Research title
Evaluation of pollutants in animal farms, the concept of new particle formation (npf)

Valutazione dell'impatto ambientale in allevamento, il concetto della formazione di nuove particelle e di particolato secondario

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State of the art and aims of the project
Large scale livestock farms are great sources of environmental pollutants, as ammonia, greenhouse gases and dust, that can lower indoor air quality and reduce animal health and performance.
Despite great progress over the last few years, in terms of revealing biological mechanisms of particulate matter (PM) formation through ammonia, sulphates, and other compounds, condensation or nucleation, very few studies evaluated the new particle formation (NPF) and their adverse effects on animal and workers in livestock houses.

For these reasons, the project will be run in enclosed intensive pig and poultry farms and in dairy cattle farms:

- To investigate pollutants (PM and gases) concentration/emission in relation to microclimate, farm design, plant and structural solutions.
- To start evaluating the mechanisms governing NPF in animal farms.
- To better understand the role of pollutants as carriers, using bacterial indicators (i.e. MRSA S. Aureus).
- To evaluate the role of pollutants on animal health and performance.

Recent publications of the tutor in the field
1. Costa A., Domeneghini C. 2018. Pollutants in livestock buildings: ammonia and dust interplay with the respiratory tract. In: Air quality and livestock farming, Eds: T. Banhazi, A. Aland and J. Hartung. London, UK, CRC Press. 49-58. ISBN 9781138027039
2. Costa A. 2017. Ammonia concentrations and emissions from finishing pigs reared in different growing rooms. Journal of Environmental Quality. 46:255-260
3. Costa A., Gusmara C., Gardoni D., Zaninelli M., Tambone F., Sala V., Guarino M. 2017. The effect of anaerobic digestion and storage on indicator microorganisms in swine and dairy manure. Environmental Science and Pollution Research. 31:24135–2414
4. Costa A., Tangorra F.M., Zaninelli M., Oberti R., Guidobono Cavalchini A., Savoini G., Lazzari M. 2016. Evaluating an e-nose ability to detect biogas plant efficiency: a case study. Italian Journal of Animal Science. 15:16-123
5. Costa, C. Colosio, C. Gusmara, V. Sala, M. Guarino. 2014. Effects of disinfectant fogging procedure on dust, ammonia concentration, aerobic bacteria and fungal spores in a farrowing-weaning room. Annals of