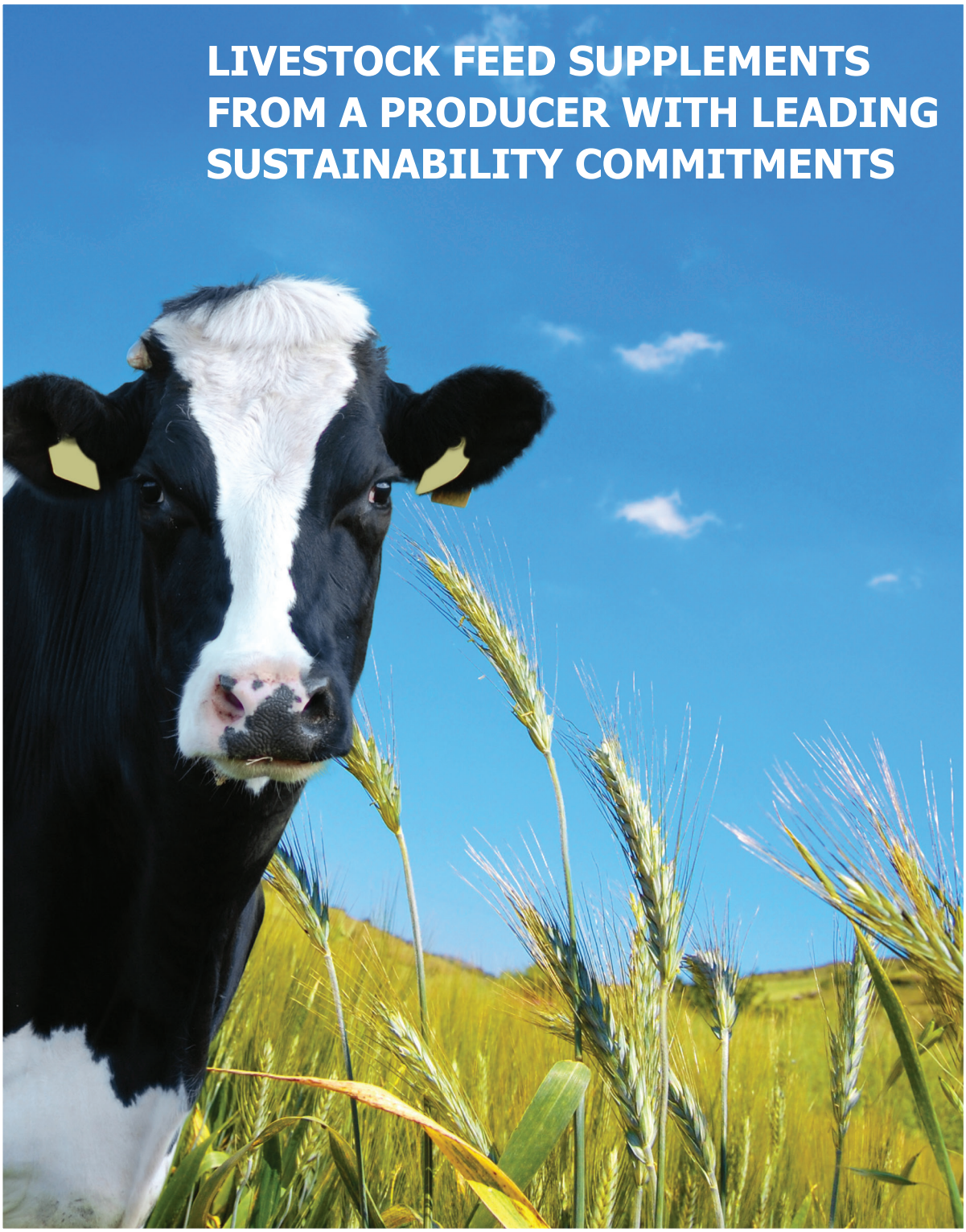
GoNutri

by GAR

LIVESTOCK FEED SUPPLEMENTS FROM A PRODUCER WITH LEADING SUSTAINABILITY COMMITMENTS



Healthy, productive livestock

Farmers today face several challenges—the ever-increasing demand for animal protein, the call to improve animal welfare, the scrutiny to reduce antibiotic use, and the overall need for more sustainable production.

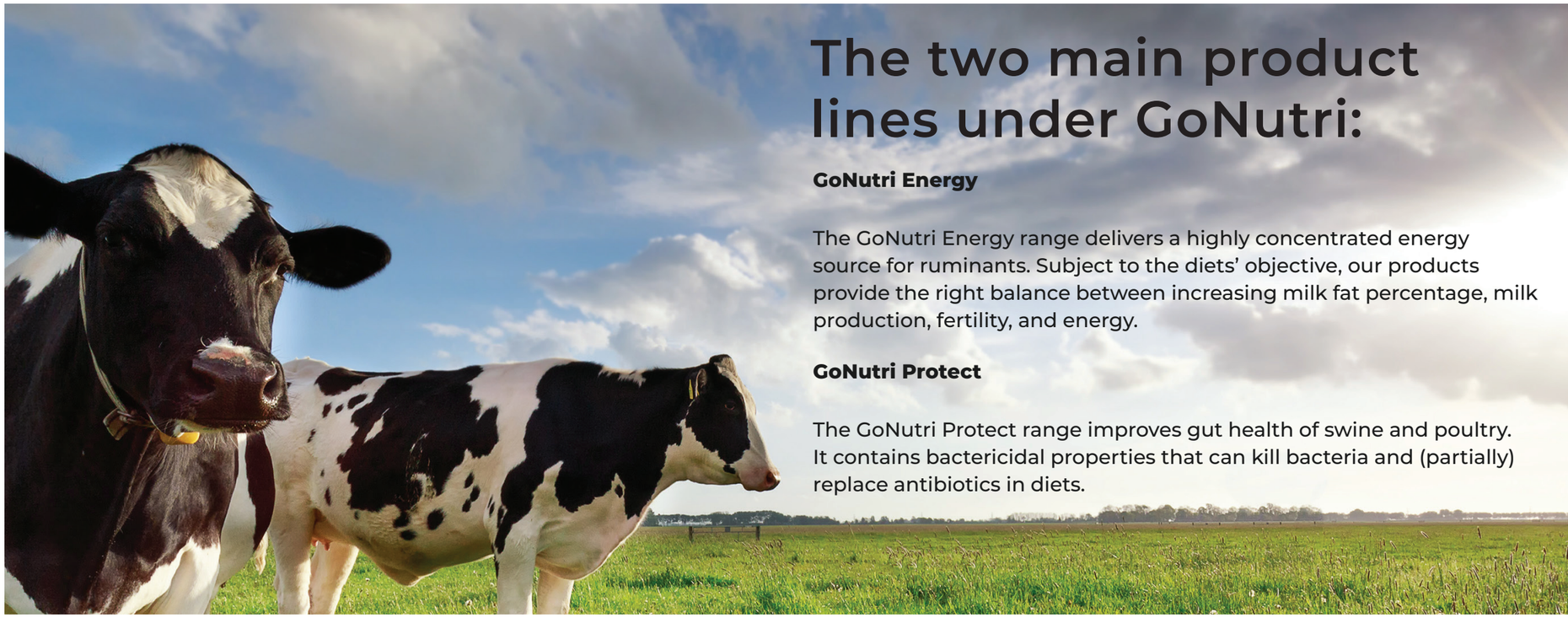
GoNutri is a brand helping farmers with animal nutrition through livestock feed supplements produced from ingredients that are sustainably sourced.

GoNutri's range of high-quality fats is a nutritious energy source for ruminants, swine, and poultry. It effectively helps farmers and producers improve productivity, fertility, and health of animals.

GoNutri products are palm-based, and meet internationally recognised standards and certifications including GMP+ FSA and RSPO.

As a Golden Agri-Resources (GAR) brand, GoNutri benefits from an integrated supply chain that adheres to strict traceability and sustainability standards.





The two main product lines under GoNutri:

GoNutri Energy

The GoNutri Energy range delivers a highly concentrated energy source for ruminants. Subject to the diets' objective, our products provide the right balance between increasing milk fat percentage, milk production, fertility, and energy.

GoNutri Protect

The GoNutri Protect range improves gut health of swine and poultry. It contains bactericidal properties that can kill bacteria and (partially) replace antibiotics in diets.

GoNutri Energy

A nutritious, high-energy diet

Fats are one of the essential nutrients for animals. Besides providing a concentrated source of energy, fats are also indispensable nutrients for forming cell membranes and bacteria. They are involved in the synthesis of hormones and vitamins.

Incorporating fats into the diet of high producing ruminants improves energy delivered to the animal and increases its milk and milk fat production. It also has a positive effect on the animal's fertility and body condition.

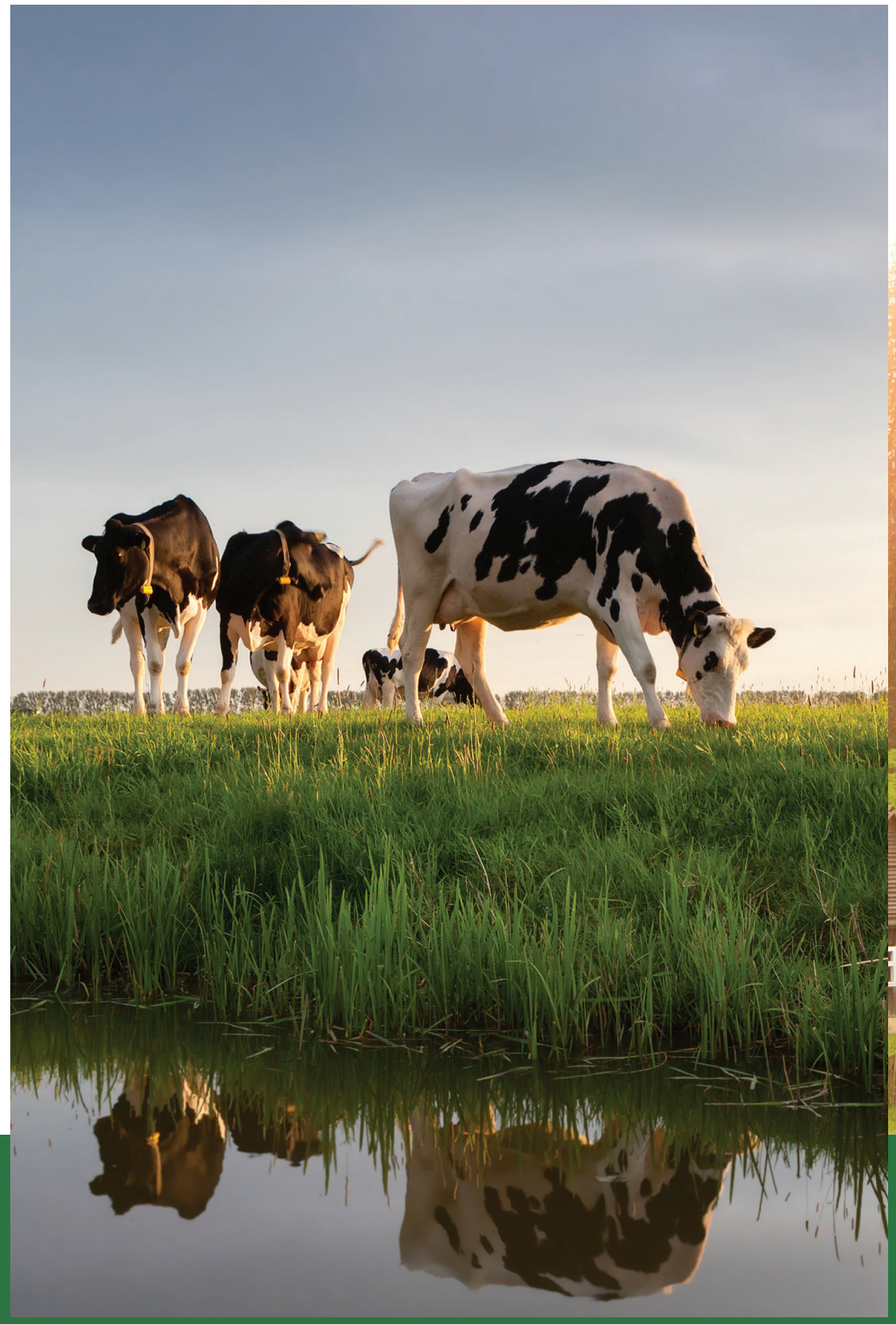
GoNutri Energy products contain high amounts of palmitic acid. Palmitic acid is a long-chain saturated fatty acid naturally present in ruminants' milk and meat, making it a safe addition to their diets. It increases the production of milk fat by ruminants consistently and helps yield high and stable economic return.

Free fatty acids present in GoNutri Energy products are more digestible in ruminant intestines[1] as compared to triglycerides, meaning better absorption of nutrients, which equates to more energy delivered to the animals. Thanks to its free fatty acids make-up, GoNutri Energy is also advantageous in providing consistent and predictable results. This way, you know exactly what output to expect, from animal behaviour to level of milk fat.

GoNutri Energy products have a neutral smell and taste, and behave inertly in rumen—they do not disturb ruminal flora or ruminal fermentation. This means they do not affect dry matter intake.

A recommended dose (about 300 grams/cow/day) in a cow with about 35 litres of production, increases the production of milk fat by approximately 5-8 percent. This implies, with a standard payment of milk fat by the dairy industry, an economic return of about 0.12 euros/cow/day.*

*This calculation is based on both litres of production and pricing from average milk base price in Spain in 2021.



Benefits at-a-glance

Easily digested in ruminants at the intestine level[2]

Constitutes a good energy intake (99%)[3]

Improve milk production and quality[4]

Improve fertility and body condition of animals[5]

Improve the digestibility of detergent neutral fibre and energy efficiency[6]

	Without GoNutri Energy	With GoNutri Energy	Difference
Milk price/litre (€) Base price	0.320	0.326	0.006
Income/cow/day (€) *Based on production of 35 litres	11.20	11.41	0.21
Cost of 300g of supplements	0.27 Using calcium soap & calcium carbonate	0.36	0.09
Total income	10.93	11.05	**Profit = 0.12 €/cow/day**

* Prices shown are an estimate based on a standard payment of milk fat by the dairy industry of between 3-3.5 €/tonne per tenth of milk fat above 3.7%.

[1] J de Souza & A L Lock. Milk production and nutrient digestibility responses to triglyceride or fatty acid supplements enriched in palmitic acid. *Department of Animal Science, Michigan State University, East Lansing 48824* (2019)

[2] J de Souza & A L Lock. Milk production and nutrient digestibility responses to triglyceride or fatty acid supplements enriched in palmitic acid. *Department of Animal Science, Michigan State University, East Lansing 48824* (2019)

[3] J R Loften, J G Linn, J K Drackley, T C Jenkins, C G Soderholm, & A F Kertz. Invited review: Palmitic and stearic acid metabolism in lactating dairy cows. *Milk Specialties Global, Eden Prairie MN 55344; Department of Animal Sciences, University of Illinois, Urbana 61801; Department of Animal and Veterinary Sciences, Clemson University, Clemson, SC 29634; Andhil LLC, St. Louis, MO 63122* (2014)

[4] P Piantoni, A L Lock, & M S Allen. Palmitic acid increased yields of milk and milk fat and nutrient digestibility across production level of lactating cows. *Department of Animal Science, Michigan State University, East Lansing 48824* (2017)

[5] C R Staples, J M Burke, & W W Thatcher. Influence of supplemental fats on reproductive tissues and performance of lactating cows. *Department of Dairy and Poultry Sciences, University of Florida, Gainesville 32611* (1998)

[6] P Piantoni, A L Lock, & M S Allen. Palmitic acid increased yields of milk and milk fat and nutrient digestibility across production level of lactating cows. *Department of Animal Science, Michigan State University, East Lansing 48824* (2017)

Product	GoNutri Energy 98	GoNutri Energy 85	GoNutri Energy 80	GoNutri Balance
Description	Fat supplement rich in palmitic acid (min. 98%) as free fatty acid. This product provides excellent stability in the rumen and brings about a significant increase in milk fat percentage, milk yield and it is a great overall source of energy.	Fat supplement rich in palmitic acid (min. 85%) as free fatty acid. This unhydrogenated product is very digestible and delivers a significant increase in milk fat percentage, milk yield, improves body condition and is a great overall source of energy.	Fat supplement rich in palmitic acid (min. 80%) as free fatty acid. This hydrogenated product provides excellent stability in the rumen, delivers a significant increase in milk fat percentage, milk yield, improves body condition and is a great overall source of energy.	Fat supplement with a high level of palmitic acid (min. 58%) and stearic acid as free fatty acids. This product has a good mix of the most important saturated fatty acids for ruminants. The palmitic content delivers an increase in the milk fat percentage whilst the C18:0 directly supports the overall milk yield and improves body condition. Great overall source of energy.
Recomemmended Dosage	Dairy 300-700g/cow/day Sheep 40-80g/sheep/day Beef 150-300g/head/day	Dairy 300-700g/cow/day Sheep 40-80g/sheep/day Beef 150-300g/head/day	Dairy 300-700g/cow/day Sheep 40-80g/sheep/day Beef 150-300g/head/day	Dairy 300-700g/cow/day Sheep 40-80g/sheep/day Beef 150-300g/head/day
Composition	Palmitic Acid: Min. 98%	Palmitic Acid: Min. 85%	Palmitic Acid: Min. 80%	Palmitic Acid: Min. 58%
	Crude Fat: Min. 99%	Crude Fat: Min. 99%	Crude Fat: Min. 99%	Crude Fat: Min. 99%
	Moisture: Max. 1%	Moisture: Max. 1%	Moisture: Max. 1%	Moisture: Max. 1%
Form	Bead or Flake	Bead or Flake	Bead or Flake	Bead or Flake
Packaging	25kg (1.2tonne per pallet)/ 650kg bags (1.3tonne per pallet)	25kg (1.2tonne per pallet)/ 650kg bags (1.3tonne per pallet)	25kg (1.2tonne per pallet)/ 650kg bags (1.3tonne per pallet)	25kg (1.2tonne per pallet)/ 650kg bags (1.3tonne per pallet)







GoNutri Protect

Maintaining animal health while reducing the use of antibiotics

GoNutri Protect is a range of products with anti-bacterial and anti-inflammatory properties, used to improve gut health and control infectious diseases, decreasing antibiotic use in animals.

When animals undergo stressful situations, such as weaning, feeding changes, or social group changes, they become more susceptible to disease and metabolic disorders. But the call for more 'natural' products has led to a reduction in the use of antibiotics in feed. This has resulted in an increase in meningitis and polyarthritis in piglets, which are generally associated with Streptococcus suis infections and are among the leading causes of economic losses on farms.

GoNutri Protect products contain medium-chain free fatty acids and monoglycerides that strengthen the intestinal membrane's integrity, minimise pathogenic bacterial growth, positively modulate intestinal flora, and increase nutrient absorption as they improve the development of intestinal villus.

Medium-chain fatty acids are effective in controlling digestive pathogens[7]. In particular, lauric acid is a saturated fatty acid that stands out for its potent antibacterial effects against gram+ bacteria such as Streptococci and Staphylococci and fat enveloped virus.

When lauric acid is combined with glycerine, monolaurin – a monoglyceride – is formed. Alpha monoglycerides are biologically active molecules that work throughout the gastrointestinal tract of the animal. They are non-corrosive, non-volatile, have a neutral taste and odour, resist high processing temperatures and have a bactericidal effect about ten times more potent than its corresponding free fatty acids. Thanks to its fast lymphatic absorption, they have a systemic effect too.

Lauric acid, alpha monolaurin and their combinations have shown a great ability to control infections and improve intestinal health, which has an impact on better production rates[8] in poultry and swine.

[7] Jackman, J.A., Boyd, R.D. & Elrod, C.C. Medium-chain fatty acids and monoglycerides as feed additives for pig production: Towards gut health improvement and feed pathogen mitigation. *J Animal Sci Biotechnol 11, 44* (2020)

[8] Fortuoso, Bruno & Reis, João & Gebert, Roger & Barreta, Mauricio & Griss, Luiz & Casagrande, Renata & de Cristo, Thierry & Santiani, Fabio & Campigotto, Gabriela & Rampazzo, Luana & Stefani, Lenita & Boiago, Marcel & Lopes, Leonardo & Santos, Roberto & Baldissera, Matheus & Zanette, Régis & Tomasi, Thainã & Silva, & Aleksandro. Glycerol monolaurate in the diet of broiler chickens replacing conventional antimicrobials: Impact on health, performance and meat quality. *Microbial Pathogenesis. 129. 10.1016/j.micpath.2019.02.005* (2019)

Benefits at-a-glance

Effective throughout the gastrointestinal tract, as they do not dissociate at high pH as is the case with free fatty acids[9]

More palatable than their corresponding free fatty acids[10], presenting a neutral taste and smell

Biologically more potent[11]—they are more polar products capable of forming micelles at concentrations below their corresponding triglycerides[12]

Absorbed quickly by the lymphatic due to their strong amphipathic character. In this way, in addition to their antibacterial effect on the digestive tract, these molecules have a systemic effect when transported intact to other organs where they can help fight infectious processes[13]

Product	GoNutri Protect	GoNutri Protect Xtra
Description	High concentration of minimum 99% C12:0 as free fatty acid. This supplement has a positive effect against gram+ bacteria and lipid envelope virus and improves overall gut health.	High concentration of minimum 90% alfa-glycerol monolaurate. This supplement has a strong effect against gram+ bacteria, lipid envelope virus, improves gut health in the gastrointestinal tract and presents a systemic effect.
Recomemmended Dosage	Swine 1-4kg/tonne; Poultry 0.3-4kg/tonne	Swine 1-4kg/tonne; Poultry 0.3-4kg/tonne
Composition	Lauric Acid: Min. 99%	Glycerol Monolaurate: Min. 90%
	Crude Fat: Min. 99%	Crude Fat: Min. 99%
	Moisture: Max. 1%	Moisture: Max. 1%
Form	Bead or Flake	Powder
Packaging	25kg (1.2tonne per pallet)/ 650kg bags (1.3tonne per pallet)	25kg (450kg per pallet)

[9] Valle-González, E. R., Jackson, J. A., Bo, K. Y., Park, S., Sut, T. N., Cho, & N.-J. Characterizing how acidic pH conditions affect the membrane-disruptive activities of lauric acid and glycerol monolaurate. *Langmuir, 34(45), 13745-13753. DOI:10.1021/acs.langmuir.8b02536* (2018)

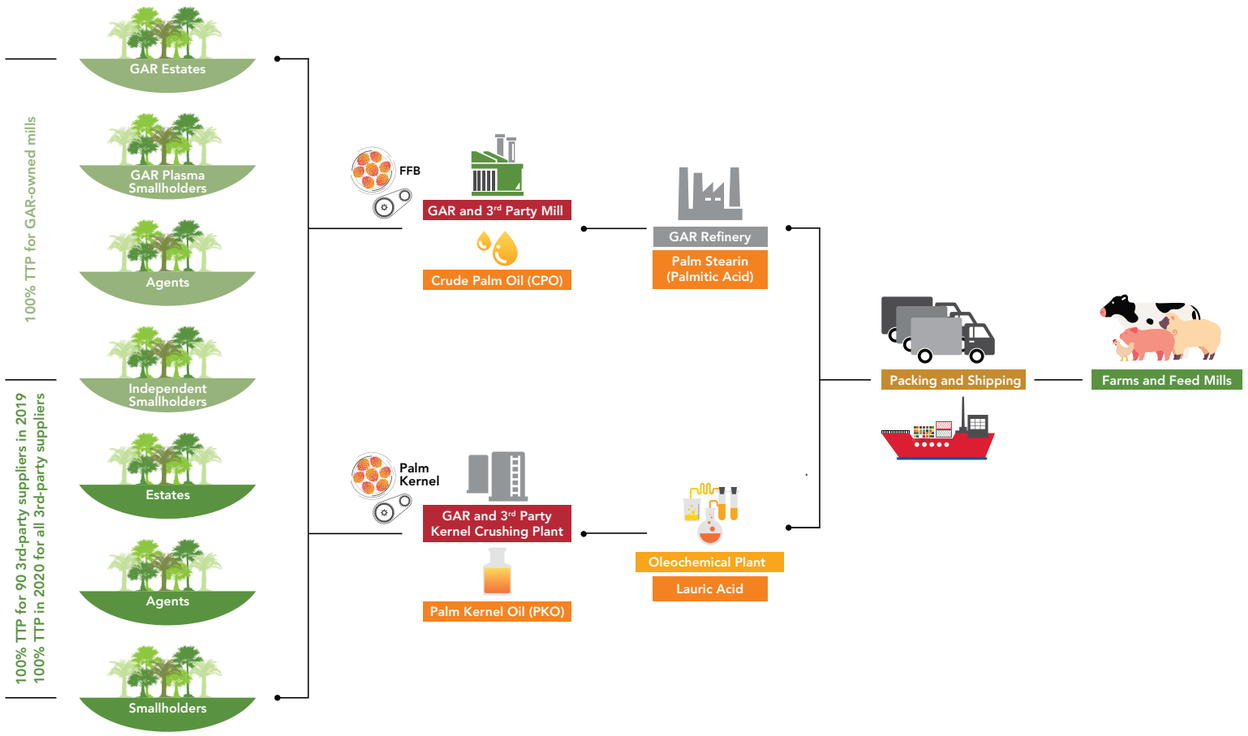
[10] Zentek, Jürgen & Buchheit-Renko, S & Ferrara, Fabienne & Vahjen, W & Van Kessel, Andrew & Pieper, & Robert. Nutritional and physiological role of medium-chain triglycerides and medium-chain fatty acids in piglets. *Animal health research reviews/Conference of Research Workers in Animal Diseases 12. 83-93. DOI:10.1017/ S1466252311000089* (2011)

[11] Jackman, J.A., Boyd, R.D. & Elrod, & C.C. Medium-chain fatty acids and monoglycerides as feed additives for pig production: Towards gut health improvement and feed pathogen mitigation. *J Animal Sci Biotechnol 11, 44. DOI:10.1186/s40104-020-00446-1* (2020)

[12] Thormar H, Isaacs CE, Brown HR, Barshatzky MR, & Pessolano T. Inactivation of enveloped viruses and killing of cells by fatty acids and monoglycerides. *Antimicrobial Agents and Chemotherapy 31(1):27-31. DOI: 10.1128/aac.31.1.27.* (1987)

[13] Letlole & BR. Coated butyric acid and C12 monoglyceride supplementation of broiler feed to improve performance and gut health. *MSc (Agric) Dissertation, University of Pretoria, Pretoria* (2018)

Sustainably sourced



GoNutri's products contain palm-based ingredients that are sustainably sourced from GAR and its suppliers.

GAR's Social and Environmental Policy ensures its operations:

- Abide by the highest standards of quality and integrity
- Protect biodiverse ecosystems, including forests, safeguarding the health of our planet and its population
- Bring benefits to the people and communities
- Respect and strengthen the rights of workers
- Support smallholders to bring about a transparent supply chain

GoNutri by GAR

If you need further information, please contact:

gar agribusiness and food

The Netherlands
Golden Agri-Resources Europe B.V.
Stadsplateau 24b, 3521 AZ Utrecht,
The Netherlands
+31 202 182 535

Spain
Golden Agri-Resources Iberia S.L.U.
Paseo General Martinez Campos 46-2ºA
28010 Madrid, Spain
+34 910 607 316

gar.eu.feed@sinarmas-agri.com