

EASTMAN Animal nutrition

Eastman™ Choline Chloride

A liquid solution to complement
and optimize animal nutrition

EMEA



Eastman™ Choline Chloride supports your animals' health

Eastman Choline Chloride is a **nutritional supplement** that supports the health of farmed and domestic animals. It is an aqueous solution of choline chloride, which is naturally present in plant and animal tissue.

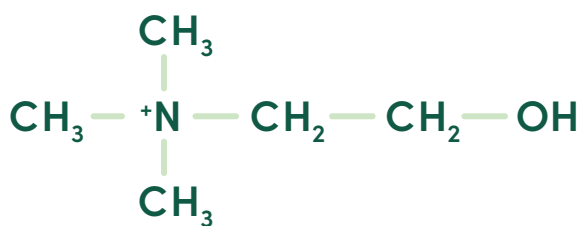
Choline plays a significant role in nutrition, especially for animal growth, muscle development, reproduction and overall health. Eastman Choline Chloride is backed by years of expertise, ensuring the highest quality and reliable performance in various species.

Eastman Choline Chloride offerings

Product name	Production location	Choline equivalent, %
Eastman Choline Chloride 70	USA	52.2
Eastman Choline Chloride 75	USA	55.9
Eastman Choline Chloride 75	Belgium	55.9
Eastman Choline Chloride 78	Belgium	58.1

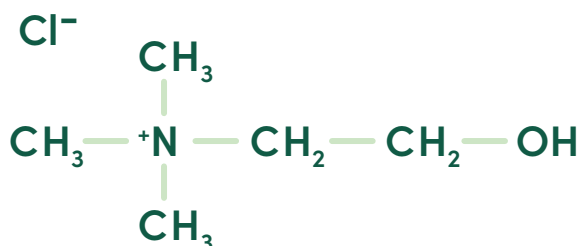
Choline chloride: basic chemistry

Choline is a beta-hydroxyethyl trimethylammonium hydroxide and is categorized as an essential water-soluble B vitamin (B4). Like other vitamins, it plays a significant role in nutrition, but animals require more choline than other B vitamins. Choline plays a significant role in the metabolism of growing livestock.



Choline — or the trimethyl (2-hydroxyethyl) ammonium ion — is a quaternary ammonium base.

Choline chloride, a widely used animal feed additive, is synthesized from trimethylamine and formulated under strictly controlled conditions.



Choline feed supplements are most often added in the form of the salt choline chloride.



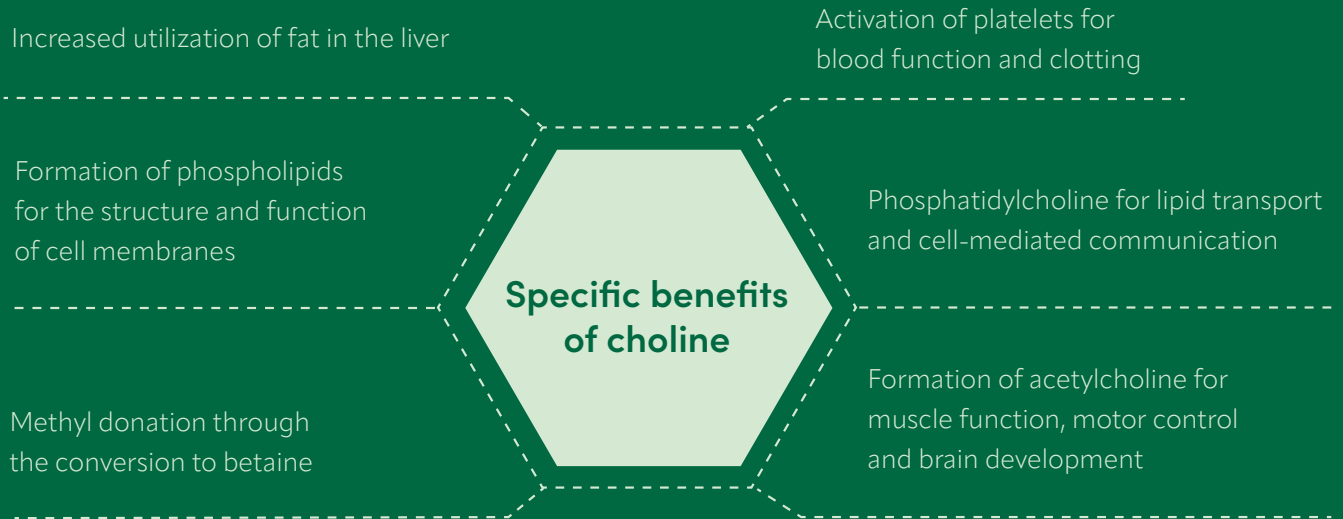
Why add choline?

Choline is — in highly variable levels — naturally present in most feed ingredients, including meat and bone meal (1,996 mg/kg), fish meal (4,408–5,306 mg/kg), soybean meal (640 mg/kg), cereals (1,002–1,090 mg/kg) and peanut meal (1,655–2,396 mg/kg). Less than 10% of the total choline is present as free choline.

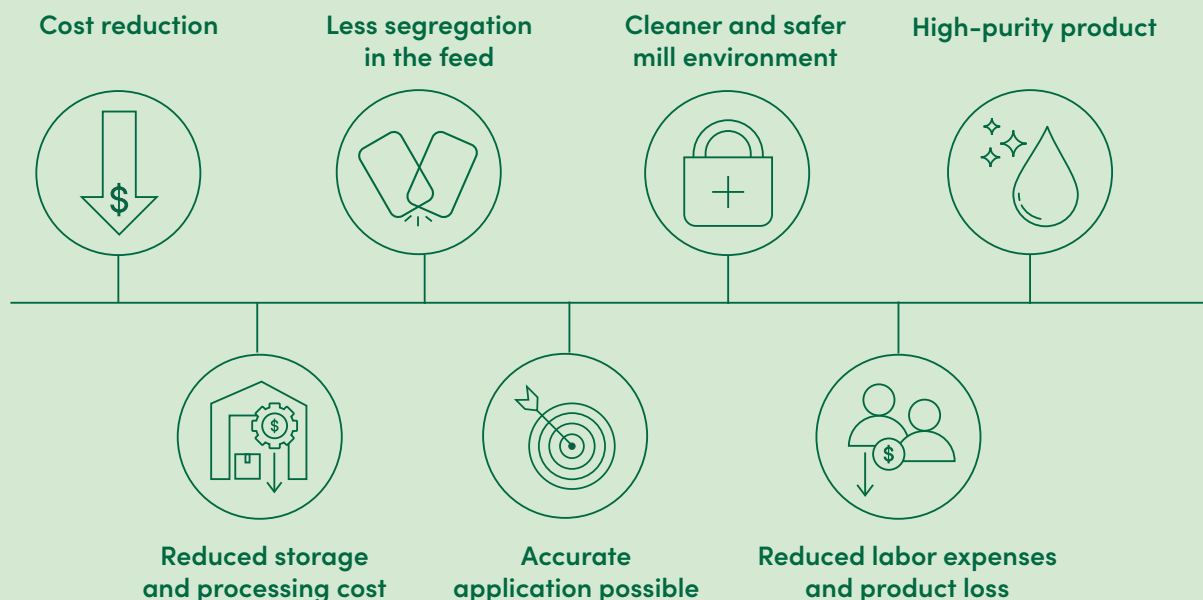
Most of it appears as phosphatidylcholine, which has to be hydrolyzed by enzymes in the gut to release choline. Choline can be synthesized in the body but usually only covers 70%–100% of the metabolic needs. To meet those needs, choline needs to be taken in from feed ingredients or as a supplement.

Optimizing animal health: the power of choline chloride

Choline chloride supports optimal growth, muscle development, reproductive performance and overall animal health.

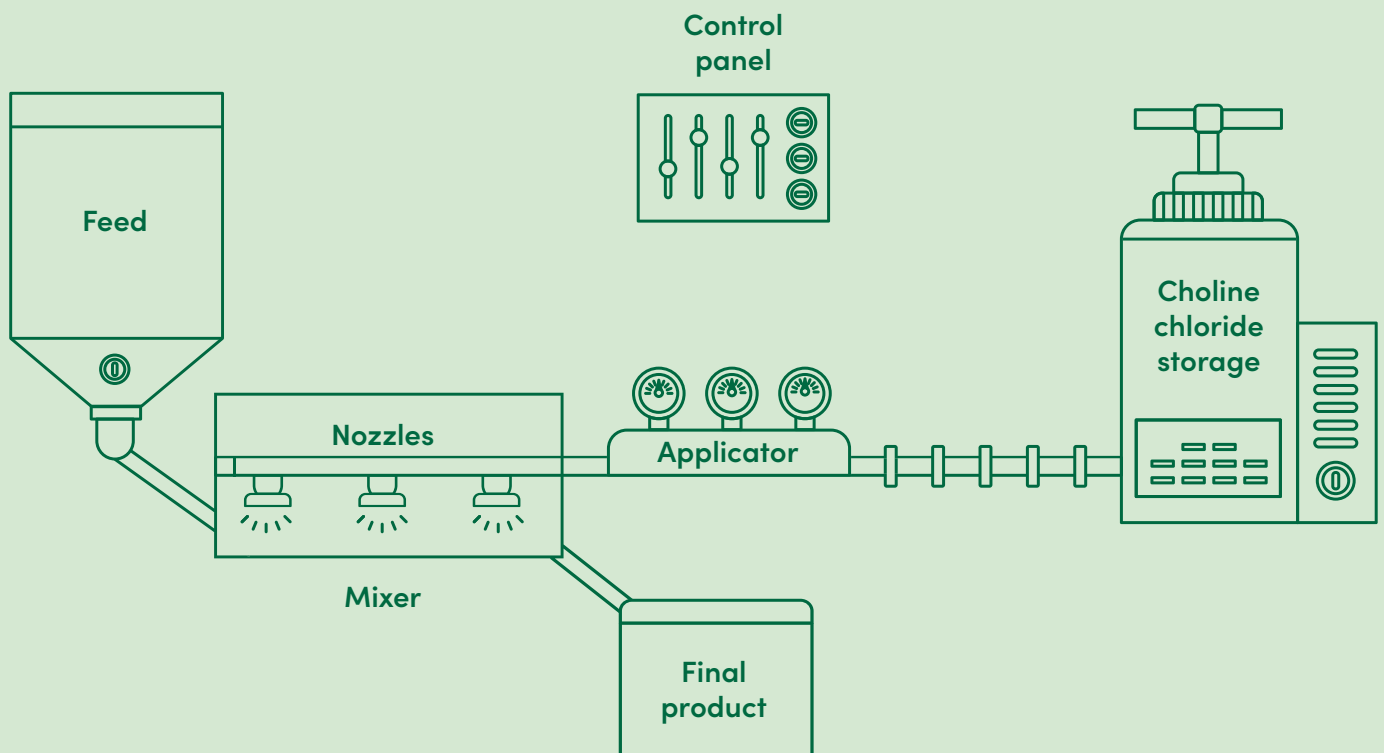


Liquid choline chloride benefits: efficiency, precision and safety



Application of liquid choline chloride

Liquid choline chloride is typically applied to feed using a specialized application system that includes a pump, nozzles, flow meter, and connection pipes to the IBC/storage system. The storage tank holds the choline chloride, which is sprayed into the feed in the mixer via several nozzles to achieve a homogeneous final product. An electronic controller and metering system are used to ensure that the correct amount of choline chloride is added to the feed.



Supplementary choline recommendations

Species	Age	Eastman recommendation	
		Choline supplement in mg/kg feed 90% DM	
Broilers		Lower	Upper
Starter	1–10 days	500	700
Grower	11–24 days	300	600
Finisher	25+ days	300	600
Broiler breeder			
Starter/grower pullets	0–18 weeks	300	600
Layers and male breeders	18+ weeks	300	600
Turkeys			
Starter	0–6 weeks	800	1,000
Grower	7–12 weeks	500	700
Finisher	13–18 weeks	500	700
Finisher 2	18+ weeks	500	700
Turkey breeders			
Starter	0–6 weeks	1,000	1,200
Grower	7–29 weeks	1,000	1,200
Layers and male breeders	Laying phase	500	700
Fattening pigs			
Prestarter	> 5 kg	300	600
Starter	5–30 kg	200	400
Grower	30–70 kg	200	400
Finisher	70+ kg	150	300

These recommendations serve as a general guideline only, since diet composition and vitamin availability from regular feed ingredients can vary greatly.



Advantages of Eastman Choline Chloride over alternative solutions

Choline chloride is currently the only form of choline registered as a feed additive in the European Union (EU) under Regulation (EC) No. 1831/2003. Although there are products that claim to be choline replacements, this should be viewed with caution. Following are brief descriptions of other alternatives offered in the market. This information can be used as a basis for comparison when evaluating the different options.

Plant-derived choline

Plant-derived choline products, such as herbal mixtures, often claim properties like those of choline chloride. It is important to note that plant-derived choline is not considered a feed additive in the EU, and claims such as "choline replacement" are misleading. In the EU, plant-derived choline products are currently classified as feed materials, allowing their use in animal feed formulations. Such products may exhibit extremely low choline content compared to the stability found in synthetic choline products.

Betaine

The body cannot function without choline because, as a vitamin, it serves several important functions in the body, including cell membrane synthesis, acetylcholine production, fat transport, methyl donation and osmolytic regulation. Betaine, while having its own unique roles, cannot fully replace all the functions of choline. Specifically, betaine is unable to fulfill the crucial tasks of cell membrane synthesis, acetylcholine production and fat transport that choline is responsible for. Therefore, it is essential to ensure an adequate intake of choline to support these vital functions.



A global product with uniform quality standards

Eastman Choline Chloride is a valuable feed additive that is produced in the United States and Belgium for worldwide distribution. As the leading producer of choline chloride, Eastman maintains uniform quality specifications across all production locations to ensure that customers receive the highest quality of product possible.

To guarantee the quality of the product, we follow strict rules throughout the production and delivery process. Our choline chloride is delivered to customers in bulk, intermediate bulk containers (IBCs) and drums.

Eastman is recognized globally for its animal nutrition products and production practices. We are certified by FAMI-QS, ISO 9001:2015, ISO 14001:2015, and the Feed Chain Alliance (FCA).

ISO 9001:2015
ISO 14001:2015
certifications

FAMIQS



Level up your nutrition.

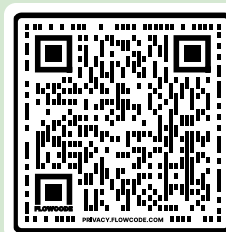
Eastman is equipped with more than 50 years of experience producing high-quality choline chloride. Our liquid choline chloride is supported by sophisticated lab equipment and state-of-the-art production units with the best technology available. We produce at scale and offer customers a high-quality product and reliable supply chain at a competitive cost.

Our experts are available to help you determine your specific needs and tailor your choline chloride application. Eastman's quality management team follows strict regulations, so you get the same, guaranteed quality no matter your location.

Take the next step. Request a product demonstration, schedule a consultation, place an order or visit our website to improve your animals' nutrition with Eastman Choline Chloride.

eastman.com/animalnutrition

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