



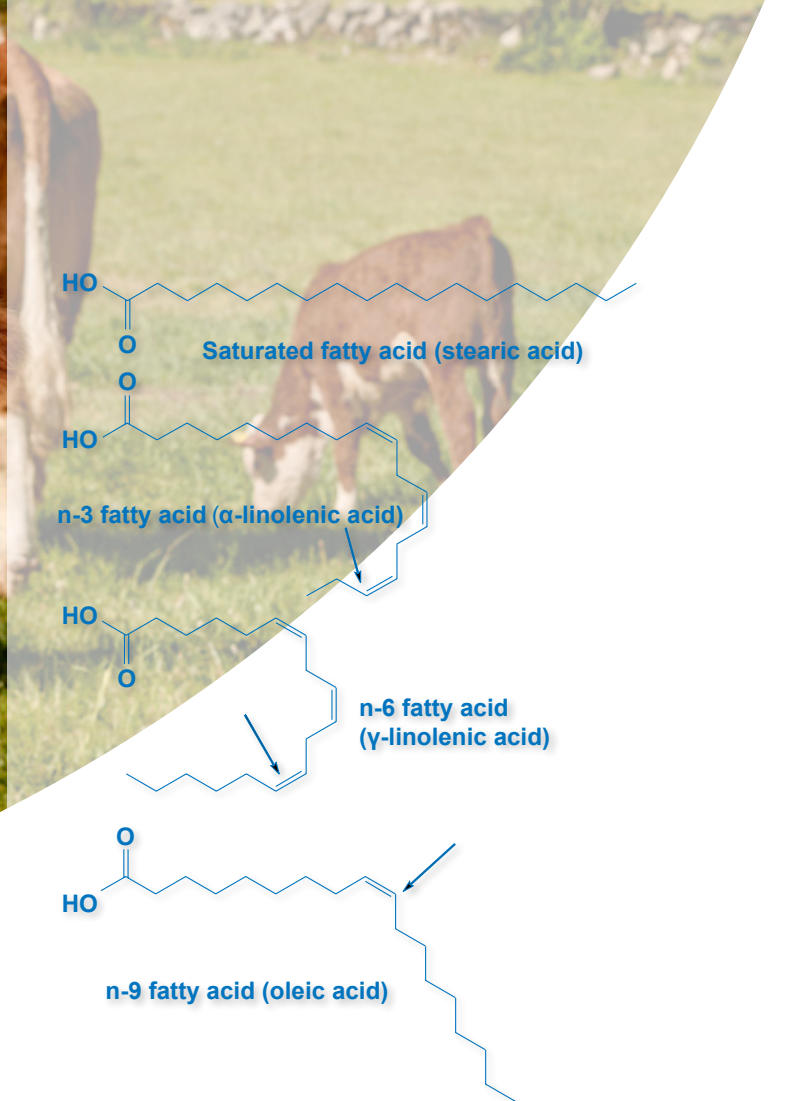
AkoFeed®

Vegetable oils & fats for farm animals

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The Co-Development Company

AAK



What is a fat and why use it for feeding?

Fats are so called triglycerides, which are chemically built up by three fatty acids attached to a glycerol backbone. The physical and nutritional properties of the fat are determined by the type, composition and position of the fatty acids in the triglyceride molecule. Fatty acids may be of different lengths, having a different number of carbon atoms and may also be saturated or unsaturated, having one or more double bonds in the carbon chain.

Different types of animals have different needs with regards to fatty acid composition and compound feed plants have different technical requirements on the fat depending on their recipes and equipment. AkoFeed® is a line of oils and fats of vegetable origin developed by AAK in cooperation with its customers to satisfy both the nutritional needs of animals and the technical requirements of our customers.

Benefits with fats in feed

- ◆ Fat is a concentrated source of energy which contains 2-3 times more energy than cereals and protein feed.
- ◆ Adding fat to the feed ration significantly increases the energy concentration creating a more efficient feed rate.
- ◆ Fat is needed for building cell membranes and hormones, and acts as a carrier for vitamins.
- ◆ Addition of the right type of fat in dairy cow diets increases milk yield and fat content in the milk.
- ◆ Fat may be used to improve pellet quality and reduce dusting.
- ◆ Addition of the right type of fat reduces methane formation in the rumen and consequently the release of greenhouse gases into the atmosphere.

Liquid fats

AAK has a wide range of liquid fats in its portfolio. In addition to the standard products in this brochure we are able to tailor products in cooperation with our customers to suit their specific needs.

AkoFeed® Standard

AkoFeed® Standard is a fat which is designed to suit most types of farm animals including cattle, pigs and poultry. It is a cost efficient alternative for boosting the energy content in the diet. Since it can be used for most types of animals it is the perfect option when you have a limited number of tanks to hold raw materials. It may also be used for coating of the finished pellet. AkoFeed® Standard is based on a mixture of fats which are mainly by-products from our own production of food oils.

AkoFeed® Soft

AkoFeed® Soft is in many ways similar to AkoFeed® Standard, but it contains a higher level of unsaturated and polyunsaturated fats, which makes it softer. Due to the high content of unsaturated fats AkoFeed® Soft is especially well suited for poultry. It can also be used to improve coating under cold conditions when fats with higher melting points may cause problems.

AkoFeed® Extra Soft

AkoFeed® Extra Soft is specifically developed for poultry, but may also be used for other applications. It is based on a mixture of rapeseed oil, soybean oil and sunflower oil providing a very high level of unsaturated fatty acids (oleic, linoleic and linolenic acids), which gives a healthier fatty acid profile of the egg yolk.

AkoFeed® Cattle

AkoFeed® Cattle is a fat designed to be used in ruminant diets. It has a lower degree of unsaturated fatty acids and a higher content of palmitic acid (C16:0) which makes it less rumen active than softer feed oils and thus a larger amount of the fatty acids are digested in the small intestine.





By-pass fats

Fats for efficient milk production

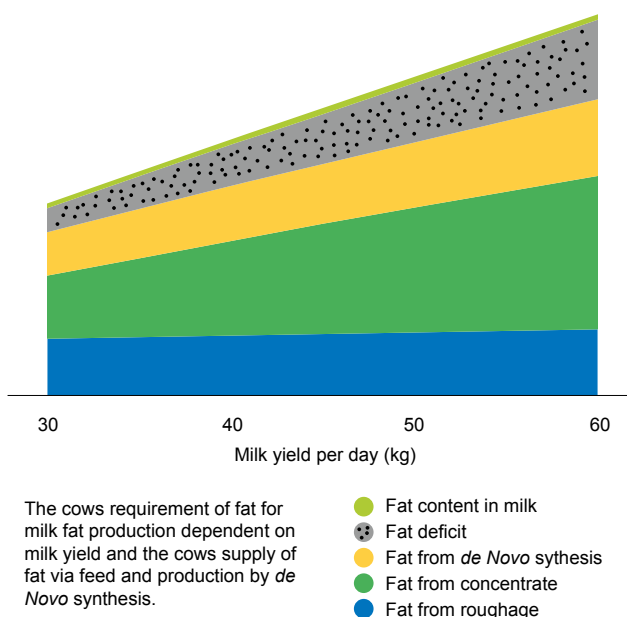
High yielding dairy cows have a huge demand for energy during early lactation as milk yield increases rapidly after calving. Dry matter intake rises at a slower rate. This causes a negative energy balance which may have a negative impact on body condition, milk yield, fertility and may cause ketosis.

Standard vegetable oils often have a high share of unsaturated fatty acids. The unsaturated fatty acids are hydrogenated by the microbes in the rumen to saturated fatty acids. This is called bio-hydrogenation. A high level of unsaturated fatty acids in the rumen can be toxic for the microbes, which may lead to a reduced fiber digestion and thereby also a reduced feed efficiency.

Fat is the component in both milk and feed, which has the highest concentration of energy and during high production there is a clear "deficit". To maintain the content of fat in the milk the cows have to compensate with increased *de Novo* synthesis (fat production in the mammary gland), which they are normally not fully capable of. In addition to reduced fat content in the milk, the consequence is that the cows mobilize body fat and lose in body condition score or milk yield. To avoid this, more fat must be added to the feed ration.

To increase the fat intake without negative impact on rumen function, it is recommended to feed with rumen protected fats, so called by-pass fats. By-pass fats pass through the rumen without being bio-hydrogenated.

Fat balance



Fats may be protected from rumen bio-hydrogenation by several methods. AAK has developed two lines of rumen protected fats with different benefits. Our fats may be fed directly in TMR blends or be used in compound feeds.



AkoFeed® Gigant

AkoFeed® Gigant is a line of by-pass fats from AAK, which are rumen protected by saturation.

Research has shown that palmitic acid (C16:0) is significantly more efficient in increasing milk fat content than other saturated long chain fatty acids. The mammary uptake of circulating palmitic acid is higher than for other long chained saturated fatty acids, i.e. stearic acid (C18:0).

Our AkoFeed® Gigant products:

- ◆ Supply a concentrated source of energy.
- ◆ Have a high level of palmitic acid.
- ◆ Have in trials significantly increased milk fat content and also milk yield.
- ◆ Are specifically recommended in diets for high yielding dairy cows to maintain or increase milk fat content.
- ◆ Reduces the formation of methane and heat development in the rumen.

Our AkoFeed® Gigant product line includes three products with different levels of palmitic acid, AkoFeed® Gigant 45, AkoFeed® Gigant 60 and AkoFeed® Gigant 75, with minimum 45%, 60% and 75% palmitic acid respectively. This selection provides the perfect opportunity to optimize cost against fatty acid composition.

AkoFeed® Lac

Our AkoFeed® Lac products are rumen protected by saponification. Fatty acids are reacted with calcium hydroxide to form a calcium fat. Fats, rumen protected by saponification, are known to drive lactation and milk yield, but also to increase milk fat content.

Our AkoFeed® Lac products:

- ◆ Provide a concentrated source of energy which is digested up to 95 %.
- ◆ Has in both field trials and in trials at the Swedish University of Agricultural Sciences (SLU) increased milk yield by 3 kg ECM per cow and day.
- ◆ Reduces heat development in the rumen and increases the feed efficiency
- ◆ Reduces methane formation.
- ◆ Often improve pellet quality.

Our AkoFeed® Lac series include two products AkoFeed® Lac 45 and AkoFeed® Lac 70. AkoFeed® Lac 45 is a classic calcium fat. AkoFeed® Lac 70 is very similar, but with an enhanced level of palmitic acid to boost milk fat content even further.

Product overview – Liquid feed fats

	AkoFeed® Standard	AkoFeed® Soft	AkoFeed® Extra Soft	AkoFeed® Cattle
Fat content (% of DM)	100	100	100	100
FFA (%)	70	50	4	90
Fatty acid composition (%)*				
C12:0	4	4	<1	2
C14:0	2	2	<1	2
C16:0	24	21	5	45
C18:0	9	6	2	5
C18:1	38	40	62	37
C18:2	17	20	20	8
C18:3	4	4	9	<1
C20-C24	2	3	2	1
Trans fatty acids	<1	<1	<1	<1
Metabolisable Energy (ME)** (MJ/kg DM)				
Ruminants	31.8	31.4	30.4	31.1
Pigs	34.0	34.0	34.0	34.0
Poultry	37.7	37.7	37.7	-

* Specified values are only indicative. Real values may vary slightly between batches.

** Calculated according to recommendations from the Swedish Board of Agriculture SJVFS 2011:40



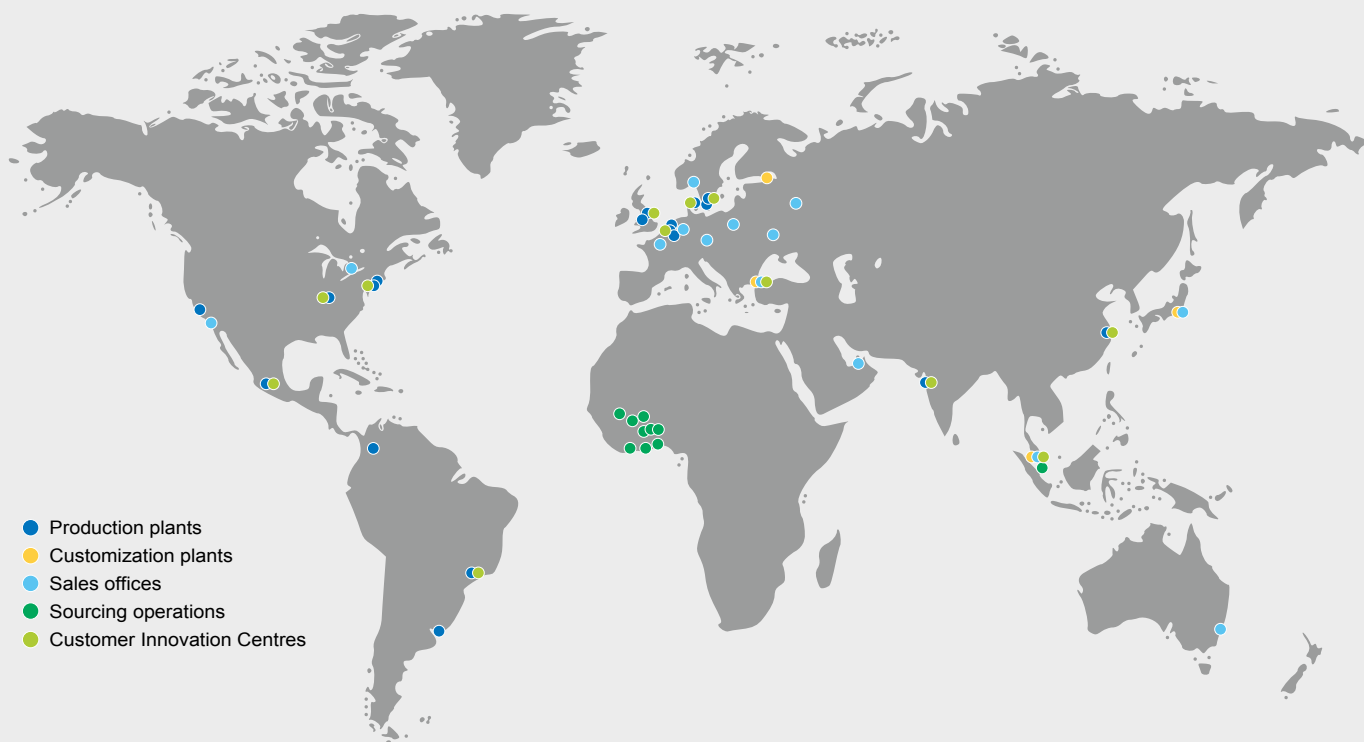
Product overview – By-pass fats

	AkoFeed® Gigant 45	AkoFeed® Gigant 60	AkoFeed® Gigant 75	AkoFeed® Lac 45	AkoFeed® Lac 70
Fat content (% of DM)	100	100	100	85	85
FFA (%)	85	85	85	-	-
Moisture (%)	-	-	-	5	5
Calcium (%)	-	-	-	9	9
Fatty acid composition (%)*					
C12:0	1	<1	<1	<1	<1
C14:0	1	2	1	1	1
C16:0	47	60	79	47	70
C18:0	40	28	4	6	4
C18:1	10	9	13	37	19
C18:2	1	1	3	9	4
Trans fatty aids	<0.1	<0.1	<0.1	<0.1	<0.1
Metabolisable Energy for ruminants (ME)** (MJ/kg DM)	27.6	27.7	26.2	27.2	24.4

* Specified values are only indicative. Real values may vary slightly between batches.

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The first choice for value-adding vegetable oil solutions

We develop and provide value-adding vegetable oil solutions in close collaboration with our customers, enabling them to achieve long lasting business results.

We do so through our in-depth expertise in oils & fats within food applications, working with a wide range of raw materials and broad process capabilities.

Through our unique co-development approach we bring together our customers' skills and know-how with our capabilities and mindset. By doing so, we solve customer specific needs across many industries – Chocolate & Confectionery, Bakery, Dairy, Special Nutrition, Foodservice, Personal Care, and more.

AAK's proven expertise is based on more than 140 years of experience within oils & fats. With our headquarters in Malmö, Sweden, 20 production facilities and customization plants, and sales offices in more than 25 countries, more than 3,000 employees are dedicated to providing innovative value-adding solutions to our customers.

So no matter where you are in the world, we are ready to help you achieve long lasting results.

We are AAK – The Co-Development Company.



AAK