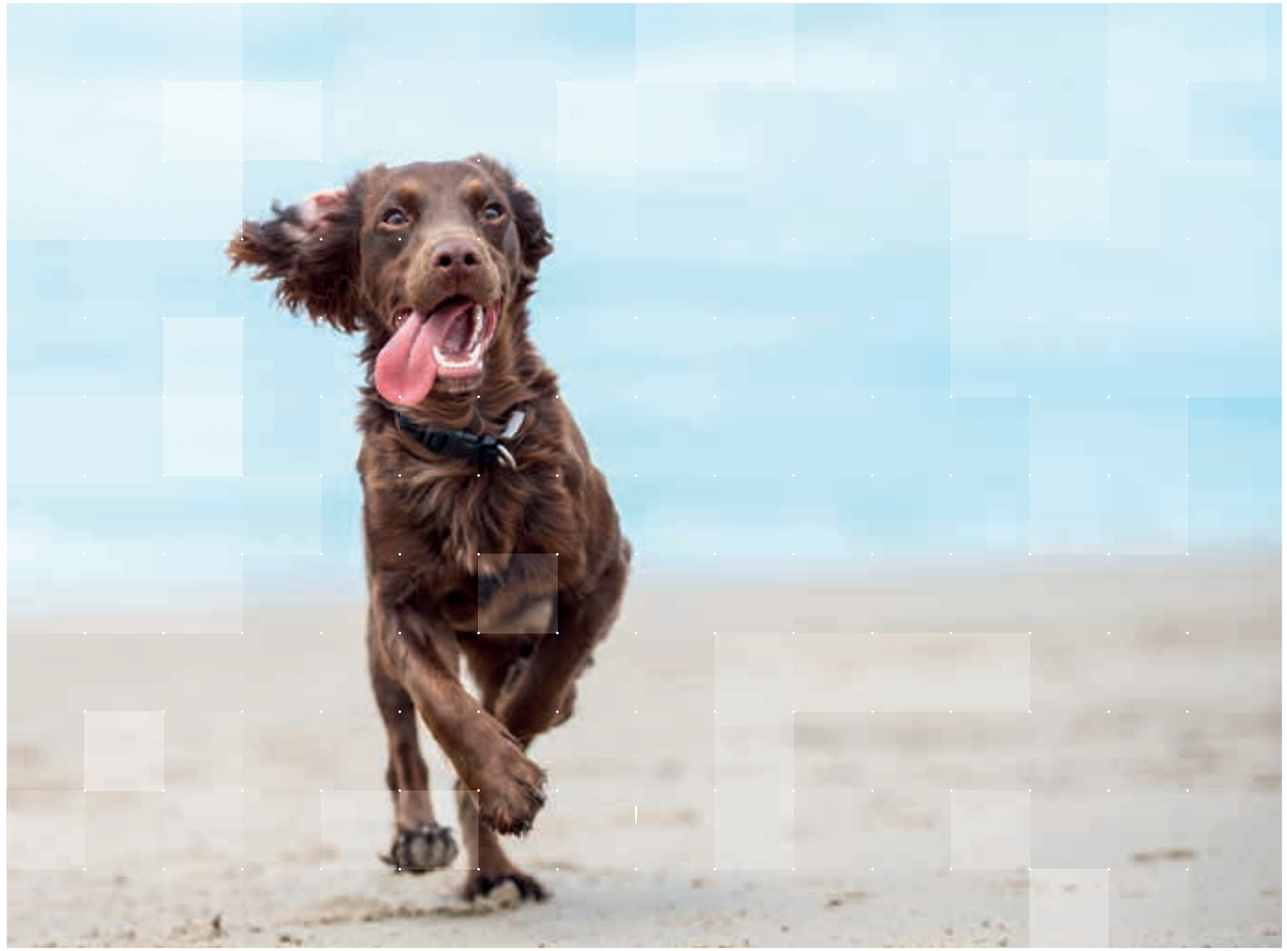
AX3® vegetable substitution for animal proteins

The increasing occurrence of allergy and digestive problems in pets is a challenge to the pet food industry giving rise to a demand for gentle and highly digestible raw materials. To meet this TripleA has developed AX3®. The product is continually being tested not only with respect to protein nutrition but also other characteristics. Recently AX3® has been evaluated by VPG, Denmark in an AAFCO-test.

Veterinarian Kim Hesvang concludes: 'I am very satisfied with the performance of AX3®'.



AX3® has positive characteristics beyond protein nutrition



Collaboration with the university of Copenhagen

In recent years, TripleA has worked closely with Biochemistry & Bioprocessing at UCPH to facilitate commercial use of their IGM BioProcessing method. This resulted in the AX3® product line. TripleA focuses on innovation, and therefore we will continue to add new products to the AX3® range.

Both new and customer-designed products can be developed at TripleA's pilot plant at the university where the TripleA R&D team works together with researchers to optimise process parameters and meet required product specifications.

AX3® properties:

- Low acid-binding capacity
- Low ANF (anti-nutritional factors) level
- Low content of low molecular weight fibres 0.8 %
- Low ash content