Phase feeding (nitrogen emissions)

Last update: 2 June 2023

- **Type of challenge**: Environment.
- **Challenges**: Soil contamination (nitrates); air pollution (ammonia); resources management (resource efficiency, nutrient losses).
- **Action**: Match as close as possible the nutrient requirements of the pigs.
- **Animal category**: Pigs.
- **Technique**: Feeding strategy consisting in adjusting permanently the composition of the diet to the requirements of the animal per fixed periods (2 to 5) based on the age or weight of the animal in the course of fattening.
- **Mode of action**: The technique enables to minimize the amount of in-excess proteins in the feed, thus reducing nitrogen excretion as ammonia or nitrate.
- **Potential efficacy:** Up to 10–30 % reduction in the amount of nitrogen excreted with a two-phase feeding compared to one-phase. An increase in the number of phases allows further reduction.
- **Nature of evidence of efficacy**: Peer-reviewed scientific publications (meta-analysis); Joint Research Center Best Available Techniques Reference document for Intensive rearing of poultry or pigs.
- **Factors impacting on efficacy**: Number of phases; level of proteins in the feed; amino acid balance (can be achieved by combining with the use of essential synthetic amino acids); genetics.
- **Mode of use**: The different types of feed corresponding to the different phases are mixed on the farm, taking into account the predefined nutritional requirements.
- **Requirements/limitations**: May be implemented in all systems (including home mixing) requires additional storage capacities as well as conveying mixing and weighing equipment; large dependency upon Third Countries for the supply in synthetic amino acids.
- **Economic consequences**: Higher cost due to special equipment; return on investment depends on the size of the farm; volatility of costs of amino acids due to high dependency on global market.
- **Other considerations**: Phase feedings allows also reduction of emissions of other nutrients, e.g. phosphorous.
- **References**:
  - JRC (2017). Best Available Techniques Reference document for Intensive rearing of poultry or pigs.
  - Wang *et al*. (2020). *Can dietary manipulations improve the productivity of pigs with lower environmental and economic cost? A global meta-analysis*. Agriculture, Ecosystems & Environment - Volume 289, 15 February 2020, 106748. https://doi.org/10.1016/j.agee.2019.106748
- **Other techniques**: Use of (hydroxy) amino acids, use of enzymes.

Ambitions: 2and 5