



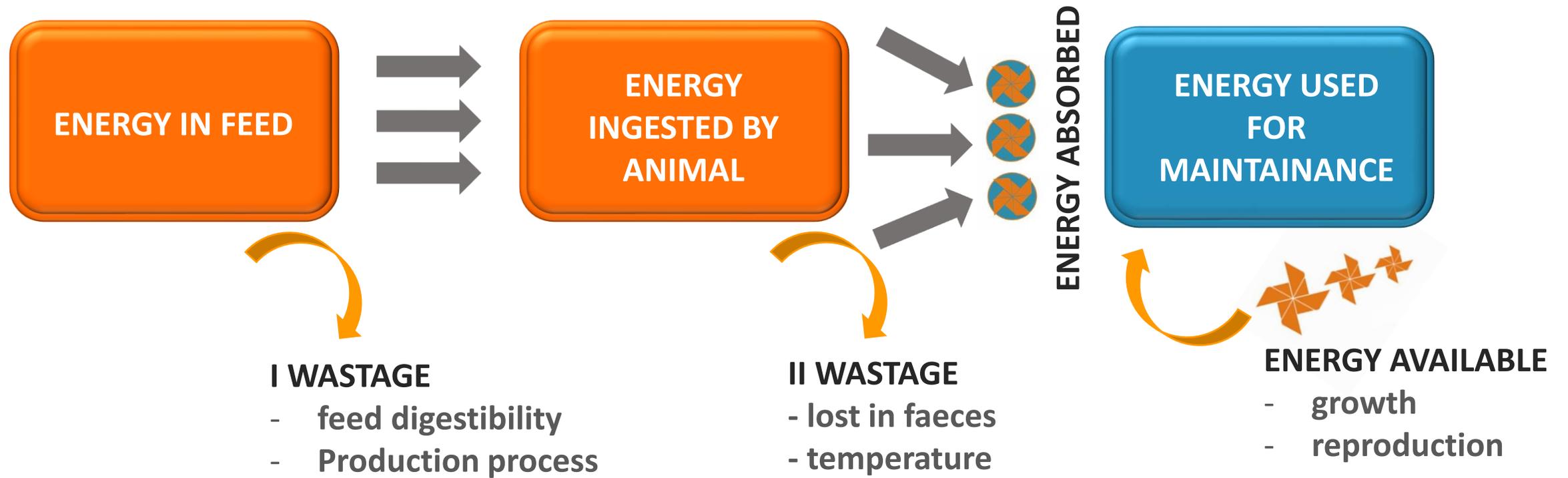
Don't waste your energy!

DIGEST FAsT

is a nutraceutical product designed for use in nutrition of monogastric species for improvement of fat efficiency and reduction of feed cost.

DIGEST FAsT allows:

- To reduce fat inclusion rate up to 10kg/Mt
- To use less concentrated raw materials
- To increase digestibility of saturated fats
- To increase digestibility of fat in pre-starter diets
- To optimize linoleic acid profile
- To increase energy content in the diet.



Fat digestion and absorption is influenced by

- **Age** (reduced lipase secretion in young animals)
- **Liver condition** (bile production, phospholipids production)
- **Pancreas condition** (lipase production)
- **Digesta transit time** (The slower the transit time, the better is the digestibility and absorption of nutrients)
- **Raw material type and quality** (un/saturated fatty acids <C12, mycotoxins, fibre)
- **Gut ecology and disease conditions** (coccidiosis, E. Coli, Necrotic enteritis, malabsorption syndrome, stress, overuse of antibiotics)

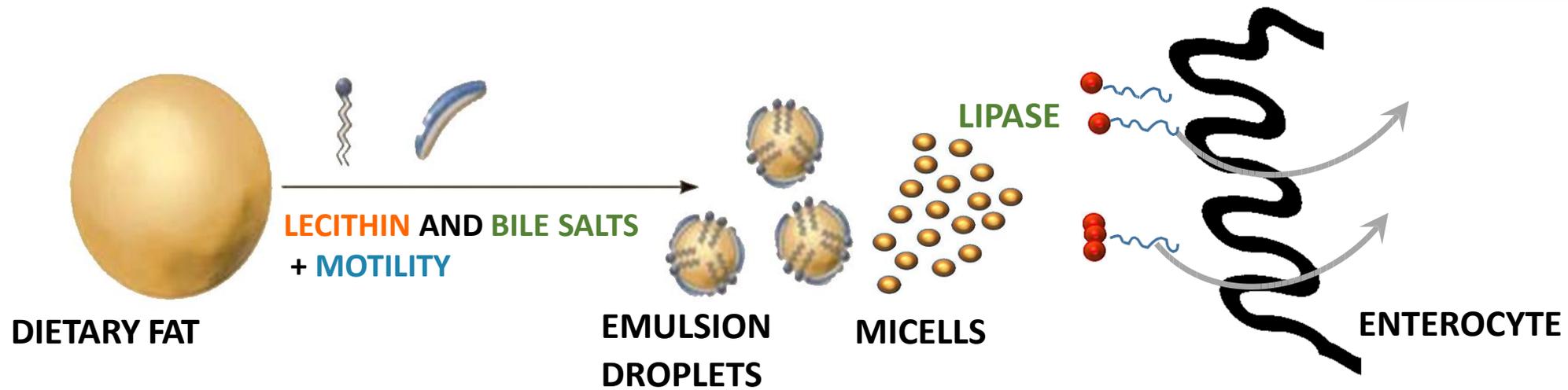
FAT DIGESTION AND ABSORPTION MAY BE MAXIMIZED BY:

- **BILE SALTS and LIPASES**
 - Improve emulsification and digestibility but not the absorption
 - High cost of the bile salts

- **AGENTS THAT IMPROVE EMULSIFICATION PROCESS**

- **AGENTS THAT IMPROVE MEMBRANS PERMEABILITY - BIOSURFACTANTS**

FAT DIGESTION AND ABSORPTION



SOLUBILITY - the key question in fat digestion and absorption.

1. Lipids are **hydrophobic** -> poorly soluble in the aqueous environment of the digestive tract.
2. The digestive enzyme lipase is **water soluble** -> works only at the surface of fat globules.
3. **Bile salts and phospholipids** are **amphipathic** molecules that are present in the bile.
4. **Motility in the small intestine** breaks fat globules apart into small droplets, that are coated with bile salts and phospholipids (preventing the emulsion droplets from re-associating)

DIGEST FAsT ACTS IN 3 WAYS:

1. Favours liver and pancreas health and stimulates bile and lipase production.
2. Allows the creation of smaller micells, therefore increase the surface available for lipase activity.
3. Improves the transport of monoglycerides, fatty acids, and fat soluble vitamins through the membranes.

1. LIVER HEALTH

More than **500 functions**, all nutrients absorbed from the intestine will pass through the liver as a first stop:

Bile production and Bile salts recuperation

Synthesis of phospholipids

Synthesis of lipoproteins

Oxidize triglycerides to produce energy



Detoxification

Haemoglobin processing and bilirubin production

Storage of fat soluble vitamins

Production and activation of vitamins

Glucose secretion and **energy storage**

Converts excess carbohydrates and proteins into **fatty acids** and triglyceride

Diseases that impair bile secretion and affect the pancreatic secretion of enzymes with lipase activity lead to serious deficiencies in the digestion and absorption of fats.

DIGEST FAsT contains a combination of **medicinal plants and botanicals** that:

- Activates production and **secretion of bile**, improving the function of liver and gall bladder.
- Facilitates **digestion** of fatty substances.
- Stimulating effect on **pancreatic activity**, enhances secretion of enzymes.
- Botanicals promote **intestinal motility**, contributing in mixing the concrete of fat ingested with bile and lipase.



Phospholipids are amphipathic molecules, having both hydrophilic and hydrophobic characteristics.

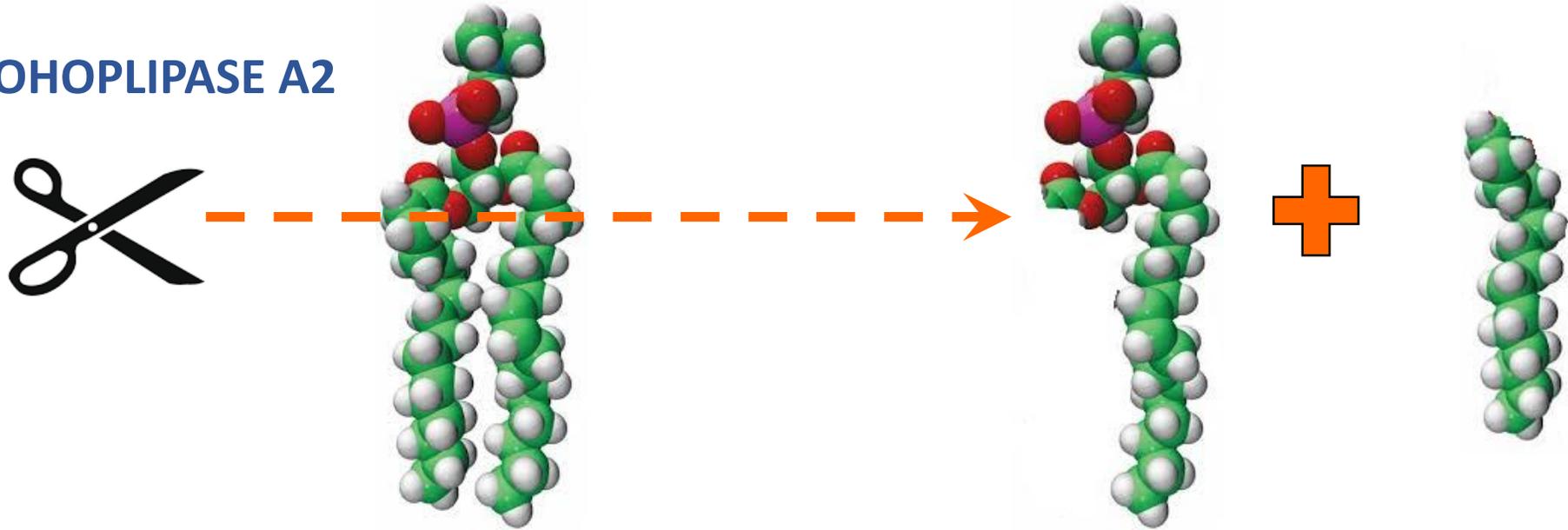
Widely used by the industry as **water- in-oil emulsifiers**

- Phospholipids are produced by the body
- Mixtures or fractions of phospholipids obtained by physical procedures from animal or vegetable food stuffs;
- The major source of lecithin is non-refined soybean oil. Alternative sources are non-refined rapeseed and sunflower oils.

LYSOPHOSPHOLIPIDS



PHOSPHOLIPASE A2



Hydrolysis of the phospholipids at the sn-2 position by phospholipase A2 yields
LYSOPHOSPHOLIPIDS + free fatty acid

Lysophospholipids are more hydrophilic than phospholipids.

2. CREATION OF SMALLER MICELLS

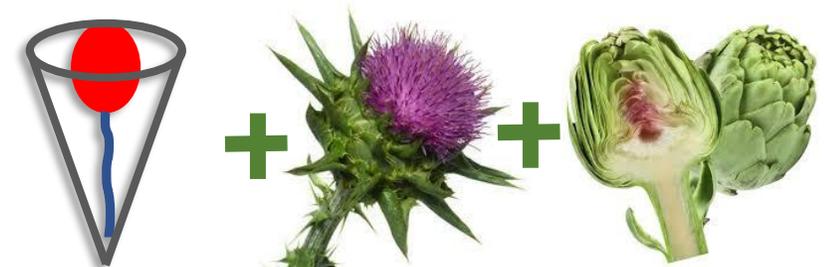


- Low **Critical Micellar Concentration** (CMC) → easier micelle formation. CMC –concentration of fatty acids needed to form a micelle.
- Smaller micelles → bigger active surface for bile and lipase activity.
- Reduce interfacial tension between oil and water
- Optimum **Hydrophilic Lipophilic Balance** → **effective oil/water emulsifiers**
- Increase the porosity of lipid bilayer and increase the efficacy of nutrient absorption.

3. IMPROVED TRANSPORT

PHOSPHOLIPIDS AND PLANT EXTRACTS

- Phospholipids increase the porosity of lipid bilayer and increase the efficacy of nutrient absorption.
- **LYSOPHOSPHOLIPIDS** have conic shape, instead of cylindrical shape of phospholipids
- Artichoke extracts has mucilage effect.
- Milk thistle extracts reduce inflammatory reactions of intestine mucosa
- Artichoke extracts have a positive influence on intestine motility and gallbladder emptying.



TRIALS IN SWINE - 1.



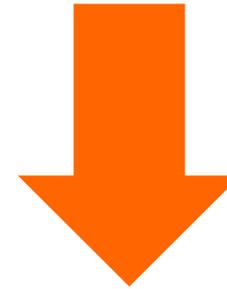
NAVARRA, Spain. April – July 2016

Control Group – 435 heads

DigestFast Group – 867 heads

Genetics: Pietrain

Replacement of 8kg of fat by 0,8kg of DigestFast



Feed cost reduction by 13%

	GROUP DIGEST FAST	GROUP CONTROL
INITIAL WEIGHT	19,34	17,4
SLAUGHTER WEIGHT*	103,1	107,7
DAYS IN TRIAL	129,83	139,85
ADG	649	645
Average Feed Intake	1,648	1,647
KG GAINED	83,76	90,3
FCR	2.55	2.55

	GRUPO DIGEST FAST	GRUPO TESTIGO
SLAUGHTER WEIGHT*	103,1	107,7
CARCASS YIELD	81.7	81.92
YIELD DESVIATION	7.73	8.57
% LEAN MEAT	66.26	66.62
QUALITY BONUS	0.0162	0.0137

TRIALS IN SWINE - 2.

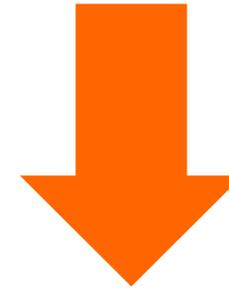


CATALOÑA, Spain. July-October 2016

Control Group – 66 heads

DigestFast Group – 66 heads

Genetics: PIC x Pietrain



Feed cost reduction by 19,5%

DIET	FEED CONSUMPTION/KG /HEAD	CONTROL (T1)		DIGEST FAST (T2)	
		FAT (KG)	DIGEST FAST (KG)	FAT (KG)	DIGEST FAST (KG)
G237	Aprox 15	15,7	0	10,0	0,4
G557	Aprox 100	20,4	0	10,4	0,7
G556	Aprox 85	20,2	0	15,0	0,4

	ADG, g	FCR	Back fat, mm	Loin eye area, mm
CONTROL	1827	2,18	10,2	51,37
DIGEST FAST	1891	2,17	10,27	53,09

TRIALS IN POULTRY - 1.



Effects on productive results of an emulsifier in broiler diets

School of Agricultural, Food and Biosystems Engineering, Technical University of Madrid (UPM), Spain. Experimental farm in Cataluña (Spain). December 2016.

No. animals: 3000

Breed: Ross 308

Age at slaughterhouse: 38 days

No. of diets / batch: 4

Replacement: 10 kg of animal fat by 1Kg of Digest Fast + 9 kg of cereals.

	CONTROL BATCH	DIGEST FAST
Average Daily Gain (g)	67.25	67.47
Feed Conversion Rate	1.64	1.63
Feed Intake (g/broiler/day)	110.8	110.78
Final weight (g)	2556	2564
Production Efficiency Factor	390	391

TRIALS IN POULTRY - 2.



Effects on productive results of an emulsifier in broiler diets
University of Pretoria, Pretoria, South Africa (2017)

552 day-old male Ross 308

Divided into 24 identical floor pens with 23 birds per pen

Treatment A: Positive Control x 12 replicas per treatment

Treatment B: **DIGEST FAST** x 12 replicas per treatment

- Starter (0-14 days): The same diet as Positive Control with DigestFast added “on top” to the diet at 500 g/Mt.

- Grower and Finisher: Lower fat than Positive Control (soya oil reduced with 5 kg/MT) with DigestFast added to the diet at 500 g/Mt.

	TOTAL FEED INTAKE (g)	FINAL WEIGHT (g)	BREAST WEIGHT (g)
POSITIVE CONTROL	4021	2768	690,1
DIGEST FAST	4089	2762	708,7

Effect of DigestFast in diets based on soybean olein

Commercial farm laying hens (Southern Europe)
No. of animals: 100.000 laying hens Hy-line Brown

Age: 36 weeks
 Trial duration: 30 days (December 2016)
 Divided into 24 identical floor pens with 23 birds per pen

2 TREATMENTS:

Treatment A: Positive Control – 30 kg/Mt of soybean olein

Treatment B: **DIGEST FAST**

20 kg/Mt of **soybean olein**

1 kg Digest Fast

9 kg of cereal (wheat)

	LAYING RATE (%)	FCR (kg/kg)	FCR (kg/dozen)	AVERAGE DAILY CONSUMPTION (g)	EGG WEIGHT (g)	EGG MASS (g)	LAYERS WEIGHT (g)	MORTALITY (%)
POSITIVE CONTROL	78,8	2,23	1,66	107,8	61,8	48,7	1717	0,46
DIGEST FAST	90,5	2,01	1,49	111,6	61,9	56,1	1747	1,17

Effect of DigestFast in formulas with high oil inclusion

Sparos (Portugal) trial in seabass. 2017

- 3 experimental treatments in triplicate.
- Fish sea bass (*Dicentrarchus labrax*)
- 35 fish per tank
- Initial weight 146 grams
- Pellet size: 4 mm.

3 TREATMENTS:

CTRL: Commercial feed – 9,6 % of wheat meal + 14,98 % soybean oil.

DF 0,1% (CTRL – 1% Soybean oil + Digest Fast product at 0.1%)

- 10kg oil + 1kg DF

DF 0,2% (CTRL – 2% Soybean oil + Digest Fast product at 0.2%)

- 20kg oil + 2kg DF

Day 62	CTRL	DF ^{0.1%}	DF 0.2%	P-Value
FBW, g	221.79 ± 1.91 ^a	228.22 ± 7.39 ^a	242.84 ± 7.72 ^b	0.016
SGR, %/d	0.66 ± 0.01 ^a	0.71 ± 0.05 ^a	0.80 ± 0.05 ^b	0.016
FCR	1.25 ± 0.01 ^c	1.13 ± 0.04 ^b	1.02 ± 0.04 ^a	<0.001
FI, %ABW/d	0.82 ± 0.01	0.78 ± 0.04	0.80 ± 0.02	0.195
PER	1.96 ± 0.01 ^a	2.18 ± 0.08 ^b	2.42 ± 0.10 ^c	0.001
Dressing yield, %	87.28 ± 0.78 ^a	89.95 ± 1.29 ^b	90.39 ± 0.53 ^b	0.015
Filleting yield, %	41.75 ± 0.59	42.40 ± 1.01	43.21 ± 0.52	0.128
Protein, % body composition	14.71 ± 0.17	14.62 ± 0.27	14.37 ± 0.22	0.164
Energy, kJ/g body composition	8.36 ± 0.07	8.19 ± 0.21	8.20 ± 0.15	0.505
Fat, % retention	59.62 ± 1.49 ^a	69.26 ± 3.95 ^b	74.16 ± 2.09 ^b	0.002
Energy % retention	40.58 ± 0.57 ^a	42.93 ± 3.21 ^{ab}	46.64 ± 1.77 ^b	0.036

MATRIX



Feed	Energy basis of feed	Energy value (MJ/kg)	Energy value (Kcal/kg)
Broiler	Metabolizable Energy	362	86.156
Layer	Metabolizable Energy	380	90.440
Pigs	Net Energy	362	86.156
Shrimp/fish	Metabolizable Energy	342	86.156

Recommended dose: 250 - 1000g/Mt

Minimum content of 1,5% of fat must remain in the diet.

Minimum content of 2% of fat must remain in shrimp diet

RECOMANDATIONS FOR USE



COST REDUCTION:

- Addition of 0,5-1kg/Mt of LIPTOEMULSIFIER PLUS allows to reduce the fat/oil content up to 10kg/mt.
- Especially interesting for fattening diets.

RECOMANDATIONS FOR USE



- 0,5 kg/Mt “*On-top*” for prestarter and starter diets:
piglets and chickens up to 21 days of life have immature lipid digestion functions:
 - Increase fat digestibility
 - Supports lipase activity
 - Reduce diarrhea risk

RECOMANDATIONS FOR USE



- For saturated fats digestion improvement:
 - Lard and tallow contains high concentration of saturated fats with low solubility.
 - Long chain fatty acids are non soluble in aqueous environment

RECOMANDATIONS FOR USE

- Optimizing the content in Linoleic acid:
 - Corn, soya and sunflower meal have high content of linoleic acid.
 - In fattening animals high levels of linoleic have negative impact on carcass quality and fat.

	CRUDE FAT	LINOLEIC AC. (C18:2)
CEREALS		
CORN	3,5 – 4 %	1,81 - 2 %
BARLEY	1,8 %	1,1 %
WHEAT	2 %	1,17 %
OILS AND FATS		
SOYA OIL	99,9 %	51 %
SUNFLOWER OIL	99,9 %	66 %
PAL OIL	99,9 %	10 %
LARD	99,9 %	10 %

RECOMENDATIONS FOR USE



- In order to **reduce the cost**: can replace up to 10kg of fat.
- “*On-top*” for prestarter and starter diets for **fat digestion improvement**.
- For **saturated fats** digestion improvement (lard, tallow)
- In lactating sows diets, **to prevent the body weight lost**.
- **Reformulation**, in order to use less concentrated and cheaper raw materials.



DigestFast

Biosurfactant

Don't waste
your energy!!

- ✘ Better results
- ✘ Less cost
- ✘ Improving benefits

