



# MASESTER<sup>®</sup> MEDIUM CHAIN TRIGLYCERIDES (MCT<sub>s</sub>) AND MASEMUL<sup>®</sup> GLYCERYL MONOLAURATE (GML)

## Improving Animal Health and Nutrition

MASESTER<sup>®</sup> Medium Chain Triglycerides (MCTs) are derived by esterifying caprylic (C:8) and capric (C:10) fatty acids fractions from palm kernel or coconut oil with glycerol using a unique non catalytic process. These are further refined to remove residual fatty acids and then deodorized to make them completely odourless and tasteless.

MCTs are high energy source which is efficiently absorbed in the small intestine of livestock and poultry.

This increase in available energy has been shown to improve the energy supply and performance of piglets.<sup>1</sup>

MCTs have antimicrobial properties against gram (-) and gram (+) bacteria: *C. coli*, *E. coli* *Salmonella*,<sup>2,3</sup> as well as virus pathogens SVA, PEDv, PRRSv.<sup>2,3,4</sup> MCTs are amphipathic, having hydrophilic and hydrophobic characteristic similar to the phospholipid bi-layer of the cell membrane.<sup>5</sup> This similarity enables MCTs to insert themselves into the bi-layer of the membrane causing pore formation within the cell membranes.<sup>6</sup> The pores allow for leakage of the intercellular content, which compromises the cell's integrity leading to lysis of the cell and eventual cell death.<sup>7</sup>

Supplementation of MCTs into feed rations or top dressing improves feed utilization efficiency and intestinal microbial health.



MASEMUL® Glyceryl Monolaurate (GML) is a Medium Chain Monoglyceride with 12 carbon atoms formed by the combination of glycerol and lauric acid. GML has bactericidal, fungicidal, and virucidal properties; it is approved by the US Food and Drug Administration FDA as a non-toxic compound.

GML has strong antimicrobial activity as well as growth-promoting capacity, making it an ideal replacement for antibiotics helping growth, weight gain, and improved broiler chickens<sup>8</sup> and pigs' gut health.

- ✓ **Inhibits gram(+) and gram(-) bacteria**
- ✓ **Effective over wide pH range**
- ✓ **Odourless and tasteless**
- ✓ **Promotes and improves gut health**
- ✓ **Safety**
- ✓ **Higher daily weight gain, improved feed conversion**

### Minimal Concentration (Reducing bacterial growth by 50% in vitro)

	Escherichia coli	Streptococcus suis	Salmonella poona	Clostridium perfringens
Medium Chain Triglycerides (MCTs)	0.30%	<0.2%	>1.0%	0.10%
Glycerol monolaurate (GML)	0.40%	0.10%	0.60%	0.10%

Source: Pig Progress, 17 October 2017

### MASESTER® and MASEMUL® products for Animal health and Nutrition:

**MASESTER® E 6000**  
**MASEMUL® GML 9002**

**GMP+ B2 Certified, Non GMO and manufactured in FSSC2000 certified facilities.**

References:

- <sup>1</sup> Zentek, J., Buchheit-Renko, S., Ferrara, F., Vahjen, W., Van Kessel, A., and Pieper, R. 2011. Nutritional and physiological role of medium-chain triglycerides and medium-chain fatty acids in piglets. *Animal Health Research Reviews*. 12.1: 83-93.
- <sup>2</sup> Skrivanová, E., Marounek, M., Dlouha, G., and Kanka, J. 2005. Susceptibility of Clostridium perfringens to C2–C18 fatty acids. *Letters in Applied Microbiology*. 41.1: 77-81.
- <sup>3</sup> Cochrane, R., Huss, A., Aldrich, G., Stark, C., and Jones, C. 2016. Evaluating chemical mitigation of Salmonella Typhimurium ATCC 14028 in animal feed ingredients. *Journal of Food Protection*. 79.4: 672-676.
- <sup>4</sup> Cochrane, R., Dritz, S., Woodworth, J., Huss, A., Stark, C., Saensukjaroenphon, M., DeRouchey, J., Tokach, M., Goodband, R., Bai, J., and Chen, Q. 2016. Assessing the effects of medium chain fatty acids and fat sources on porcine epidemic diarrhoea virus viral RNA stability and infectivity. *Kansas Agricultural Experiment Stations Research Reports*. 2.8: 14.
- <sup>5</sup> Desbois, A. and Smith, V. 2010. Antibacterial free fatty acids: activities, mechanisms of action and biotechnological potential. *Applied Microbiology and Biotechnology*. 85.6: 1629-1642.
- <sup>6</sup> Choi, M., Kim, S., Lee, N., and Rhee, M. 2013. New decontamination method based on caprylic acid in combination with citric acid or vanillin for eliminating Cronobacter sakazakii and Salmonella enterica serovar Typhimurium in reconstituted infant formula. *International Journal of Food Microbiology*. 166.3: 499-507.
- <sup>7</sup> Tsuchido, T., Hiraoka, T., Takano, M., and Shibasaki, I. 1985. Involvement of autolysin in cellular lysis of bacillus subtilis induced by short- and medium-chain fatty acids. *Journal of Bacteriology*. 162.1: 42-46.7.
- <sup>8</sup> B Fortuoso, J Heis, R Gebert, et al, GML in the diet of broiler chickens replacing conventional antimicrobials. *Microbial Pathogenesis* V 129, 161-167.

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