



Natural vitamin E (d- α -tocopherol)

What is vitamin E, what is the role of vitamin E and how much vitamin E does a horse need?

Vitamin E is **an essential nutrient that acts as an antioxidant**. Vitamin E reacts with free radicals that are produced during oxygen metabolism. During this process, vitamin E donates a hydrogen atom to the free radical to prevent harmful oxidative processes from happening. Vitamin E **must be obtained from the horses' diet**, sources of vitamin E include fresh forage, oils and seeds.

The NRC determined that the **required amount of dietary vitamin E is 1 IU per kilogram bodyweight** for adult horses at maintenance. Exercise level, health status, lactation and age influence the required amount of vitamin E in an individual horse.



How much vitamin E is your horse getting?

Fresh grass contains 35-155 IU vitamin E per kg dry matter, adult horses with unlimited access to fresh grass can consume up to 10 kg of dry matter per day ¹.

Horses with unlimited access to fresh grass obtain 350-1550 IU of vitamin E per day, which is most often enough to meet the dietary needs for healthy adult horses at maintenance. The amount of vitamin E in grass is negatively affected by maturation and by overgrazing. The vitamin E content is also affected by seasonal fluctuations and by weather conditions. Harvesting, drying and storing also significantly reduce the vitamin E content of grass. Hay only contains 30 IU vitamin E per kg dry matter ¹. Supplementation of vitamin E is necessary when the nutritional needs of the horse are not met.

Grovet vitamin E softgels

The source of Grovet's vitamin E softgels is soybean and sunflower. Each softgel **contains 400 mg of d-alpha tocopherol** (this is equivalent to 600 IU of d-alpha tocopherol).

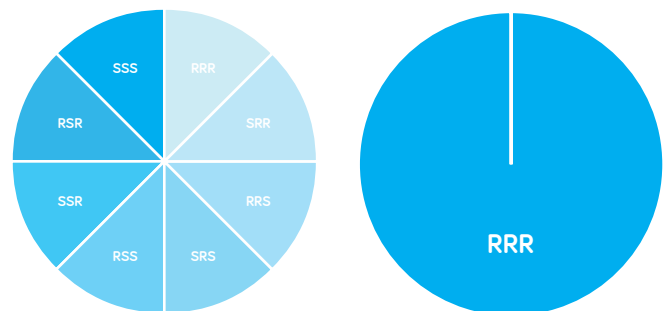
Why softgels?

1) Stability – Vitamin E, occurring naturally in the form of d-a-tocopherol, oxidizes slowly when exposed to air ². In a softgel vitamin E stays stable for 3 years ³.

2) Single dose presentation – Allows for exact dosing.

Why natural vitamin E?

For most vitamins, there is little difference between the natural and synthetic forms of the vitamins. With vitamin E however, it is important to choose a natural form. This form can be recognized on the label of supplements, it is listed as d-alpha-tocopherol. Synthetic forms of vitamin E are labeled with the prefix dl- or rac.



Natural vitamin E exists in several variations: alpha, beta, gamma and delta tocopherol. Synthetic alpha-tocopherol consists of 8 isomers as shown in the diagram, of which only one is identical to the natural form (RRR-a-tocopherol) ⁴. The other isomers range in potency from 21 percent to 90 percent of natural alpha-tocopherol.

The dosage of dl-/rac-tocopherol is not simply a matter of administering 8 times the dosage of alpha-d-tocopherol as the unnatural variants block the uptake of alpha-d-tocopherol and show differences in potency.

RRR-alpha-tocopherol binds to a specific tocopherol transport protein, after binding it is transported out of the liver into the bloodstream. Research has shown that natural vitamin E supplements provide a greater increase in alpha-tocopherol plasma levels in horses ⁵.

How much vitamin E is enough?

The recommended daily requirement is sufficient for healthy, adult horses that are free to roam and are not trained frequently. If a 600 kg horse is fed a daily amount of 1 IU per kg of body weight every day, the jar containing 210 softgels will last 7 months.

However, most horses are not kept in this way and are regularly exposed to stressors. Training, competition, travel and other stressors



lead to the formation of free radicals. These are volatile, destructive molecules that can potentially damage the horses' tissue, prolonged exposure can lead to a wide variety of health issues. Most often, these health problems are not caused by a vitamin E deficiency itself. However through its antioxidative activities, vitamin E supplementation will offer a level of protection against the damage caused by free radicals.

Most horses can benefit from higher levels of vitamin E in their diet than the recommended daily requirement. Young horses, horses in training, pregnant and lactating mares have increased vitamin E requirements. Therefore, we recommend supplementing these horses with the following dosages per day:

Recommended dosage per day

- Adults at maintenance: 1 softgel (600 IU) ¹
- Yearlings to two years of age: 1-2 softgels (600-1200 IU)
- Sporhorses: 2-5 softgels (1200-3000 IU), depending on level of activity ¹
- Gestation: 2 softgels (1200 IU) ¹
- Lactation: 2-3 softgels (1200-1800 IU) ¹
- Stallions: 2 softgels (1200 IU)
- More daily vitamin E is needed for certain health problems:
- RER and PSSM: 2-5 softgels (1200-3000 IU) ⁶
- EMND, EDM and EPM: 8-16 softgels (4800-9600 IU) ⁷
- Or at the discretion of the attending veterinarian.**

Choosing a supplement

Grovet sells **softgels containing vitamin E** and a **softgel containing vitamin E and selenium**. The latter, in addition to 300 IU of vitamin E, also contains 0.5 mg of selenium per softgel.

Vitamin E and selenium are often combined as these two nutrients both have antioxidative actions. However, selenium has a narrow range of safety and the diet may already contain sufficient selenium. It is advised to evaluate the horses' plasma concentrations and the ration to determine which nutrients need to be supplemented. If the horse only requires additional vitamin E, choose a supplement without selenium.

Below are some examples for **supplementation for a 600 kg horse in different conditions** (Maintenance and Athlete).

Supplementation for a 600 kg horse				
M (Maintenance) - A (Athlete)				
	Diet low in vit. E + selenium		Diet low in vit. E	
	M	A	M	A
Vitamin E softgel	0	2 - 7	1	3 - 8
Vitamin E + selenium softgel	2	2	0	0

Product information

- Brand: Grovet
- Target species: Equine
- Feeding instructions: By hand or mixed with feed.
- Storage conditions: Store dry and at roomtemperature (15° - 25°C). Keep out of reach of children.
- Package: Natural vitamin E: jar containing ca. 210 softgels (160 g)
Natural vitamin E + selenium: jar containing ca. 150 softgels (158 g)
- Article code: Natural vitamin E: 281537
Natural vitamine E + selenium: 281537150

References

- ¹ van Duinkerken, G., and J. W. Spek. Tabellenboek Veevoeding 2016: voedernormen paarden en pony's en voederwaarden voedermiddelen voor paarden en pony's. No. 55. Federatie Nederlandse Diervoederketen, 2016.
- ² Yang, Ying, and David Julian McClements. "Vitamin E bioaccessibility: Influence of carrier oil type on digestion and release of emulsified -tocopherol acetate." Food Chemistry 1411 (2013): 473-481.
- ³ Tocopheryl acetate is the ester of tocopherol. On a molecular level it is a tocopherol molecule with an acetate group added. It is more stable than tocopherol, typically giving products a longer shelf-life. In order for the body to absorb and use vitamin E, it must somehow remove the acetate group. Thus, many claim that tocopherol is more bioavailable to skin and for internal use because it can be absorbed without additional metabolism.
- ⁴ Brigelius-Flohé, Regina, and Maret G. Traber. "Vitamin E: function and metabolism." The FASEB journal 13.10 (1999): 1145-1155.
- ⁵ Fagan, Madison M., et al. "Form of Vitamin E Supplementation Affects Oxidative and Inflammatory Response in Exercising Horses." Journal of equine veterinary science 91 (2020): 103103.
- ⁶ Geor, Raymond J., Patricia Harris, and Manfred Coenen. Equine applied and clinical nutrition: health, welfare and performance. Elsevier Health Sciences, 2013.
- ⁷ Finno, C. J., and S. J. Valberg. "A comparative review of vitamin E and associated equine disorders." Journal of veterinary internal medicine 26.6 (2012): 1251-1266.