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Review of NH₃ and greenhouse gas emission factors from poultry housing: Influence of practices and rearing conditions

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Introduction

Poultry production ⇒ NH₃ and greenhouse gases (GHGs):
• diversity of systems ⇒ variability of emissions ?
• mitigation of gas emissions ⇒ best practices ?

Database description

124 EFs converted into the same unit: g gas bird⁻¹ day⁻¹

91% of EFs concern Europe or the USA
USA 37% Europe 54%
not specified 9%

87% of EFs concern layer or broiler housings

layers 48% broilers 39% ducks 7% turkeys 6%

NH₃ is the most studied gas

77% 12% 11%
NH₃ CH₄ N₂O of selected EFs

A high variability of emissions due to the diversity of production systems

Flock management

- lower animal density
- lower slaughtering age
- dietary manipulations:
  ⇒ reduction of N content in diets
  ⇒ use of acidifiers in diets

Manure management

- lower manure moisture:
  ⇒ nipples waterers and/or collecting bowls
  ⇒ manure drying systems (e.g. drying belts)
  ⇒ add of new litter during rearing
- manure removal ⇒ higher removal frequency
- lower manure pH ⇒ litter acidifiers

Indoor conditions

- temperature ⇒ limited air temperature
- relative humidity ⇒ limited air moisture to increase evaporation from litter
- control of ventilation:
  ⇒ increase ventilation to dry the litter during brooding
  ⇒ limit air flow speed above manure surface during finishing

Conclusions

- diversity of production systems ⇒ high variability of EFs
- manure management ⇒ most efficient practices for NH₃ mitigation
- research needs:
  ⇒ greenhouse gases (CH₄, N₂O) EFs
  ⇒ systems with access to an outdoor-run
- system approach ⇒ manure storage and spreading EFs ?
- pollution swapping prevention ⇒ simultaneous study of NH₃ and GHGs emissions

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