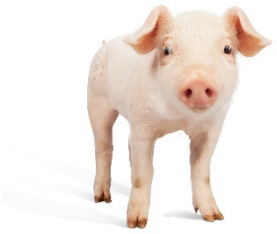
Yet again the international market faces shortage of vitamin E causing severe price fluctuations.

The situation forces the feed producers and integrators to look for alternatives.

Cabanin® CSD replaces vitamin E



By: Annette L. Voergaard and Karsten C. Kjeldsen, Product development in R2 Agro. March 2020

Research with weaned pigs has shown that natural polyphenols product can substitute up to 44 % of vitamin E in feed beneficially, and work as performance enhancer when applied on top of high vitamin E application. In addition to that, later research with broilers has shown that natural polyphenols product can substitute up to 80% of vitamin E in feed beneficially.

Aim at a high content of polyphenols

Some fruits, berries and herbs have a high content of polyphenols that possess interesting properties in feed for animals. The selected polyphenols have the potential to partially replace vitamin E in animal feed. Animals are often fed vitamin E far beyond the minimum standard to ensure a sufficient level of antioxidants to counteract oxidative stress.

It is therefore possible to replace that part of the vitamin E content in the feed above the minimum standard and even improve the results.

Replace vitamin E with Cabanin® CSD

Trials with pigs and broilers prove that 50 to 100 % of vitamin E content above 15 ppm can be replaced in complete feed.

Extend your vitamin E stock

Our general recommendation to new users of Cabanin® CSD, is to start up with 50 % replacement above minimum standard of vitamin E (15 ppm for piglets).

When you have made your own experience for a period of time, you may increase the replacement to 100 % of vitamin E above minimum standard.
By this ratio you can extend your stock of vitamin E in order to resist vitamin E shortage and increasing prices *(figure 1)*.

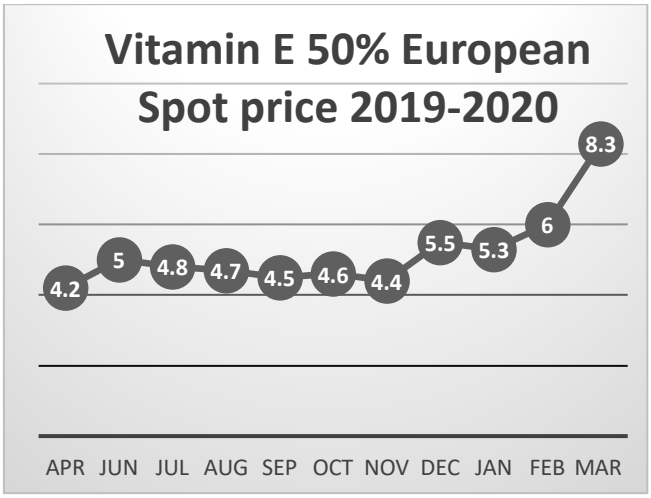


Figure 1: Vitamin E 50 % European spot price 2019-2020 (EUR).

Remarkable piglet trial results

A trial conducted at "Freie Universität Berlin", Germany, in 2017 confirms that Cabanin® CSD can replace 50% of the vitamin E above the 15 ppm NRC standard requirements in feed for piglets beneficially. Further, Cabanin® CSD can improve production results when used with 1000 ppm as performance enhancer.

Enhance the growth performance

The purpose of the trial was to investigate the effects of Cabanin® CSD as partly vitamin E replacement and used in higher dosage as performance enhancer.

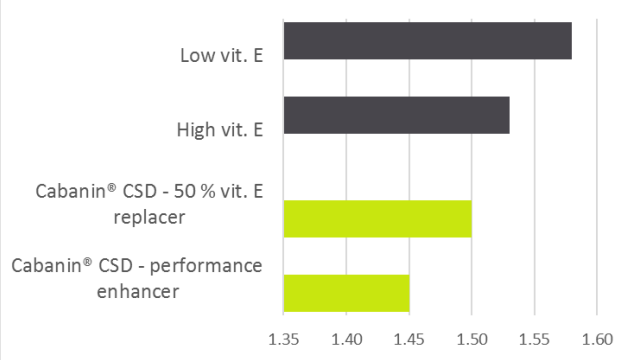


Figure 2. Feed conversion ratio (kg/kg) in piglet trial 2017.

University trial setup

A total of 84, 25-days old piglets were divided into 4 groups, consisting of 7 replicates of 3 piglets each. The trial was conducted during a period of six weeks from weaning.

Table 1 shows how the groups were fed with a basal weaning and starter diet with 50 % of vitamin E replaced by Cabanin CSD or with a performance enhancing level of Cabanin CSD.

Figure 2 shows the feed conversion ratio (kg/kg) achieved in the piglet trial.

Table 1. Effect of Cabanin® CSD as antioxidant and performance enhancer in feed for pigs, day 0-42 after weaning.

		Low Vit. E	High Vit. E	Cabanin® CSD 50 % replacer	Cabanin® CSD Performance enhancer
Vitamin E, 100%	mg/kg	15	130	73 (15 + 58)	130
Cabanin CSD	mg/kg	0	0	115	1000
Start body weight	kg	6.43	6.44	6.41	6.43
Final body weight	kg	25.64[a]	26.03a	26.47ab	27.09b
Weight gain	g/day	**457**[a]	**466**[ab]	**478**[bc]	**492**[c]
Index		100	102.0	104.6	107.7
Feed intake	g/day	723	716	715	713
Feed conversion[1)]	kg/kg	**1.58**[a]	**1.53**[b]	**1.50**[c]	**1.45**[d]
Index		100	**97.0**	**94.8**	91.8

[1)] Kg feed per kg body weight gain;

[ab] Means with different superscripts within the row differ significantly (P<0.05

Additional effect: Less oxidative stress

Cabanin® CSD also improves the antioxidant status in the body compared to standard dosage of vitamin E. It was tested by taking venous blood samples from piglets (table 2) for testing stress relevant parameters. Reactive oxygen species (ROS) are present in all respiratory organisms, including in animals, and have important physiological functions, but are also involved as oxidative stress in various diseases. The balanced antioxidative status can be influenced negatively but also positively by influencing factors in the feed.

Table 2. Stress relevant parameters measured in blood serum in piglets at day 35 of age

Parameters	Low Vit. E	High Vit. E	Cabanin® CSD 50 % replacer	Cabanin® CSD Performance enhancer
SOD, U/ml High = Better protection capacity	145.9[a]	157.1[ab]	165.4[b]	182.1[c]
MDA, nmol/l Low = Less stress	2.94[a]	2.60[bc]	2.20[b]	1.62[C]

MDA = Malondialdehyde, SOD = Superoxide-dismutase

The results for the two markers malondialdehyde (MDA) and superoxide dismutase (SOD) give a clear indication of the positive effect of Cabanin® CSD. MDA is one of the most prevalent byproducts of lipid peroxidation during oxidative stress, where lower values mean less stress and less fat oxidation.

Superoxide is a very reactive form of oxygen and can damage proteins and the genome. The SOD is a proprietary protective enzyme to neutralize superoxide. A higher unit value (U / ml) means a potentially greater protective capacity.

Cost saving vitamin E antioxidant replacement

About Cabanin® CSD

Cabanin® CSD has a high content of polyphenols in the form of selected elements from grapes, blackcurrants, citrus fruits and sweet chestnut with particularly strong antioxidant effect. These polyphenols can be even more effective antioxidants than vitamin C and E. In addition to the antioxidant properties, the polyphenols in Cabanin® CSD have also good anti-microbial and anti-inflammatory properties.

Our general recommendation is a replacement with 2 kg Cabanin CSD per kg of pure vitamin E (including a significant safety margin). **This means that 1 kg of Cabanin CSD can replace 1 kg of vitamin E 50% adsorbate.**

As proofed, it is not only of performance reasons beneficial to replace the vitamin E antioxidant part of vitamin E in animals' feeds with Cabanin® CSD.

With today's vitamin E price level, the typical obtainable cost-savings will be minimum 30 %, based on calculation of the prices to feed manufacturers of *vitamin E 50% adsorbate* and Cabanin® CSD, respectively, as of March 2020.