

VITAMINS

ADULT ENERGY	
GB - Pelleted feed for adult horses at work.	
Composition : Barley, Oats, Alfaifa 17, Extruded linseed, Maize without GMO*, Soya bean meal without GMO*, Sepiolite, Lithotamnion, Dicalcium phosphate, Trace elements, Vitamins.	
* Guaranteed 99.1 % - Cereals of french origin	
Nutrient analysis (kg)	Trace elements (kg)
Humidity.....11.5 %	Zinc (chloride tri hydroxide).....90 mg
Crude protein.....12 %	Copper (chloride tri hydroxide).....35 mg
Crude oil and fats.....4 %	Manganese (oxide).....30 mg
Crude fibre.....0.5 %	Iron (sulphate).....35 mg
Ash.....8 %	Iodine (calcium iodate).....0.5 mg
Calcium.....1 %	Selenium (selenomethionin).....0.5 mg
Phosphorus (kg)	Vitamins (kg)
Magnesium.....0.4 %	Vitamin A.....15000 UI
Carbohydrates (kg)	Vitamin D3.....1500 UI
Starch.....345 g	Vitamin E.....400 mg
Starch + sugar.....370 g	Vitamin K3.....3.5 mg
Essential fatty acids (kg)	Vitamin B1 (thiamine).....20 mg
Linolenic acid (omega 3).....10.5 g	Vitamin B2 (riboflavin).....20 mg
Linoleic acid (omega 6).....10.5 g	Vitamin B3 (niacin ou PP).....40 mg
Amino acids (kg)	Vitamin B5 (panthoic acid).....20 mg
Lysine.....5100 mg	Vitamin B6 (pyridoxine).....10 mg
Threonine.....4450 mg	Vitamin B8 (biotine).....0.5 mg
Methionine.....2000 mg	Vitamin B9 (folic acid).....15 mg
Rationing values (kg)	Vitamin B12 (cyanocobalamin).....0.15 mg
DE (Digestible Energy).....12.9 MJ	
MADC.....84.5 g	

The REVERDY range proposes feeds offering an **optimal coverage of requirements** of all these elements, no matter what the age or activity of your horse.

VITAMIN A

PRINCIPAL FUNCTION

Contributes to the **synthesis of proteins** (with zinc) and intervenes in:

- Production of **enzymes, hormones, immunoglobulins**.
- All tissue development, in particular **skeletal**, thus its action on growth in the young.
- **Reproduction**, in both the male and the female.
- **Fight against infection**, by contributing to **healthy epitheliums**.
- **Sight**.

SOURCES

Green forage is an excellent source of β -carotenes, precursors of vitamin A. However **deficiency** in β -carotenes is frequent **at the end of winter** because of:

- Deterioration of hay during storage.
- Exhaustion of the hepatic (liver) reserves.

Carrots are also rich in β -carotenes and can be distributed at the end of the winter without worry of hypervitaminosis.

RECOMMENDATIONS

Reinforced supplementation is indicated if we wish to:

- Improve **stallion** and **broodmare fertility**.
- Obtain optimal growth in **foals and young horses**.

Equally, complementation is recommended at the end of winter for horses not receiving concentrate feeds with correct levels of this vitamin. However, excess vitamin A (over 100 times requirements) is both **inutile** and **dangerous**.

USEFUL TO KNOW

The vitamins incorporated into REVERDY feeds are supplied by the European leader of vitamins manufacturing. They offer superior stability and sanitary guarantees.

VITAMIN D

PRINCIPAL FUNCTIONS

Principally participates in bone **mineralisation**, because of its role in regulating the phosphocalcic balance.

SOURCES

Vitamin D is present in **sun dried hay**. Furthermore it can be **synthesised by the skin** when exposed to the ultra-violet rays of sunlight. In absence of excellent hay, and exposure to direct sunlight on the horse, including vitamin D in the ration is essential.

RECOMMENDATIONS

Vitamin D must be supplied moderately and conjointly with sufficient and balanced quantities of calcium and phosphorus.

For **horses in training, supply must be reinforced** because:

- They are **confined** to stables for long periods of the day.
- **Their skeletal structures** are confronted to daily stress.

Overdosing with vitamin D (regular doses of 10 to 100 times the daily requirements) is particularly **harmful**.

VITAMIN E

PRINCIPAL FUNCTIONS

The **major biological antioxidant** and as such it:

- Ensures **the protection of cell membranes** rich in polyunsaturated fatty acids. In this way, along with selenium, which could play the first role, vitamin E contributes to maintain **muscle integrity**.
- Prevents lipid reserves from oxidising.
- Intervenes in **reproduction**.
 - By protecting vitamin A and essential fatty acids.
 - Hoffman and al.(1999) reported an increase blood antibody concentration (IgG) in broodmares who had received supplementation with high doses of vitamin E. After birth, the foals born from these mares also had superior blood antibody levels (IgG).

SOURCES

Vitamin E is found in **young grass** and **fresh vegetable oils**.

RECOMMENDATIONS

Vitamin E requirements increase when the ration is enriched with unsaturated fatty acids (oils) and when work increases.

Vitamin E requirements are **reduced by the presence of selenium**.

VITAMIN K

PRINCIPAL FUNCTIONS

Vitamin K plays a role in:

- **Blood coagulation.**
- Bone calcification (on a more secondary basis).

SOURCES

Abundant **digestive synthesis** by the gut micro-organisms allows sufficient supply, this is coupled with relatively high levels found in **forage**.

RECOMMENDATIONS

Under normal conditions, **deficiency is not a problem**. However intensive work may weaken the gut micro-organisms and disrupt the digestive synthesis of vitamin K.

A complementation of **2-3 mg / 100 kg live weight** per day is recommended in horses undertaking heavy intensive work.

Abusive supplementation with vitamin K in the hope of preventing exercise induced pulmonary haemorrhages reveals being **ineffective** and **very dangerous** because it can expose the horse to serious kidney damage (acute nephritis).

THE B GROUP VITAMINS

PRINCIPAL FUNCTIONS

● Vitamin B1 (thiamine)

Essential for the metabolism of carbohydrates and important for:

- Sprints: it intervenes in the combustion of carbohydrates in the muscles.
- Healthy functioning of the nervous system and nerve cell communication.

● Vitamin B2 (riboflavin)

Activates the catabolism (transformation) of lactic acid (as does zinc) and takes part in the metabolism of carbohydrates and lipids.

● Vitamin B3 (PP or niacin)

Intervenes in energy metabolism.

● Vitamin B5 (pantothenic acid)

Participates in the renewal of epitheliums and integuments. It favours wound healing and hair growth.

● Vitamin B6 (pyridoxine)

Intervenes in the metabolism of amino-acids and proteins, and notably, has an anti-anaemic role.

● Vitamin B8 (H or biotin)

- At doses of 10 to 30 mg a day over a period of 6 to 10 months it improves the growth rate and strength of the hoof wall.
- At lower doses intervenes in the metabolism of carbohydrates.

● Vitamin B9 (folic acid or Anti-anaemic)

Favours regeneration and maturing of red blood cells.

● Vitamin B12 (cyanocobalamin)

Participates in the formation of red blood cells, and so, just like vitamins B6 and B9 helps protect against anaemia. Overdosing is inutile.

SOURCES

The B group vitamins are present in **green forage, cereals**, and **probiotics**, they are also synthesised by the **gut micro-organisms**.

RECOMMENDATIONS

For adult horses consuming plenty of good quality forage, there is generally **a sufficient supply provided by the micro-organisms in the caecum and the colon**. However, taking into consideration the many roles played by the B group vitamins in muscular effort, the **requirements of horses in heavy training/work may be increased**, even more so as the gut micro-organisms are weakened by the intensity of the work. Providing **too much vitamin B is not a worry**, the limit being more an economic one.

VITAMIN C

PRINCIPAL FUNCTIONS

Vitamin C is a water soluble vitamin which participates in hundreds of processes in the body. Among its' principal functions, it notably intervenes in:

- **Collagen** synthesis.
- Formation of **red blood cells**.
- Maintaining **immunity**.
- The healing of **wounds**.

Vitamin C **also increases iron uptake** from dietary sources. Finally, as a **major antioxidant**, it plays a very important role in the fight against free radicals by **participating in the recycling of vitamin E**.

SOURCES

Vitamin C is **naturally synthesised by the liver of the horse**.

RECOMMENDATIONS

Unlike man, the horse is able, to synthesise his own vitamin C and cover his maintenance requirements. However, considering the multiple implications of vitamin C in the metabolism, **supplementing horses in intense work and training is recommended**, even more so as the requirements related to effort can be accumulated and the flora weakened by work intensity.

PROTECTED VITAMIN C

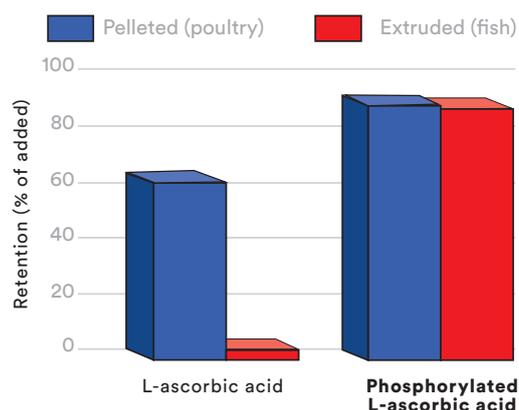
The simplest and most common type of vitamin C used is L-ascorbic acid. Unfortunately, this molecule is very fragile and degraded considerably during feed manufacturing and storage processes.

For this reason, **we have selected a protected, thus very stable form of vitamin C: Phosphorylated L-ascorbic acid**.

The active part of this molecule is stabilised (esterified with a phosphate group) and is only reactivated after the vitamin C is absorbed and metabolised within the organism.

The best fulfilment of daily requirements for horses in intensive work is ensured by using this form of protected vitamin C associated with the incorporation of optimum levels into our feeds (500 to 1,000 mg / kg).

STABILITY OF STANDARD VITAMIN C (L-ascorbic acid) AND PROTECTED (phosphorylated L-ascorbic acid) DEPENDING ON FEED MANUFACTURING PROCESSES (source. DSM Nutritional products)



RECOMMENDED DAILY VITAMIN REQUIREMENTS
(sources DSM and BASF)

IN MG/100KG LW/DAY EXCEPT FOR VITAMINS A AND D	GROWING YOUNGSTERS	LEISURE HORSES	RACEHORSES AND BREEDING STOCK
Vitamin A (in IU/100 kg LW/day)	10,000 - 12,000	6,000 - 8,000	12,000 - 15,000
Vitamin D (in IU/100 kg LW/day)	1,800 - 2,200	600 - 800	1,200 - 1,500
Vitamin E	100 - 200	90 - 180	200 - 400
Vitamin K	3 - 4	1 - 2	3 - 4
Vitamin B1 (Thiamine)	8 - 10	7 - 10	12 - 20
Vitamin B2 (Riboflavin)	8 - 12	6 - 8	12 - 16
Vitamin B3 (Niacin)	10 - 20	10 - 15	20 - 35
Vitamin B5 (Pantothenic acid)	8 - 12	8 - 12	9 - 15
Vitamin B6 (Pyridoxine)	6 - 8	4 - 7	7 - 10
Vitamin B8 (Biotin)	0.2 - 0.3	0.2*	0.2 - 0.3*
Vitamin B9 (Folic acid)	6 - 8	4 - 7	8 - 12
Vitamin B12 (Cyanocobalamin)	0.06 - 0.12	0.06 - 0.12	0.1 - 0.15
Vitamin C (L-ascorbic acid)	200 - 300	-	200 - 400

*To improve the quality of the hoof wall, 15-20 mg/d for at least 6 months.

