Improve performance with oregano oil in early weaned pig feed

Healthy animals, with good feed intake and high daily gains, are essential for efficient pig production. Compared to other species, pigs and especially piglets are highly sensitive to feed smell and taste, which may affect feed intake.

In addition, pathogens and toxins can affect the animal immune system by colonising the gastrointestinal tract and have a negative impact on performance and health status.

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Feed additives have been used for years to support performance and animal health. The positive effects of essential oils are well-known from human medicine and can also contribute to increase performance and health in livestock.

Essential oregano oil is characterised by its antimicrobial and antioxidant properties, also having a good disinfecting effect.

The main effect is attributed to the phenols thymol and carvacrol. However, the effectiveness depends on the chemical composition of the oregano oil.

This is influenced by the origin, plant species, growth stage and processing method. Important here is a consistent quality of the essential oil in order to achieve a constant effect at the recommended dosages.

Origin of oregano oil

DOSTO Concentrate 500, the product used in the feeding test, contains 50% oregano oil from a specific subspecies of Origanum vulgare var. hirtum.

After harvesting, the essential oregano oil is extracted from the plant by gentle steam distillation. The content of phytochemicals in the essential oil is determined after each production in order to ensure a consistent standardised composition. Oregano oil can be used in all livestock species both conventional and organic production systems.

Parameter	Control group	DOSTO Concentrate 500
Number of animals	100 (50 male; 50 female)	100 (50 male; 50 female)
Repetitions	10	10
DOSTO Concentrate 500 in Diet I (day 25-38, mg/kg)	0	150
DOSTO Concentrate 500 in Diet II (days 39-66, mg/kg)	0	75

Table 1. Experimental setup.

Experimental setup

In collaboration with the Institute of Animal Nutrition at the Free University Berlin, Germany, the potential of DOSTO Concentrate 500 (50% oregano oil) to improve performance and apparent digestibility of nutrients was tested.

For the experiment, 200 mixed-sex, healthy, early weaned piglets (Danbred x Piètrain) were selected and divided into an experimental group and control group.

Thus every group consisted of 10 replicates of 10 animals each. The feeding trial took place from the 25th-66th day of life. The experimental group received 150mg/kg DOSTO Concentrate 500 from day 25-38 and 75mg/kg DOSTO Concentrate 500 on days 39-66 of age.

To the feed of the control group a carrier material was added in the same amount. The zootechnical performance parameters were determined weekly by monitoring the live weight, feed intake and feed conversion rate. The health status of the animals was recorded daily and, if necessary, veterinary treatments were applied and documented.

Faecal consistency was assessed daily using a 5-step scoring scheme. Apparent ileal digestibility of selected nutrients was determined using titanium dioxide – a non-absorbable marker – from samples collected on the 42nd experimental day. The test data was evaluated with SPSS computer software for statistical data analysis.

Zootechnical performance

Both groups started with a uniform body weight of 6.32kg. In the first feeding phase (from the 25th to the 38th day of life), a significantly better weight gain of 0.58kg was observed in the group fed with DOSTO Concentrate 500, resulting in a significantly better feed conversion by 0.129 in the same period when compared to the control group (Table 2).

Table 2. Live weight gain (kg), feed intake (kg) and feed conversion ratio in Diet I (day 25-38). Means with different superscripts in one row (^{a,b}) are significantly different at $p<0.05$.

Parameter	Control group	DOSTO Concentrate 500	p-value
Live weight gain (kg)	1.77 ± 0.38^{a}	2.35 ± 0.34^{b}	0.002
Feed intake (kg)	2.28 ± 0.41^{a}	2.75 ± 0.40^{b}	0.017
Feed conversion ratio	1.299 ± 0.076^{a}	1.176 ± 0.126^{b}	0.017

In the next feeding phase from day 39-66, a higher weight gain (+0.33kg) with lower feed intake (-0.03kg) was found in animals fed with DOSTO Concentrate 500, resulting in an improvement of the feed conversion (1.485 vs. 1.520) compared to animals without additional DOSTO Concentrate 500 in the Diet II (Table 3). Furthermore, a statistically significant difference could not be determined.

Over the entire feeding period was a statistically significant increase in weight gain (+0.91kg) of the animals fed with DOSTO Concentrate 500 and also a significantly improved feed conversion (1.444 vs. 1.496) compared to the control group which did not receive any oregano oil supplement (Table 4).

The significantly better results in the first feeding phase were achieved with a supplementation of 150mg DOSTO Concentrate 500 per kg feed.

In the second feeding phase, with an addition of DOSTO Concentrate 500 of 75mg per kg feed, the results were not significantly better.

Whether the improvement of the performance parameters was dose-response has not been conclusively clarified. Further studies are needed to confirm or deny it.

Stool consistency

Even though the faeces consistency was, in general, good due to the good health status of the trial animals, the supplement of DOSTO Concentrate 500 was able to achieve a further improvement (3.89 ± 0.02 vs. 3.79 ± 0.09). Based on the total

Continued on page 10

Parameter	Control group	DOSTO Concentrate 500	p-value
Live weight gain (kg)	15.20±0.85	15.53±0.56	0.323
Feed intake (kg)	23.07±1.12	23.04±0.59	0.929
Feed conversion ratio	1.520±0.064	1.485±0.042	0.165

Table 3. Live weight gain (kg), feed intake (kg) and feed conversion ratio in Diet II (day 39 to 66). Means with different superscripts in one row ([a,b]) are significantly different at p<0.05.

Parameter	Control group	DOSTO Concentrate 500	p-value
Live weight gain (kg)	16.97±0.98[a]	17.88±0.71[b]	0.028
Feed intake (kg)	25.35±1.32	25.79±0.69	0.364
Feed conversion ratio	1.496±0.056[a]	1.444±0.049[b]	0.041

Table 4. Live weight gain (kg), feed intake (kg) and feed conversion in Diets I + II (days 25 to 66. Means with different superscripts in one row ([a,b]) are significantly different at p<0.05.

Continued from page 9
trial, a significantly better faeces consistency could be proven. Health-related effects, however, could not be distinguished.

Ileal digestibility

The apparent ileal digestibility of selected nutrients (crude protein, amino acids, crude fat, crude fibre, crude ash, calcium and phosphorus) was determined at the end of the test period using titanium (IV) dioxide as a marker.

For all identified nutrients, numerical improvements could be proved in the animals fed with DOSTO Concentrate 500.

The apparent ileal digestibility of crude protein showed a relative significant improvement of 13.5% and the apparent ileal digestibility of total amino acids a significant relative improvement of 10.3% (Table 5).

Conclusion

In both feed phases, the significant or numerical positive effect of DOSTO Concentrate 500 on feed intake were reflected in an improved apparent ileal digestibility at the end of the feeding period. The results confirm the positive effects of phytogenic feed additives on gastrointestinal motility and enzyme activity.

The positive effect of DOSTO Concentrate 500 on the performance was statistically proved, despite optimal housing conditions. This suggests a complex mode of action in addition to the assumed positive effects on gastric and intestinal motility and enzyme activity.

The results also indicate better protein digestibility, which is likely to have a positive impact on meat yield when fed over a longer period.

In summary, the present efficiency study confirms that DOSTO Concentrate 500 has a significant positive impact on the zootechnical performance and the apparent ileal digestibility of crude protein and amino acids in breeding piglets in the age range 25-66 days of life. ■

References are available from the author on request

Table 5. Determination of apparent ileal digestibility at the end of feeding period (66th day of life). Means with different superscripts in one row ([a,b]) are significantly different at p<0.05.

Parameter	Control group	DOSTO Concentrate 500	p-value
Crude protein	64.48±5.88[a]	73.16±3.83[b]	0.02
Total amino acids	71.49±3.23[a]	78.86±3.01[b]	<0.001