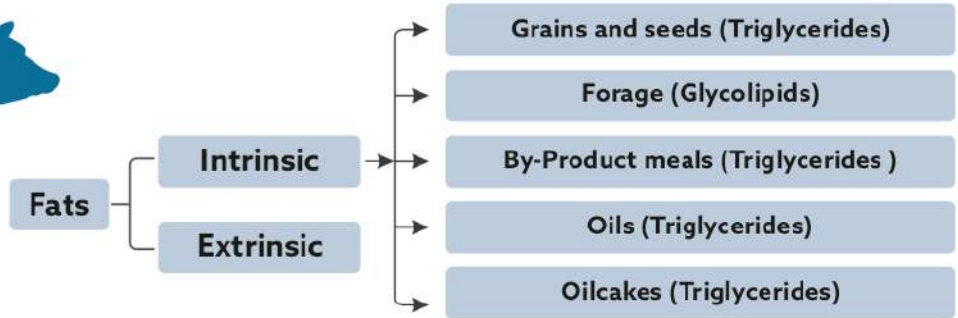
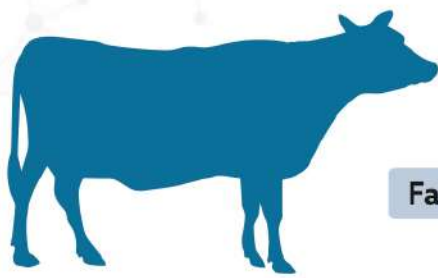


MICROFAT™ *Booster*

Enhances Fat Digestion and Absorption

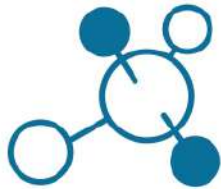
KEMIN[®]

TYPES OF FATS SUPPLEMENTED IN RUMINANT DIET



HOW ARE FATS DIGESTED IN THE RUMINANT?

RUMEN



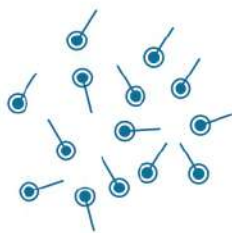
HYDROLYSIS

Fatty acids released

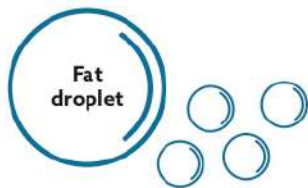


BIOHYDROGENATION

Unsaturated fatty acids converted to saturated fatty acids



ABOMASUM

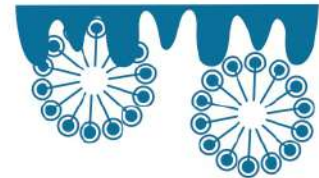


EMULSIFICATION

Large fat droplets converted to small globules



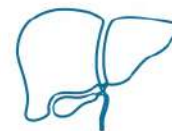
INTESTINE



Micelles get absorbed into intestinal cells



MICELLE FORMATION



Liver supplies lecithin, and bile salts



Pancreas produce pancreatic lipase



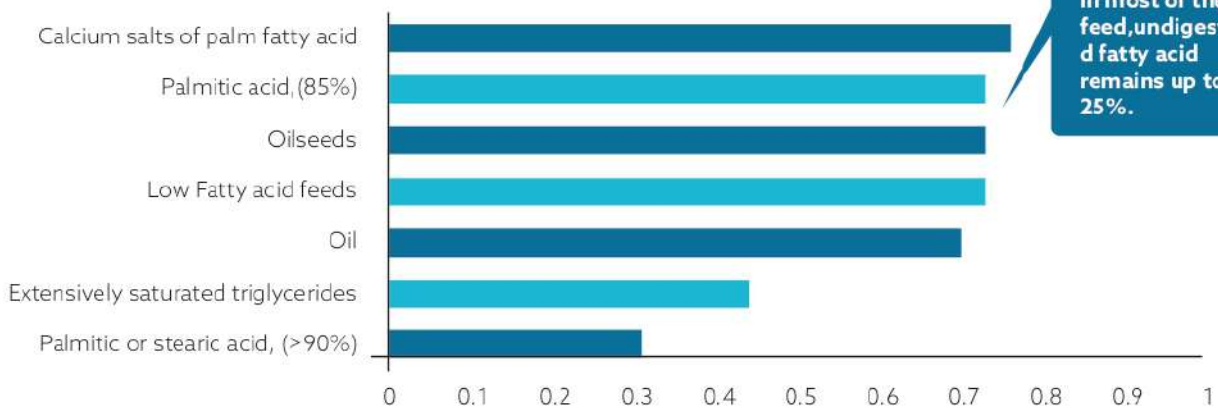
Free fatty acids adsorb on feed particles and evacuate to intestine

ARE FATS DIGESTED EFFICIENTLY?

Fats and oils are not always digested efficiently. Several causes depending upon the inclusion levels of fats, cereals and forages impact the ruminal environment and may hamper the functioning of rumen microbes and their ability to hydrolyze fats. Moreover, the degree of saturated and unsaturated fats in the ration can affect rumen microbiome and reduce the digestibility of fats.

Therefore, that fats are not always digested efficiently. The degree of fat digestibility is measured through the **Digestibility Coefficient of Fatty Acids**, which measures the digestion of fatty acids in the total digestive tract of cow. It is a value which is computed using the fatty acid intake through feeds, or as a dry matter basis, nutrient composition and fecal fatty acid excretion.

Digestibility Coefficient of Fatty Acids (g/g) - DCFA



Source: J. Dairy Sci. 103:6982-6999



HIGHER DENSITY OF FATS AND VARIABILITY IN DIGESTION REQUIRES A MORE ADVANCED SOLUTION

MICROFAT™ Booster IS THE KEY

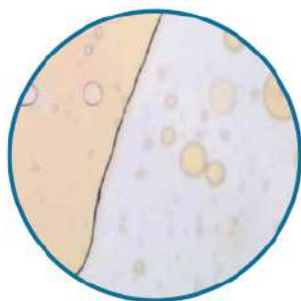
MICROFAT™ Booster is a sustainable and synergetic blend of Quaternary Polar lipids which delivers superior fat digestion and absorption, both in the rumen and intestine.

Quaternary Polar Lipids are biomolecules produced through an enzymatic process in which they acquire a quaternary ammonium head and a fatty acid tail. This modification helps in better water solubility, efficient micelle formation, nutrient absorption and higher stability in the rumen.

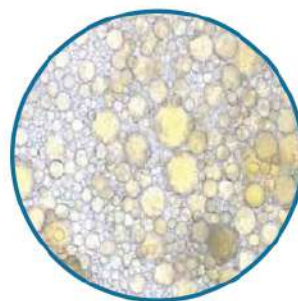
HOW DOES MICROFAT™ Booster WORK?

CREATES BETTER EMULSIFICATION

Quaternary Polar Lipids reduces the size of oil droplets up to 200 times the original size.



**Control- oil and water
poor mixability**

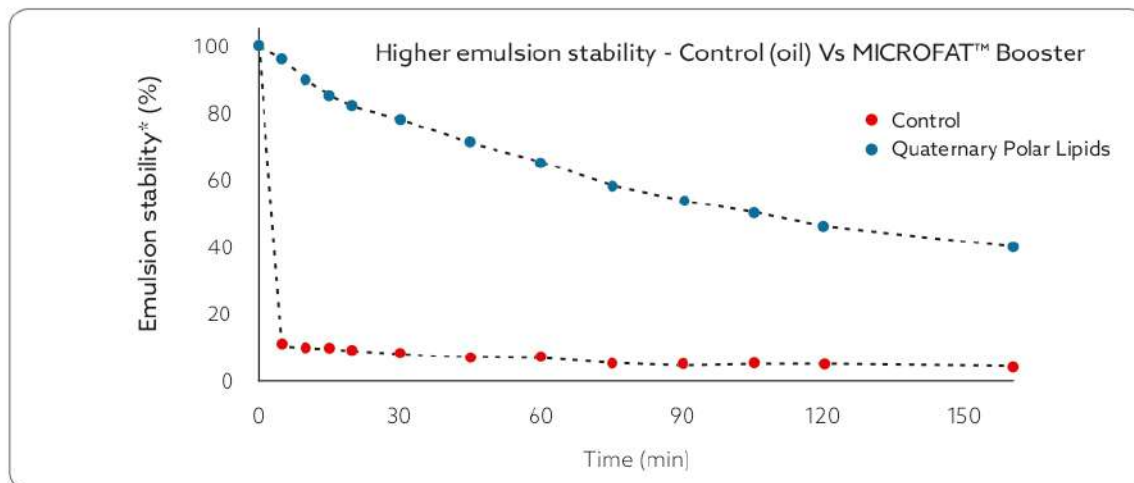


**Quaternary polar lipids with oil and
water- smaller droplets better mixability**

Kemin Internal document:12-00028

Smaller the Fat Globule, Faster is the Digestion and Absorption

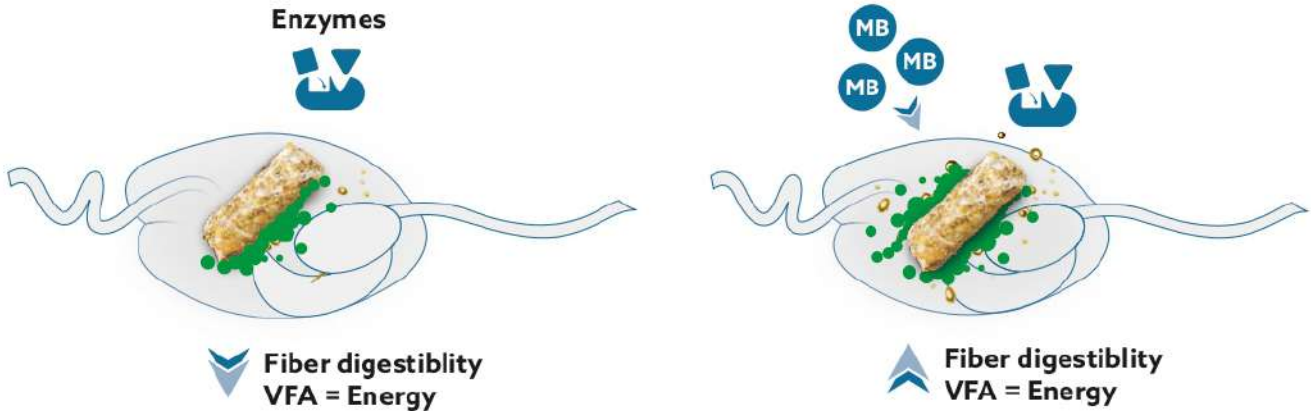
HIGHER EMULSION STABILITY



Longer duration of stability ensures longer action of fat breakdown.

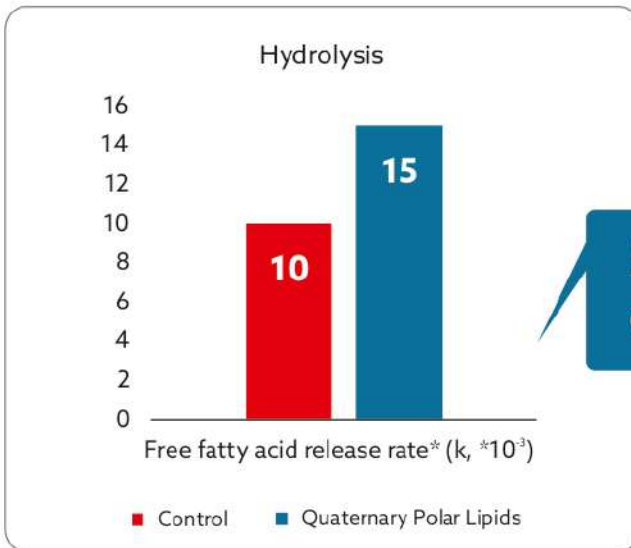
Source: Kemin Internal Document-19-1020

ENHANCES RATE OF HYDROLYSIS



Action of enzyme blocked by Fat coating

Source: Concept by Dr Fernando Valdez, 2019



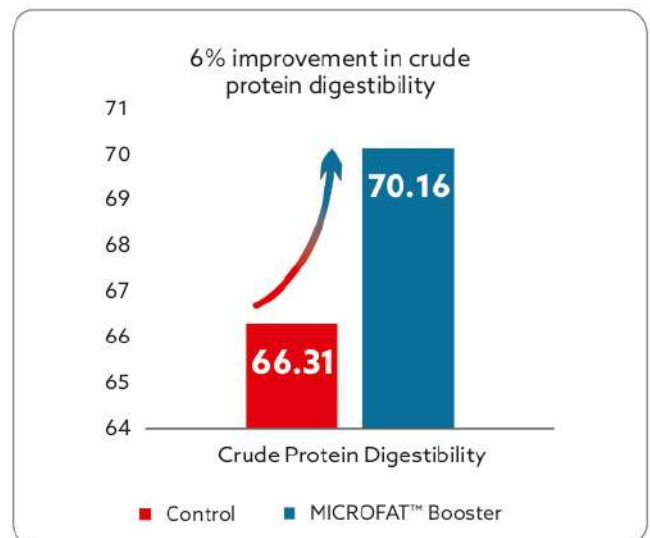
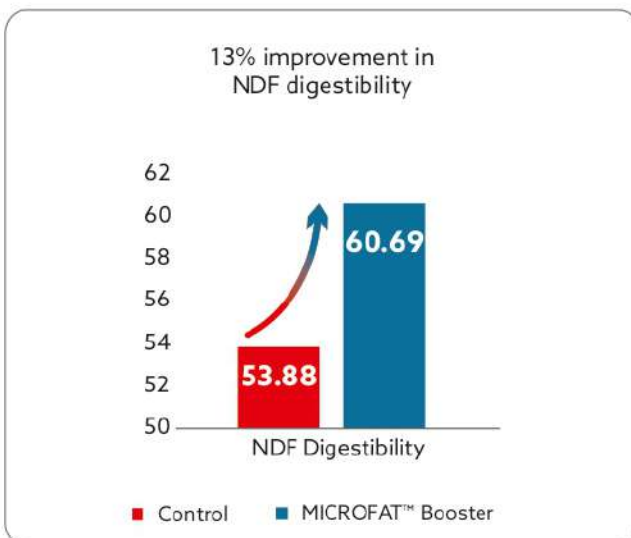
**50% more release
of free fatty acids**

MICROFAT™ Booster helps to breakdown the fats as smaller globules making it possible for bacterial populations to access the feed. This leads to better fat digestion as more space is available for microbial action on fibres and fats.

Efficient emulsification and hydrolysis due to MICROFAT™ Booster helps in a higher release of Free fatty acids.

Source: Kemin Internal Reference-17-00272

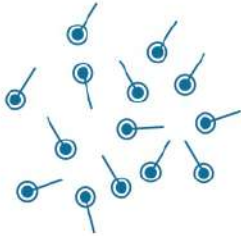
IMPROVES FEED DIGESTIBILITY



Source: Drago et al., 2019

IMPROVES ABSORPTION OF FATTY ACIDS

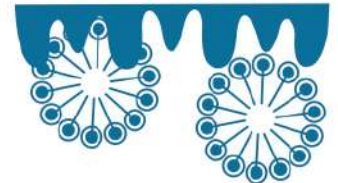
MICROFAT™ Booster is enriched with Quaternary Polar Lipids which potentiates the activity of endogenously produced bile salts, making the process of micelle formation and emulsification more efficient. Quaternary Polar Lipids have been shown to increase epithelial permeability and absorption of nutrients in the small intestine.



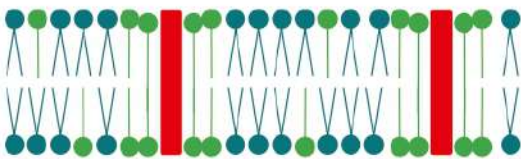
Free fatty acids reach the intestine adsorbed on feed particles.



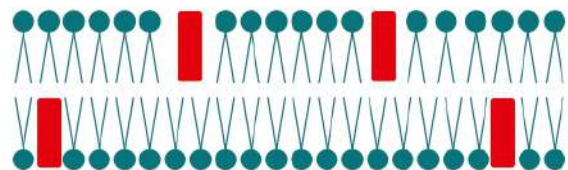
Quaternary Polar Lipids from MICROFAT™ Booster along with bile salts form micelles.



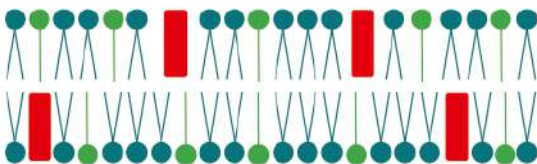
Micelles further reach the intestinal cells for absorption.



Active transport



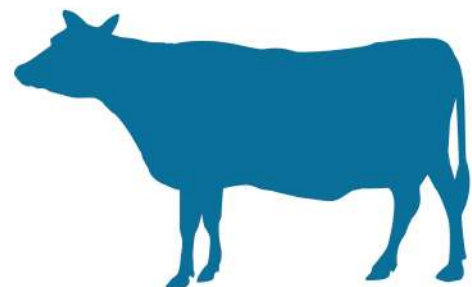
Enterocyte membrane



Passive Transport



 Phospholipid  Protein channels  Quaternary Polar Lipids

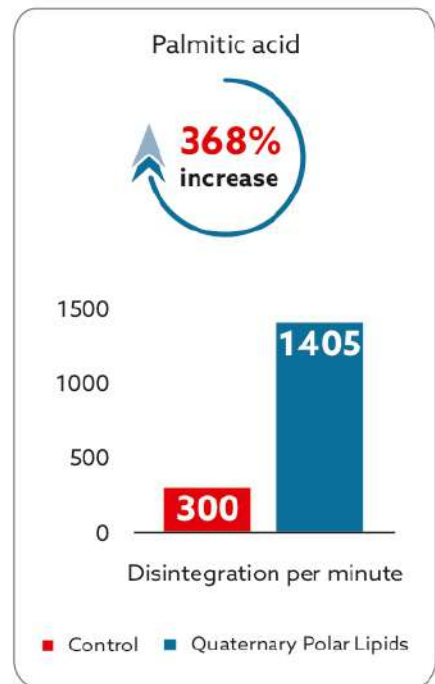
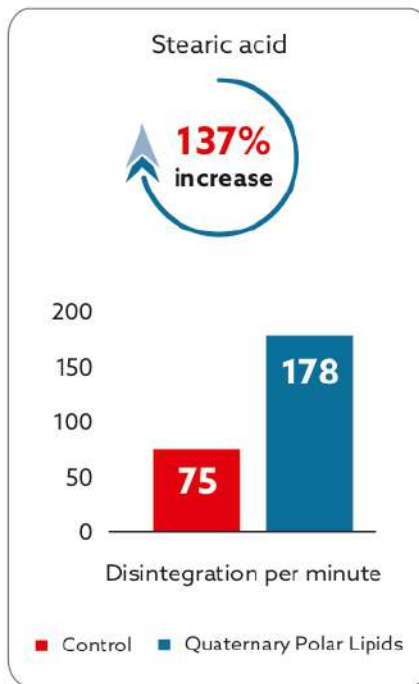
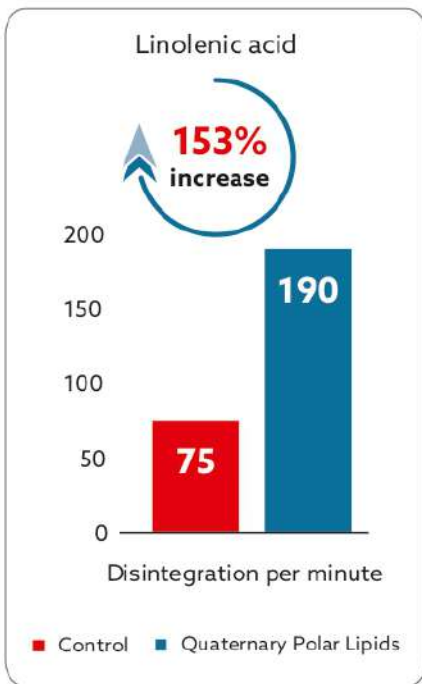


Source: Kemin Internal Reference-20-18927

Quaternary Polar Lipids improves the epithelial cell permeability and absorption of fatty acids

IMPROVES ABSORPTION OF FATTY ACIDS FROM INTESTINE

Quaternary Polar Lipids significantly help in the absorption of both saturated and unsaturated fatty acids into the intestinal cells. This may help in better fatty acid yield in milk.



Source: Kemin Internal Reference:20-1434

ANIMAL TRIAL

Quaternary Polar Lipids in MICROFAT™ Booster improves the energy value of bypass fat by increasing its digestibility and absorption.



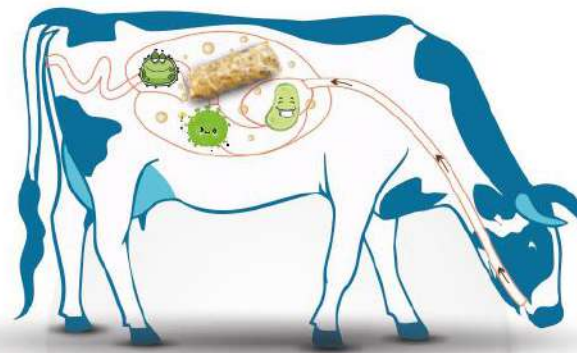
Effect of MICROFAT™ Booster with bypass fat replacement

Parameter	Control Group	MICROFAT™ Booster supplemented groups	
		85%	70%
Bypass fat supplemented	100%	85%	70%
MICROFAT™ Booster Inclusion levels / ton of feed	0g	375g	750g
Milk Yield (litre/day)	24.3	25.8	25.2
Energy corrected milk	25.4	26.3	26.1
Cumulative milk yield (litre)	2661	2843	2843
Fat (%)	3.82	3.67	3.94
BCS (Body Condition Score)	2.74	2.84	2.87


Source: Machado et al., 2021



**IMPROVES
FAT DIGESTIBILITY
AND ABSORPTION**



**KEY FEATURES OF
MICROFAT™ Booster**



**ECONOMIC BENEFITS
DUE TO BYPASS FAT
REPLACEMENT**

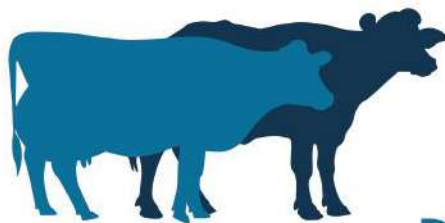
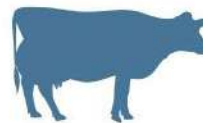
1

**ENHANCES MILK FAT
AND MILK YIELD**



2

**IMPROVES
BODY CONDITION
SCORE**



DOSAGE

Feed millers: 500g/ton of feed or as directed by Veterinarian or nutritionist

For specific preposition, please contact our Kemin Expert

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