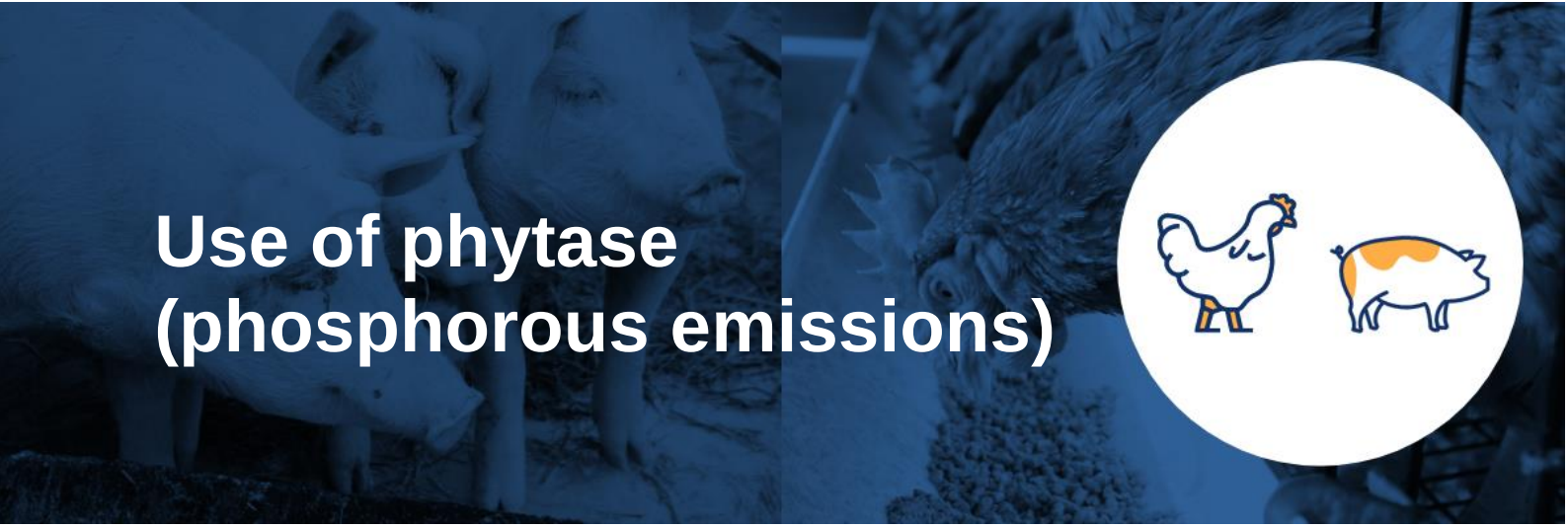

Use of phytase (phosphorous emissions)

Last update: 2 June 2023

- **Type of challenge**: Environment.
- **Challenges**: Soil pollution (phosphorous emissions); resources management (resource depletion, nutrient losses).
- **Action**: Decreasing phosphorous emissions.
- **Animal category**: All species, especially monogastrics.
- **Technique**: Addition of phytase in the compound feed combined with a reduction in the total amount of mineral phosphorous in the feed.
- **Mode of action**: The addition of phytase in the diet allows the release of phosphorus from phytate, the principal storage form of phosphorous in plants, making it more available for uptake by the animal.
- **Potential efficacy**: Increase in plant phosphorus digestibility by 20 % to 30 % in weaners, and 15 % to 20 % for other pigs; a reduction of phosphorus of 0.1 % in feed, by using phytase, results in a reduction in phosphorus excretion of 35 % to 40 % for weaners, 25 % to 35 % for growers and finishers, and 20 % to 30 % for sows.
- **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 or pigs; EFSA assessments.
- **Factors impacting on efficacy**: Type of feed materials (proportion of phytic phosphorous is variable); type and amount of phytase.
- **Mode of use**: Incorporated into compound feed; the substance must be added in a mixture by a registered feed business operator applying HACCP (Regulation (EC) No 183/2005); only phytases produced from non-GM microorganisms may be used in organic farming.
- **Requirements / limitations**: Must be used in combination with a reduction of the total mineral phosphorous in feed; needs to be followed by a parallel reduction of calcium, in order to maintain growth and bone mineralisation at the proper level; use in organic farming made difficult due to the fact that most phytases are produced with GM microorganisms.
- **Economic consequences**: The use of phytase is economically profitable and is widely applied.
- **Other considerations**: Phytases improve also protein digestibility.
- **References**:
  - JRC (2017). Best Available Techniques Reference document for Intensive rearing of poultry or pigs.
  - EFSA opinions on safety and efficacy of phytases (several opinions).

- 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 feed materials with highly digestible phosphorous (mineral or animal).

Charter Ambitions: 2and 5