



The monitoring of indoor air quality in different agricultural contexts by using a user-friendly multisensor device.

Tugnolo A., Beghi R., Cocetta G., Finzi A.^{1*}

¹ Department of Agricultural and Environmental Sciences, University of Milan, via Celoria 2 - 20133, Milan, Italy;

* Corresponding author: alberto.finzi@unimi.it

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Abstract

The effects of some polluting gas emissions of the agricultural sector can be worsened if they are originated in confined areas bringing their concentrations to critical levels of tolerability for hosts (both workers and animals). The agricultural contexts that are more exposed to this problem are attributable to the livestock activities and protected crop cultivations, in which agricultural machinery is used.

To mitigate the emissions of polluting gases and improve indoor air quality, it is important to continuously carry out effective real-time measurements that can lead to the implementation of targeted corrective measures. In this direction, a prototype device (integrated device for air quality measure – *Indaqum*) was designed, built and tested to satisfy such needs.

The novelty of this work lies in the application of this technology in a context where the monitoring systems for an active control of air quality are not currently used. This study reports the application of *Indaqum* to evaluate its analytical performance in two different agricultural contexts, the milking parlors and greenhouses for baby leaf cultivation. Tests were performed in three seasons (hot, temperate and cold).

This study highlighted that no statistical differences among *Indaqum* and references (Drager tubes) for the quantification of NH₃, CO₂ and NO₂ at a 95% confidence level. Paving the ground for the future use of *Indaqum* within the framework of Precision Livestock Farming devices.

Considering both the monitored environments, a good ventilation proved essential to keep low gas concentrations in the air. Consequently, the cold periods of the years can be considered as the most critical.