



> APPLIED SWINE NUTRITION

Feedstuff composition, presentation and dietary nutrient content have a great impact on the performance of swine. The effects can differ depending on age and production goal. In order to achieve optimal animal performance at the farm, it is of great importance to know the relation between nutrition, animal health and technical performance. Swine nutritionists need to combine the theoretical knowledge about digestive physiology and biochemistry of feedstuffs when formulating diets. Therefore the goal of nutrition is to provide essential nutrients to the animal for efficient production, but also to assure animal welfare and health, and a low excretion of nutrients to the environment.

Learning objectives

- To obtain knowhow to apply theoretical and practical nutritional knowledge to improve swine performance.
- To obtain knowhow to meet nutritional requirements of swine, as well as how to face certain dilemmas like efficiency and intestinal health.

Schothorst Feed Research can provide presentations on various topics related to swine nutrition. A number of these presentations are shown in the list below. Of course, subjects can be added to this list upon request. From the list below you can compose a program for your training. Of course, we are happy to assist you in composing a suitable program for your group.

HALF DAY – FULL DAY MODULES

These modules can be scheduled for half a day up to a complete day. The length of the modules can be adjusted in consultation with the client. The content of these modules will be tailored to the knowledge level and background of the participants.

1. Feedstuffs (multispecies)

Formulating animal feed is a complex task. Many different feedstuffs are available with very different nutritional characteristics. Next to the cost price, nutritional quality and feed safety of feedstuffs need to be considered in formulating animal feed. Unfortunately, many typical characteristics of feedstuffs are not considered in linear programming, so including these factors into a feed formulation greatly depends on the knowledge and skills of the person formulating. This module brings feeding value, feed quality and feed safety together.

2. Feed formulation

Least cost formulation is used by nutritionists to formulate feeds for the lowest costs possible while meeting all nutrient requirements and feedstuff restrictions at the actual market prices of feedstuffs. However, diet optimisation is not that simple. You always need to consider your specific situation. The learning objective of this module is to apply theoretical knowledge into feed formulas for different species and under different circumstances. The participants can hand in topics in advance by sending an e-mail to training@schothorst.nl. It is advised to schedule this module at the end of the training

SHORT MODULES

These modules will take about 1.5 – 2.5 hours. Taking breaks and lunch into account 3 or 4 modules can be scheduled on a day. Of course, also these modules can be tailored to the knowledge level of the participants.

3. Energy evaluation

Energy is an expensive component of a swine diet. Therefore understanding the impact of energy and utilization in pigs is of great interest to formulate diets that fulfil the requirements of the pigs. In this presentation, a theoretical overview of the net energy system in swine will be discussed as well as a practical implementation of this energy system. What is the added value of diet optimization based on net energy (NE)?

4. Protein and amino acid evaluation

Amino acids are important in swine diet formulations, but different digestibility coefficients are used. What is the added value of diet optimization based on digestible amino acids and the ideal amino acid profile, as well as what are the effects of diet composition on protein digestibility and amino acid utilization?

5. Calcium and phosphorus evaluation

Backgrounds of the different phosphorus systems will be explained, and effects of dietary calcium on the utilization of phosphorus. In this presentation also the efficacy of phytase and the difference between different phytase products will be dealt with. What are the requirements and what is the effect of super-dosing of phytase?

6. How to evaluate fibre in swine diets

Fibre by-products are more and more available to be used in swine diets. Therefore having an understanding of how to evaluate the different fibre ingredients and what nutrients can be used when formulating diets is very important. Based on SFR experience we have seen that fibre ingredients should be evaluated from a functional point of view and not (only) from an analytical point of view. Therefore, the objective of this presentation is to match fibre evaluation with the different physiological stages (piglets, growing pigs, gestation and lactating sows).

7. Facts about fats (multispecies)

Fats and oils are more than just an energy source for animal feeds. The fatty acids as part of triglycerides or in fatty acid products differ in chemical composition and physical characteristics. Some fatty acids can be considered functional nutrients. The main use of fats and oils in the feed industry is to increase the energy content of the feed. Therefore knowledge about the digestibility of fat, metabolisable energy content and utilisation for different production goals is of importance.

8. Feed processing

Producing feed is more than making a diet that contains all the required nutrients. Feed processing can help to improve the availability of nutrients to improve feed efficiency. However, the effect of feed processing is feedstuff dependent. Furthermore, feed processing technologies can positively affect intestinal health. However, technologies that improve either intestinal health or feed efficiency, like particle size distribution, are generally counteracting. Therefore, what conflicts are we facing when using processing technologies?

9. Mycotoxins (multispecies)

The increased levels and variety of mycotoxins in feedstuffs and consequently in feeds pose unpredictable feed safety problems worldwide. In brief, these substances affect the gastrointestinal tract in a negative sense. Most of all know what are mycotoxins, where they occur, and their main effects in different animal species, especially when acute contamination is considered. However, prevention and remediation of mycotoxins remain a challenge under subclinical and asymptomatic circumstances, where economic losses cannot be always avoided. Furthermore, climate change cannot be neglected and play an important role in mycotoxins contamination in commodities. And last, but not least, the interaction of mycotoxins with other mycotoxins, with veterinary drugs, parasites, host-microbiome, as well as with feedstuff components must be in mind when evaluating risks.

SOW NUTRITION: IMPROVE PIGLET VITALITY TO IMPROVE SOWS LIFETIME PERFORMANCE

Sows have changed dramatically over the past ten to fifteen years. Selection based on litter size results in higher milk production and therefore higher nutrient requirements. At the same time, sows have fewer body reserves due to the selection for lean meat percentage (in the finishing pigs). Therefore, the formulation of diets for highly productive sows deserves extra attention to improve piglet vitality.

10. A good start is half the work!

During the rearing phase, several factors are important for a breeding gilt to develop into a highly productive sow. Due to genetic improvement, the growth rate of breeding gilts can be similar to growing-finishing pigs. A high growth rate can be beneficial for reproductive performance but negatively affect leg conformation and therefore longevity of the sow. How to find a balance between growth rate and longevity?

11. Improving piglet performance and vitality begins pre-farrowing

The significant increase in litter size in the last years has resulted in lower average piglet birth weights and decreased uniformity within the litter. Consequently, piglet viability decreased, resulting in decreased piglet growth and increased mortality, especially during the first days after farrowing. What nutritional strategies can help the sow to improve litter uniformity and piglet's birth weight?

12. Nutritional opportunity to support the farrowing process and colostrum intake

A good colostrum intake is crucial for the survival and growth of the piglets. The colostrum intake depends on many factors, like litter size, birth weight, piglet vitality, duration of the farrowing process, but also colostrum quantity and quality. During this presentation, nutritional strategies to promote the farrowing process and therefore increase the colostrum intake of the piglets will be discussed.

13. How to increase nutrient intake during lactation to optimise sows performance?

During lactation, the focus should be on maximizing milk production to promote litter growth, but at the same time on reducing weight loss of the sow. A high body weight loss during lactation negatively affects the performance of the sow in the next cycle and also impairs the longevity of the sow. During this presentation, the nutrient requirement and nutritional strategies will be discussed to support the performance of the sows.

14. How to deal with a suboptimal environmental temperature?

Genetic selection for animals with a high metabolic rate in combination with rising global temperatures at an unprecedented rate and an increasing frequency of heatwaves worldwide makes the discussion on reducing heat stress in swine more important than it ever was. Different management strategies can be used to reduce heat stress, though this presentation will focus on the nutritional strategies to prevent heat stress and limit the negative effects.

PIGLET NUTRITION: GASTROINTESTINAL HEALTH, THE KEY TO AN OPTIMAL PERFORMANCE

Supporting pig(let)s gut health seems to be more relevant than ever due to 1) the increasing pressure to decrease the use of veterinary antimicrobials, Copper and Zinc and; 2) the continuous increase in the number of piglets born/ litter and its consequences for piglets vitality. Furthermore, gastrointestinal problems rank amongst the highest causes of morbidity, mortality, and antimicrobial use.

15. The suckling period as a window of opportunity

During this presentation, it will be discussed how to utilise the pre-weaning period as a window of opportunity to prepare the piglet for weaning. Several functional ingredients and oral supplements, supplemental milk, and creep feed will be discussed that can be used to modulate piglet gut health. In addition, it will also be discussed why the success of providing creep feed is (amongst others) also dependent on the similarity with the post-weaning diet.

16. How to modulate stomach functioning and digesta kinetics

To keep piglets healthy, it is important to establish a good gastric barrier and function. Several nutritional strategies to modulate stomach functioning and digesta kinetics will be discussed during this presentation. These will include the nutritional factors that can help newly weaned piglets to acidify the stomach digesta and which physiochemical characteristics of the feedstuff and diet can modulate the stomach retention time and digesta kinetics.

17. Protein, fibre and fat in relation to gastrointestinal health

Pigs undergo major physiological changes from weaning onwards, requiring a structured nutritional approach over time. During this presentation, it will be discussed how the main nutrients (protein, fibre and fat) can support GIT health in piglets.

18. Vitamins in piglet diets in relation to reduced levels of copper and zinc

Vitamin deficiency is generally not a problem in modern intensive pig production. However, the modern pig is often exposed to challenges that lead to a disrupted redox balance and uncontrolled inflammation. In weaned piglets, the reductions in Cu and Zn will lead to more challenging conditions compromising their (intestinal) health. During this presentation, the vitamin requirements in piglets' diets will be discussed.

GROWING-FINISHING PIGS: OPTIMAL PERFORMANCE; FOCUS ON GROWTH OR FCR?

Modern genetics have the potential to grow well over a kilo per day with very sharp feed conversion. However, this high growth does put more pressure on intestinal health and increases locomotion problems, resulting in increased mortality. Furthermore, there are increasing demands on pig welfare, high-quality products, low antimicrobial use and environmentally sustainable systems. All these factors together will determine the optimal feeding strategy.

19. Optimal performance GF pigs; focus on growth or FCR?

The main goal of the swine industry is to achieve efficient pig production and maximize the economic return, reaching high-quality pig products without compromising animal welfare or environmental issues. Since feed is the largest production cost in commercial pig production (around 60% of all costs), the feeding strategy is key to success. There are multiple approaches a swine nutritionist can take in diet formulation: maximize performance, minimize cost, or maximize profit. In addition, environmental factors need to be considered as well. How to optimize the feeding strategy?

20. How can nutritional strategies affect carcass quality?

Due to consumer demand, pigs have become increasingly lean during past years. Currently, about 20% of pigs, mainly boars, have a backfat thickness of less than 11 mm, which has a negative effect on the carcass quality. Lean carcasses show a higher amount of unsaturated fatty acids, which leads to softer fat. This negatively affects meat processing and, since fat is a flavour carrier, has a negative effect on palatability. As consequence, consumer demands have changed again to preferring meat with a higher intramuscular fat content. How can nutritional strategies affect carcass quality and therefore the value of a carcass?

21. Leg weakness, a problem in modern genetics

Leg weakness is a broad term used to describe lameness of pigs caused by cartilage or skeletal abnormalities or claw lesions. Leg weakness is a problem resulting in economic loss. Though leg problems can be found commonly in pigs associated with multifactorial factors such as management and infectious diseases, high growth rate and sharp feed conversion play a big role in the occurrence of leg problems. During this presentation, the nutritional aspect to prevent leg problems will be discussed.

22. Gastro-intestinal health in GF pigs

In growing and finishing pigs, disorders occur in the health of the stomach and the intestine. Stomach ulcers are a worldwide problem in pig production, however, their consequences on animal welfare and performance may still be underestimated. Diet can play an important role in the prevention of stomach ulcers. The effect of feed composition and particle size will be discussed in this presentation. Furthermore, intestinal disorders, like PIA and Swine Dysentery, impair animal performance and increase the use of antibiotics. Nutritional measures that can help in the prevention of these intestinal disorders will be discussed.

23. Alternative protein sources for pigs

Nitrogen excretion and the (European) dependence on soy imports are two factors that have received a lot of attention in livestock farming recently. The choice of a specific raw material in animal feed depends on the ratio between the feed value and the price. The raw materials that provide the most nutritional value for the lowest cost price are included. Which protein sources are potential soybean meal substitutes?