

# Influence of phytogenic feed additives

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In accordance to feed regulation ECC 1831/2003, flavours are considered sensory additives. Therefore, phytogenic feed additives, based on herbs and spices, are flavours.

The role of phytogenic feed additives is to modify the smell and taste of the feedstuff in order to increase feed intake. The feed intake is not only dependent upon the sensory quality of the feedstuff, but is also influenced by gastrointestinal and metabolic signals.

The positive influence of flavour on the sensory receptors is well known. The question is, can phytogenic feed additives influence the gastrointestinal and metabolic signals? To clarify the interaction between gastrointestinal signals, metabolic signals and phytogenic feed additives on the organism, the following trials were conducted:

- A trial conducted at a research farm in Australia (Bunge Meat Ltd) with piglets between 8-12kg live weight.
- An institute trial with fattening pigs between 50-105kg live weight.

The goal of the first trial was to verify the influence of a phytogenic feed additive, in this case digestarom 1322, Piglet Premium, on metabolic transfer of two different rations.

Groups A and C were the control groups. Groups B and D were the trial groups. The feed composition of Group A and B was identical with feed supplementation in Group B. The feed composition for Group

	ME/KG	Protein	Fat	Lysine	Methionine	MEQ/KG
Diet A + B	15.06	23.10	6.66	1.52	0.46	606.51
Diet C + D	14.26	20.65	3.80	1.30	0.39	653.77

**Table 1. Analysis of the diet.**

	ME/KG (%)	Protein (g/kg)	Fat (g/kg)	Lysine (g/kg)	Methionine+ cystine
Diet A + B	13.5	16.7	24.5	7.17	5.06

**Table 2. Analysis of the diet in reference to dry matter.**

C and D was different with feed supplementation in Group D. The phytogenic feed supplement was used in this trial at a dosage of 300ppm.

The difference between the Groups A and B and Groups C and D was, in addition to the reduction of the nutrient parameters, the ration in Groups C and D was modified using low digestible instead of high digestible components, such as soya, fishmeal, and bloodmeal were respectively reduced and replaced by lupine and raps.

live mass. The effect is more visible when the relation between the feedstuff used increases and the quantity of protein per kg growth is calculated in relative figures (Control Group A = 100%).

The differences between the groups clarifies the influence of the phytogenic feed additive on metabolic transfer in reference to feed intake and optimisation of protein digestion.

In comparing Group A to Group C, a very clear effect of the feed composition on growth and feed intake was observed. The lower growth resulted essentially from less feed intake. Feed intake itself became regulated, amongst other things, by the gastrointestinal and metabolic signals, depending on the quantity of digestive enzymes available.

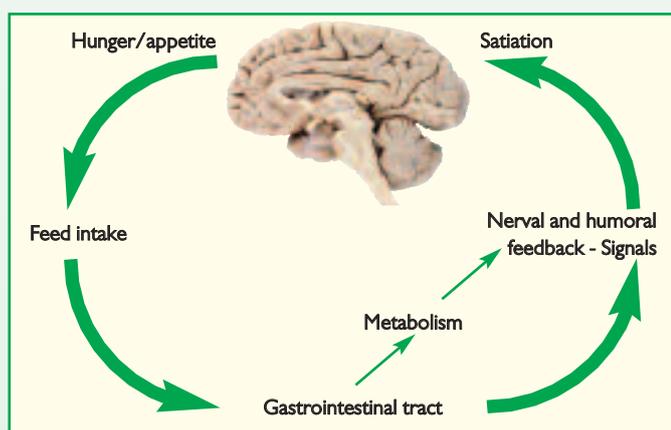
Group D had, in comparison to Group C, a higher feed intake and better development

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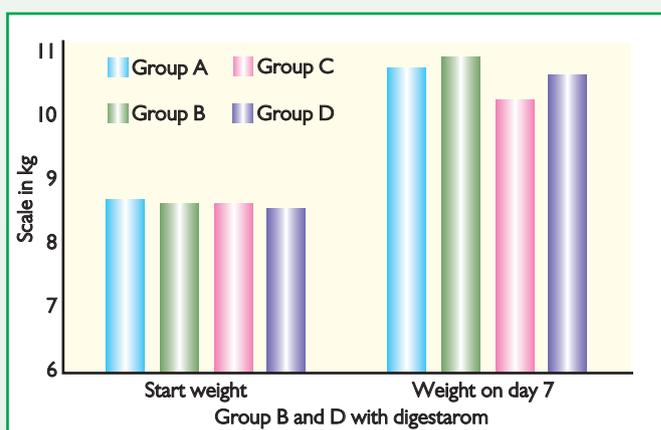
## Results

In order to clarify the effects, the time between the 26th and the 33rd day of life was used because during this time, the body's own enzyme production is not fully developed. Fig. 2 shows the development of

**Fig. 1. Feed intake is influenced by gastrointestinal and metabolic signals.**



**Fig. 2. Influence of digestarom on the body's own enzyme production. Development of liveweight.**



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of live mass. This indicates that restricting factors such as taste and digestibility, which are responsible in Group C for lower feed intake, were eliminated by the use of phyto-genic digestibility enhancers.

Most interesting is the reference to the metabolic transfer of protein. The groups provided with the phyto-genic feed additive had a clear tendency for better use of the protein intake from the feed. The higher growth in Group B and D due to the low amount of protein utilisation indicate an increase of enzymatic activity.

The research was carried forward with a second trial on fattening pigs between 50kg and 105kg liveweight. During this stage of animal growth, the body's own enzyme production has reached maturity. Therefore, changes in nutrient transfer for similar diets can directly be attributed to the feed additive used.

A trial was conducted at the University of Kazan (Russia) with 40 animals per group. The differences in the diets were only distinguished by the feed additives used (digestarom 1307, fattening with an inclusion rate of 150ppm).

Besides the zootechnical parameters, the blood serological data was collected. The results in reference to growth were statistically significant.

The control group had daily weight gain of 592g. The trial group had daily weight gain of 632g. The difference in daily weight gain between the groups was +6.7% (p<0.05) for the trial group. The feed intake in both groups were on the same level which indicates better feed conversion rate for the trial group. In similarity to the first trial with piglets, a lower quantity of protein per kg growth was required.

Fig. 4 shows results in percentage in reference to the negative control.

The zootechnical data indicated that the animals in the trial group had more of their own enzyme available and, therefore, better nutrient transfer.

In Table 3 the results of the blood serological data clarifies the zootechnical data.

The low amount of albumin and urea indi-

Name	Control	Trial
Total protein (g/l)	66,40 ± 1.21	72,00 ± 1.21
Albumin (g/l)	38,00 ± 0.95	37,20 ± 1.56
BUN (mmol/l)	8,43 ± 0.38	7,55 ± 0.51
Triglyceride (g/l)	0,70 ± 0.09	0,66 ± 0.03
Cholesterol (mmol/l)	2,41 ± 0.07	2,59 ± 0.11
Glucose (mmol/l)	4,13 ± 0.23	4,53 ± 0.21
Amylase (E/l)	1591,20 ± 9.93	1803,60 ± 118.64
AST (E/l)	42,60 ± 2.09	53,60 ± 4.68
ALT (E/l)	50,80 ± 1.32	51,40 ± 3.66
LDG (E/l)	532,80 ± 7.84	539,20 ± 41.17
Alkaline phosphatase (E/l)	94,60 ± 1.50	115,00 ± 6.30
Total calcium (mmol/l)	2,45 ± 0.02	2,52 ± 0.05
Total phosphorus (mmol/l)	2,45 ± 0.06	2,99 ± 0.14

**Table 3. Results of biochemical research on the blood serum of animals during the trial (n=5).**

cates optimisation of protein synthesis in the trial group, while the control group has a lower nitrogen utilisation. The data for triglycerides and cholesterol indicate optimisation of fat metabolism.

The cholesterol level, which directly refers

to the amount of fat metabolism was 7.4% higher in the trial groups than in the control group.

As an indicator of energy metabolism, the contents of glucose was evaluated. The amount of glucose in the trial group was 9.6% higher than in the control group.

Remarkably, the increase in amylase in the trial group was 13.35%. This corresponded to the level of glucose.

In this respect, the fermente aspartataminotransferase (AST), alaninaminotransferase (ALT) and lactatdehydrogenase (LDG) should be evaluated because they are responsible for the transfer of the amino groups between the amino acids and keto acids.

## Summary

The use of the phyto-genic feed additive, digestarom has a clear influence on feed intake, especially in reference to metabolic energy and protein digestion.

By the use of less digestible components in the ration, more time is required for the chymous to remain in the gastrointestinal tract. This had a negative influence on the feed intake in the control group.

By the use of the phyto-genic feed additives the negative aspects of the diet in the first trial was nearly alleviated.

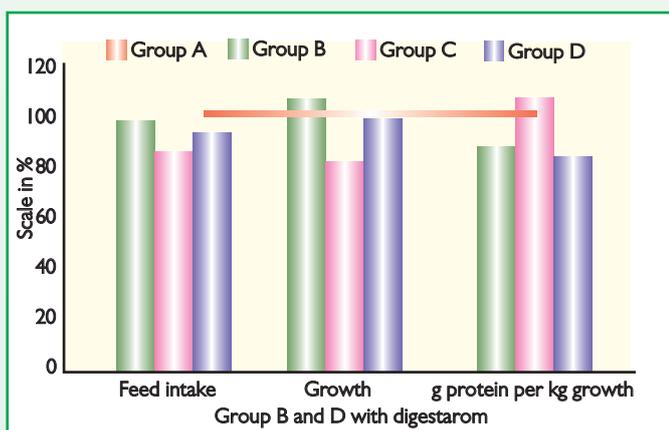
The second trial indicates that the use of digestarom increased the amount of the body's own enzymes and, therefore, the feedstuff was better metabolised.

The second experiment indicates as well that the use of the phyto-genic feed additive is attributed to a significantly higher growth rate by the same amount of feedstuff used.

Both trials indicate that less protein per kg growth is required.

The aforementioned trials conclude that the use of phyto-genic digestibility enhancers means that less expensive components can be used in the ration. Optimisation of digestion influences feed intake by increasing the passage rate and, at the same time, the animals and the environment are exonerated from metabolic stress. ■

**Fig. 3. Relation between feed intake, growth and protein utilisation.**



**Fig. 4. Relation between feed intake, growth and protein utilisation.**

