## VeyFo®

## Mulgat

E-Selenium-Mulgat Multi-Mulgat Multi-C-Mulgat

- Emulsified vitaminsEasy to administerHigh bioavailability
- Very rapid release
- No strain on the liver























Formulations for professionals demanding peak performance



# Emulsifying is not simply emulsification – it all depends on particle size and emulsifier quality

Veyx-Pharma is the specialist for vitamin microemulsions that possess many advantages over other formulations. The products from the VeyFo® Mulgat range can be administered directly, via the feed or drink. No compulsory documentation is necessary as they are complementary feeds.

The micronutrients contained in the formulations are used to compensate nutritional deficiencies that are to be expected during specific stages of life and throughout particularly demanding periods, for example during reproduction, lactation, convalescence, high muscular stress, immune suppression as well as anthelmintic treatments, vaccinations or infections.

### Physiology of the VeyFo® Mulgat range

Emulsifying means the break up of liquids such as oil or water together with the substances dissolved therein into droplets of a minute diameter  $(1 - 3 \mu m)$  as well as their dispersion in water or oil. The result is either oil in water (o/w) or water in oil (w/o) emulsions, but also double emulsions such as water in oil in water (w/o/w). It is thus possible to produce the finest microdroplet dispersal of the ingredients dissolved in both oil and water. In order to ensure that the tiny droplets present in the aqueous or oily phase do not clump together and above all, do not separate out again after emulsification, an emulsifier has to be added. The result are microemulsions (microencapsulations) exhibiting similar properties to that of the dam's colostrum, with 90 % of the microcapsules having a diameter  $\leq 1.5 \mu m$ .



#### Particle structure of various Veyx-Mulgat Microemulsions

Emulsification means that there is an extraordinarily large increase in the effective surface area. Hence, for the efficacy of the emulsion it is important that

- it remains stable in the stomach until absorption occurs in the small intestine,
- it contains an emulsifier that can be metabolised and is absolutely harmless,
- no loss of nutrients occurs through the emulsification and the concomitantly high absorption capabilities of the components,
- absorption also remains assured during fat metabolism disorders,
- vitamin A will not cause any strain on the liver.

#### What is so special about the VeyFo® Mulgat products?

#### Vitamins are essential

Vitamins are organic substances that are indispensable to the normal metabolic processes of animal organisms. They are essential to maintain health and performance and have to be supplied with the feed. In general, the animal organism itself is not able to synthesise vitamins. There are two main groups of vitamins: fat- and water-soluble vitamins. A deficiency or complete lack of one or more vitamins may lead to multiple malfunctions of the metabolism resulting in depressed performance, growth retardation, fertility problems or diseases.

#### VeyFo® Mulgat products allow vitamins to be effective

In livestock husbandry above all young, but also older animals must be provided with additional vitamins and extra micronutrients during high performance phases and even more in stressful phases when requirements are increased. The VeyFo® Mulgat products are perfectly suited for this purpose. Amongst all the other products nowadays available in various forms and formulations, for various reasons the VeyFo® Mulgat products take up a special position: Their typical characteristics are the special absorption route resulting in the high and very rapidly attained concentrations of nutrients in the tissue.





#### Absorption route

Histological section of small intestine

Histological investigations of sections of the small intestine show that the emulsion particles in the VeyFo<sup>®</sup> Mulgat products are already to be found in the lymph vessels of the gut villi within 10 minutes. From here they are carried into the bloodstream without having to pass through the liver first.

## **High bioavailability**

Investigations at the University of Munich for example, confirmed the high bioavailability of the vitamins A and E contained in the VeyFo® Mulgat products. The blood levels of vitamins administered in this way rise significantly and attain their maximum level 2 to 3 hours following administration. The values are around 20 - 60 % higher than those of other formulations.

Animals	45 piglets (German Landrace x Pietrain) at 6 weeks of age		
Feeding	Conventional complete diet for pigs ad libitum		
Allocation	Group 1:	1 x VeyFo® Mulgat (300,000 IU vitamin A, 200 mg vitamin E)	
	Group 2:	1 x Gelatine capsule with vitamins in usual powder form (300,000 IU vitamin A, 200 mg vitamin E)	
	Group 3:	Control group (1 x empty capsule)	

#### **Experimental design**

#### Significant blood level increase of vitamin A

The blood values for vitamin A already increase significantly 2.5 hours following their administration. After around 5 to 8 hours the initial level is attained. The vitamins are almost completely stored in the tissues. The powder formulation administered only achieves 50 % of the vitamin A blood levels of the emulsion after 3 hours and disappears completely after 10 hours. As expected, following administering the empty capsules, no changes in the blood levels of vitamin A occurs.



#### Plasma values of vitamin A

#### Significant blood level increase of vitamin E

About 3 hours following the administration of the emulsion, vitamin E attains a blood-content that had significantly 60 % higher values than that following giving the powder formulation. The increased plasma value can be tracked at a high level over a 24 hour-period.



Plasma values of vitamin E

#### No undesirable adverse effects

An excessive accumulation of vitamin A in the liver is undesirable as it can represent a risk to the animal. Relevant investigations of the University of Munich revealed extremely remarkable results in this respect that give every reason to believe that high amounts of vitamin A should only be given in the form of the VeyFo® Mulgat microemulsions:



The vitamin A level in the liver also slightly increases for a short period following the administration of VeyFo® Mulgat, however, it falls again to the initial value within 72 hours. The values of the conventional vitamin formulations, however, remain at three times the level during this period. This means that no detrimental vitamin A accumulation occurs in the liver when high dosages of vitamin A are given in the form of a VeyFo® Mulgat product.

The giving of vitamins via injection leads to injection injuries, pain for the animal and does not provide optimum absorption.

#### Product characteristics and use

Formulated with top grade organically bonded components meeting our high quality standards with regard to quality, bioavailability and product safety. Microemulsion formulations of the finest nutrient particle structure (90 %  $\leq$  1.5 µm) ensure protection from gastric acid during the transport of the micronutrients into the body cells via the small intestine as well as their sudden and rapid release.

The products **VeyFo**<sup>®</sup> **E-Selenium-Mulgat** (with vitamin E and selenium), **Multi-Mulgat** (containing the vitamins A, D<sub>3</sub>, E, B-complex, K<sub>3</sub> as well as L-carnitine, beta-carotene, selenium and biotin) and **Multi-C-Mulgat** (with the vitamins A, E, C, B-complex, K<sub>3</sub> as well as L-carnitine, beta-carotene and biotin) are complementary feeds with particular nutritional purposes.

Furthermore, all Mulgat products are tailored to supplement the standard ration to meet the extra needs in addition to their nutritional purpose.

	Product		:
	E-Selenium- Mulgat	Multi-Mulgat	Multi-C-Mulgat
As complementary feed with a particular nutritional purpose Nutritional purpose/target species			
To support the heart function in case of chronic cardiac insufficiency in cats and dogs	х		
To balance malabsorption/digestive insufficiencies In poultry (except for geese and pigeons) during the first 2 weeks after hatching		Х	
<u>To support the preliminary phase of oestrus and reproduction</u> In mammals such as cows during the last 2 weeks of gestation until the next confirmed pregnancy; in breeding sows starting 7 days prior to until 3 days after parturition as well as 7 days prior to until 3 days after insemination; in other female mammals during the final phase of pregnancy until the next confirmed pregnancy; in male animals during the reproductive activities and in birds such as e.g. pigeons during the laying period and in male animals during reproductive activities.	х	х	
To support the preliminary phase of and the recovery from sporting activi- ties in equids up to 3 weeks prior to and until up to 4 weeks after particular sporting performance periods.	х		
Nutritional restoration, convalescence in cats and dogs	Х		Х
To reduce stress reactions in pigs	Х		
To supplement the nutritional supply Nutritional target			
To compensate short-term increased needs of the nutrients and vital subs- tances contained in the products	х	х	х

The use of the products to supplement the standard ration in case of increased needs prior to, during and after particular performance phases or periods of increased stress as it might be the case during e.g. parturition, weaning, transport, change of housing, extreme temperature fluctuations, feed changes, high animal performances or sporting activities does not pose any problem to individual animals when given directly or to groups of animals when given via the feed or water (oily solutions via the milk).

## Formulation/major components\*



#### VeyFo® E-Selenium-Mulgat

VeyFo<sup>®</sup> E-Selenium-Mulgat has been developed for farm animals and pets. The product contains vitamin E (tocopherol) and selenium as organically bound selenomethionine which both have a high bioavailability and excellent tolerability. VeyFo<sup>®</sup> E-Selenium-Mulgat plays an important role in the control of the muscular metabolism and in the regulation, development and function of the gonads. Vitamin E and selenium are essential for antioxidant protection.

Content/ml	VeyFo® E-Selenium-Mulgat
Selenium of which as selenomethionine of which as sodium selenite	0.5 mg 0.272 mg 0.228 mg
Vitamin E	150 mg

<sup>\*</sup>Note: The information given is to be understood as a general overview and is subject to alterations, especially if these do not affect the intended nutritional purpose. The latest version of the packaging materials is always valid.

## Recommendations for use and dosage

#### E-Selenium-Mulgat

As complementary feed with a particular nutritional purpose

Nutritional purpose: To support the preliminary phase of oestrus and reproduction in mammals and birds, to support the heart function in case of chronic cardiac insufficiency, for nutritional restoration, convalescence in cat and dogs, to support the preliminary phase of and the recovery from sporting activities in equines, to reduce stress reactions in pigs

Species	Particular requirement during the recommended duration of feeding	Daily quan- tity	Duration (days)	Need/animal
Dairy cows, first calf heifers	After calving Prior to insemination	10 ml	2	20 ml
Mares	After foaling, during oestrus	10 ml	2	20 ml
Bulls and stallions	During reproductive activities	10 ml	2	20 ml
Breeding sows	Prior to farrowing up to 3 days after farrowing during weaning	5 ml 5 ml	4 2	20 ml 10 ml
Boars	During reproductive activities	5 ml	2	10 ml
Piglets	After farrowing (birth stress) during weaning (weaning stress)	0.5 ml 0.5 ml	2 4	1 ml 2 ml
Sheep, goats	After lambing, prior to service up to 5 days after service	5 ml 4 ml	5 6	25 ml 24 ml
Rams, billy goats	During reproductive activities	5 ml	2	10 ml
Dogs	After whelping/during reproductive activities	0.5 ml	2	1 ml
Cats, rabbits, small rodents	After parturition/during reproduc- tive activities	0.1 ml	5	0,5 ml
Birds via the drinking water/ litre		0.1 ml	2	0,2 ml
It is advised to consult an expert prior to feeding the products.				
As complementary feed Nutritional target: to supplement short-term increased needs of the nutrients and vital substances contained in the products				
Calves, foals	During rearing	5 ml	2	10 ml
Lambs	During rearing	1 ml	2	2 ml
Chickens, broilers, turkeys		10 ml	2	20 ml

## Package size

500 ml bottle

# Formulation/major components of the Multi-Vitamin-Emulsions\*

To secure the general needs of vitamins and active nutrients as well as to balance out nutritional deficiencies prior to, during and after particularly demanding stages such as e.g. antibiotic or anthelmintic treatments.

Content/ml	VeyFo® Multi-Mulgat	VeyFo® Multi-C-Mulgat
Beta carotene	2 mg	2 mg
Biotin	50 µg	50 µg
Calcium D-pantothenate	20 mg	20 mg
Cholin chloride	8 mg	8 mg
L-Carnitine	10 mg	10 mg
Nicotinamide	24 mg	24 mg
Selenium	0.05 mg	-
Vitamin A	15.000 IU	15.000 IU
Vitamin B <sub>1</sub>	3 mg	3 mg
Vitamin B <sub>2</sub>	4 mg	4 mg
Vitamin B <sub>6</sub>	3 mg	3 mg
Vitamin B <sub>12</sub>	15 µg	15 µg
Vitamin C	-	60 mg
Vitamin D <sub>3</sub>	130 IU	-
Vitamin E	25 mg	25 mg
Vitamin K <sub>3</sub>	1 mg	1 mg

A deficiency of one or more of the constituents contained in these products may lead to disorders of growth, blood formation, fertility, cell protection and overall resistance.

<sup>\*</sup>Note: The information given is to be understood as a general overview and is subject to alterations, especially if these do not affect the intended nutritional purpose. The latest version of the packaging materials is always valid.



## VeyFo® Multi-Mulgat

VeyFo<sup>®</sup> Multi-Mulgat contains a comprehensive range of all relevant fat- and water-soluble vitamins - excluding vitamin C - as well as additional important micronutrients including Selenium.

## Recommendations for use and dosage

Multi-Mulgat					
As complementary feed with a particular nutritional purpose					
Nutritional purpose: To support th	e preliminary phase of oestrus ar	nd reproduction in ma	mmals and birds		
Species	Particular requirement during the recommended duration of feeding	Daily quantity	Duration (days)	Need/animal	
Dainy cows first calf heifers	after calving	10 ml	2	20 ml	
Daily cows, mist can increas	prior to insemination	10 ml	2	20 ml	
Bulls, stallions	during reproductive activities	10 ml	2	20 ml	
	prior to farrowing up to 3 days	4 ml	3	12 ml	
Breeding sows	after farrowing				
	prior to and after service	4 ml	10	40 ml	
Mares	prior to foaling	5 ml	3	15 ml	
	prior to service	5 ml	3	15 ml	
Boars	during reproductive activities	IU mi	1	10 ml	
Sheep, goats	arter lamoing	5 mi	2	10 ml	
Pame hilly goats	during reproductive activities	5 ml	2	10 ml	
Kams, only goats	after birth	1111 C	2	1 ml	
Cats, rabbits, small rodents	during reproductive activities	0.2 ml	5		
Dogs					
small breeds	after whelping	0.5 ml	2	1 ml	
medium-sized breeds	during reproductive activities	1 ml	2	2 ml	
large breeds		1.5 ml	2	3 ml	
Birds (e.g. pigeons, aviary birds) via the drinking water	via the drinking water	0.1 - 0.3 ml	2	0.2 - 0.6 ml	
Nutritional purpose: To compensate malabsorption/digestive insufficiencies In poultry (except for geese and pigeons) during the first 2 weeks after hatching					
Female and male chickens and turkey chickens after hatching per 20 animals		50 ml	3	150 ml	
As complementary feed Nutritional target: to supplement short-term increased needs of the nutrients and vital substances contained in the products					
Calves, foals	rearing	5 ml	2	10 ml	
Pialota	after birth (birth stress)	0.5 ml	2 - 4	1 - 2 ml	
Figiets	during weaning (weaning stress)	0.5 ml	5 - 10	2.5 - 5 ml	
Lambs	rearing	2 ml	2	4 ml	
Poultry (chickens, broilers, turkeys) per 100 animals via the drinking water		6 ml	4	24 ml	
Dogs, cats, small rodents	puppies and young animals	0.5 ml	2	1 ml	
It is advised to consult an expert prior to feeding the products.					

## Package size

500 ml bottle



## VeyFo® Multi-C-Mulgat

VeyFo<sup>®</sup> Multi-C-Mulgat was developed specially for small animals. It provides a comprehensive range of all relevant fat- and water-soluble vitamins including vitamin C as well as additional important micronutrients, however, without selenium.

## Recommendations for use and dosage

Multi-C-Mulgat				
Species	Particular requirement during the recommended duration of feeding	Daily quantity	Duration	Need/animal
Puppies	During rearing	2 - 5 drops		0.2 - 0.5 ml
Mature dogs Small breeds	Convalescence in case of increased stress	5 - 10 drops 20 drops		0.5 - 1 ml 2 ml
Medium-sized breeds	Convalescence in case of increased stress	20 drops 30 drops		2 ml 3 ml
Large breeds	Convalescence in case of increased stress	30 drops 50 drops	1 x week	3 ml 5 ml
Young cats	Convalescence in case of increased stress	2 drops 4 drops		0.2 ml 0.4 ml
Mature cats	Convalescence in case of increased stress	2 - 5 drops		0.2 - 0.5 ml
Rabbits per 250 g BW	Basic provision in case of increased stress	1 drop 2 drops	2 v wook	0.2 ml 0.4 ml
Small rodents e.g. guinea pigs	Basic provision in case of increased stress	1 drop 2 drops	Z X WEEK	0.2 ml 0.4 ml
Chinchillas	Basic provision in case of increased stress	1 drop 1 - 3 drops	2 x week 3 x week	0.2 ml 0.3 - 0.9 ml
Birds per 10 animals < 250 g BW > 250 g BW	Basic provision in case of increased stress	10 drops 30 drops	2 x week	2 ml 6 ml
Pigeons per 10 animals	Basic provision in case of increased stress	20 drops 30 drops	1 x week 2 x week	2 ml 6 ml
Turtles/Tortoises	Basic provision	2 drops		0.2 ml
Reptiles each 250 g BW	Basic provision in case of increased stress	1 drop 2 drops	1 x week	0.1 ml 0.2 ml

**Dosage aid:** 1 teaspoon approx. 4 ml 1 drop = approx. 0.1 ml

## Package size

10 ml bottle

### Nutritional physiological significance of the individual vital nutrients and micronutrients available in the various Mulgat products

With regard to the nutritional physiological role and biological properties of the individual nutrients and micronutrients the following information has been extracted from the technical literature – amongst others from the AWT series "Vitamins and Amino Acids in Animal Nutrition".

**Beta-carotene** is a precursor (pro-vitamin) of vitamin A. By specific means of metabolic transport (cattle: 80 % high-density lipoproteins) beta-carotene is carried into specific organs (e. g. yellow bodies, follicle, udder) where it is converted into vitamin A (enzyme: carotenase). Stimulation of progesterone synthesis, necessary for the formation of the endometrium. Probable influence independent from vitamin A by antioxidative effect on cell-degrading lipid radicals, resulting in increased hormonal activity (FSH, LH) and improved immunity (multiplication of lymphocytes).

**Biotin** (Vitamin H) is also known as the "skin vitamin" and is involved in many metabolic functions. With the additional administration of Biotin a positive effect in the health of hoofs and claws is noted. It improves the intercellular filler (adhesive substance between the individual horn cells) thus achieving a more elastic and resistant junction between the horn cells.

**Carnitine** (L-carnitine) is a substance similar to vitamins that plays a key role in the fat and energy metabolism. It acts as a carrier to transport the active fatty acids from the plasma cells into the mitochondria (the cells' power stations). Without L-carnitine no energy can be generated from fat. Herbal nutrients and feed supplements only contain small amounts of L-carnitine. Key sources for L-carnitine are milk, dairy products and meat. In case of vegetarian feeding the supplementation of L-carnitine is of particular importance. In fattening pigs improvements in the daily weight gain, the feed conversion and in the proportion of meat in the carcasses could be proven. Another requirement for L-carnitine are high performance and competition animals as an improved endurance performance, muscle activity as well as active maintenance of cardiac output were established.

**Choline chloride** (choline): Production of phospholipids (e. g. lecithin) and lipoproteins, transport and metabolism of fats, production of electrical signals in neurons (involved in the production of acetylcholine), in a phospholipid form, choline is a constituent in most cell types, methyl group donor in metabolism (other methyl group donors in metabolism are amongst others methionine and betaine). **Nicotinic acid** (vitamin PP, nicotinamide/niacin) is involved in many metabolic functions. Indispensible for the regular functioning of the skin and the intestinal tract. A deficiency will result in skin and digestive disorders. A lack will also be seen in retarded growth, disorders of feather development and reduced brood capability.

**Pantothenic acid** (calcium D-pantothenate, dexpanthenol) As a constituent of coenzyme A involved in synthesis and degradation processes in the metabolism of proteins, carbohydrates and fats, production of acetylcholine for the function of neurons. Function of skin and mucous membranes. Pigmentation of hair.

Selenium: There is a close relationship in the functions of vitamin E and selenium in protecting the cell membranes from oxidation. While vitamin E acts within the cell membrane, the effect of Selenium is based on peroxide degradation by gluta-thione peroxidase in the soluble constituents of the cell. To achieve a sufficient production of selenium containing glutathione peroxidase, a selenium content of 0.2 - 0.3 mg per kg dry matter in the feed is necessary.

Vitamin A Formation, protection and regeneration of skin and mucous membranes (ephithelial protection). Promotion of fertility by improving ovulation and implantation of the ovum, embryonic and foetal development and hormone activation for pregnancy. Control of growth and differentiation processes of the cellular metabolism by influencing the transcription of more than 300 genes (gene expression). Increased resistance to infectious diseases.

**Vitamin B**<sub>1</sub> (thiamine) as water soluble vitamin has an essential function in the regulation of the metabolism of carbohydrates. It is important for the function of nerve tissue and myocardium. A deficiency results amongst others in growth depression, insufficient energy utilisation and reduced feed consumption.

**Vitamin B**<sub>2</sub> (riboflavin) which is almost always bound to proteins (flavoproteins), is a component of the coenzymes FMN (flavin mononucleotide) and FAD (flavin adenine dinucleotide) and is of importance for the hydrogen transfer within the respiratory chain for generation of energy; oxidation and reduction processes for producing and breaking down fatty acids and amino acids.

**Vitamin**  $B_6$  as a component of the coenzyme pyridoxal 5-phosphate plays a key role in: Transamination, decarboxylation and racemising processes within the metabolism of amino acids. The breaking down of tryptophan and niacin synthesis requires the enzyme kynureninase, which is linked to Vitamin  $B_6$ ; Carbohydrate metabolism by participating in the effect of phosphorylase. **Vitamin**  $B_{12}$  (cyanocobalamin) is indispensible for the blood formation, growth and protein metabolism. A deficiency might result in low meat production, growth disorders, anaemia and low feed conversion.

The effects of a vitamin  $B_{12}$  deficiency are changes in the red blood cell count, disorders of the protein metabolism, nervous diseases, skin diseases, growth disorders and low feed conversion.

**Vitamin C** Elimination of radicals and lipid peroxyl compounds in the cell metabolism in cooperation with other antioxidative vitamins such as vitamin E and betacarotene. Collagen synthesis in bones, cartilage, muscles, skin and eggshell. Regulating calcium metabolism through activating vitamin  $D_3$  metabolites. Function of macrophages, granulocytes and lymphocytes in the immune system. Inhibition of stress reactions caused by reduced hormone production (cortisol). Improvement of fertility-linked properties such as sperm quality, follicle maturation and progesterone synthesis. Improvement of iron absorption; reduction of the toxic effects of heavy metals such as lead, cadmium and nickel.

**Vitamin D**<sub>3</sub> is essential for the regulation of calcium and phosphate metabolism and particulary promotion of calcium and phosphate absorption from the intestine. Regulation of the excretion of calcium and phosphate via the kidneys and the storage of calcium and phosphate in the skeleton. Stimulation of gametogenesis. Increases the performance of the immune system and inhibition of autoimmunisation. Regulation of the transcription.

Vitamin E (tocopherol) plays a decisive biological role for the muscle-metabolism and controls the development and function of the gonads. Because of its antitoxic effect it also acts as protector. Fertility disorders, a tendency for abortion and muscular degeneration (white muscle disease) might be caused through a vitamin E deficiency. Vitamin E in close relationship with selenium plays a key role in udder health as it protects the sensitive cell membranes from oxidation, thus achieving improved resistance to mastitis pathogens. Up-to-date information proved that the formation of a healthy immune system in newborns is controlled by vitamin E to a large extent.

**Vitamin K** Synthesis of blood coagulation factors II (prothrombin), VII, IX and X. Production of the calcium transport protein osteocalcin for bone mineralisation, participation in carboxylation of other proteins.

#### High performance animals require optimized feeding regimes.

We want you to be successful and do our utmost to achieve this target! All constituents contained in the Mulgat products are well known in animal nutrition. They are also used as nutritional supplements in humans. The quality and processing meet the highest purity criteria thus achieving a long shelf-life as well as a trouble-free application of the same.

#### Notes

Shelf-life: Original packagings stored at max. 20 °C 24 months from manufacturing date, resealed package after initial opening minimum 6 months. Please read the label for storage information.

The Mulgat products are provided with convenient dosing devices, such as

- dosing caps to facilitate quick and precise dosage
- disposable syringe to allow for safe and accurate administration
- rubber closure and screwing cap to enable clean handling and safe reclosure for multiple use

In order to achieve a clear separation from our veterinary medicines and care products, all our feed specialities that are subject to the feedstuff law – as the present ones – are exclusively marketed and labelled under our umbrella brand "VeyFo<sup>®</sup>". They are no medicinal products.

The information given in this product brochure corresponds to the state of knowledge on completion. Please read the relevant package leaflet before using the products.



Veyx-Pharma is GMP- and QS-certified.

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