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► To cite this version:

Bertrand Méda, Mélynda Hassouna, Claude Aubert, Paul Robin, Jean-Yves Dourmad. Review of ammonia and greenhouse gases emission factors from poultry housings: Influence of practices and rearing conditions. 13. European Poultry Conference (EPC 2010), Aug 2010, Tours, France. Branche Française de la WPSA, pp.893, 2010, 13. European Poultry Conference. hal-01461071

HAL Id: hal-01461071

<https://hal.science/hal-01461071>

Submitted on 3 Jun 2020

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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

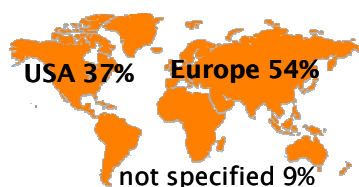
Poultry production ⇒ NH₃ and greenhouse gases (GHGs):

- diversity of systems ⇒ variability of emissions ?
- mitigation of gas emissions ⇒ best practices ?

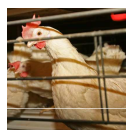
Database description

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

91% of EFs concern
Europe or the USA



87% of EFs concern layer or broiler housings



layers 48%



broilers 39%



ducks 7%



turkeys 6%

NH₃ is the most
studied gas

NH ₃	CH ₄	N ₂ O
77%	12%	11%
of selected EFs		

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

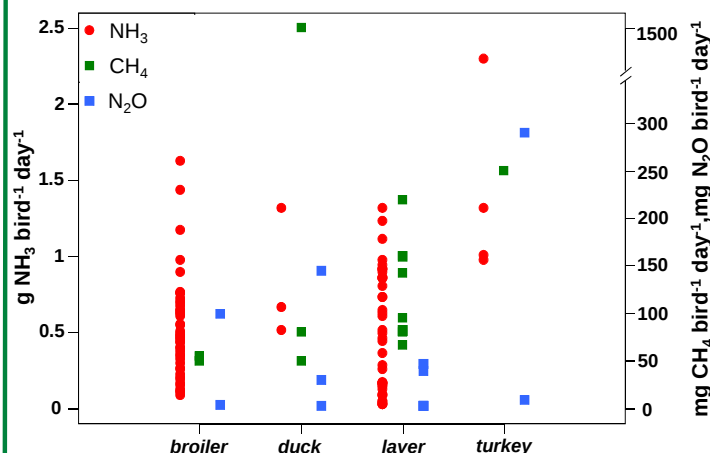


Figure 1: Variability of NH₃, CH₄, N₂O EFs according to the production

Objectives

Review of NH₃ and GHGs emission factors (EFs) for poultry housings:

- conversion of EFs into the same unit ⇒ comparison of systems
- comparison of systems ⇒ best practices for emissions mitigation

Influence factors on gas emissions

Best practices for NH₃ emissions mitigation

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



Best practices for CH₄ & N₂O mitigation:
not enough data ⇒ RESEARCH NEEDS

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

