

# VENTILATION INFLUENCE IN OCCUPATIONAL EXPOSURE TO FUNGI AND VOLATILE ORGANIC COMPOUNDS – POULTRY CASE

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## Introduction

In poultry houses, large-scale production has led to increased bird densities within buildings. Such high densities of animals kept within confined spaces are a source of human health problems related to occupational organic dust exposure. This organic dust is composed of both non-viable particles and viable particulate matter (also called bioaerosols). Bioaerosols are comprised by airborne bacteria, fungi, viruses and their by-products, endotoxins and mycotoxins.

Exposure to fungi in broiler houses may vary depending upon the applied ventilation system. Ventilation can be an important resource in order to reduce air contamination in these type of settings. Nevertheless, some concerns regarding costs, sensitivity of the animal species to temperature differences, and also the type of building used define which type of ventilation is used.

## Aim of the Study

A descriptive study was developed in one poultry unit aiming to assess occupational fungal and volatile organic compounds (VOCs) exposure.

## Methodology

Five air samples (50L each) were collected through impaction method. Air sampling was performed in two pavilions and also, outside premises, since this was the place regarded as reference. Simultaneously, temperature, relative humidity and volatile organic compounds concentrations were registered.



Fig. 1 Air sampler

## References

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## Results

### Ventilation:

- ✓ Accomplished by mechanical exhaust.
- ✓ In Pavilion 1 it was placed at the cover and it was working continuously.
- ✓ In Pavilion 2 it was located on the walls and it work only when the inside temperature is higher than 23°C.

### Quantitative assessment of air fungal and VOCs exposure

- ✓ Fungal load in Pavilion 1 was very similar to the exterior load and more than five times lower (4660 cfu/m<sup>3</sup>) that in the Pavilion 2 (24040 cfu/m<sup>3</sup>).
- ✓ Five fungal species were identified in air of both pavilions, being *Scopulariopsis brevicaulis* the most commonly isolated species (54.8%).
- ✓ In Pavilion 2 volatile organic compounds concentrations were higher (0.7 ppm) than in Pavilion 1 (0.4 ppm).
- ✓ There was no positive association (p>0.05) between fungal contamination and the environmental variables registered (temperature and relative humidity).

## Conclusions

There is good evidence that some of the biological materials found in poultry dust can cause asthma and other respiratory diseases and present a risk in the poultry industry.

Acute and chronic work-related symptoms are very common in poultry workers including cough, phlegm, eye irritation, dyspnea, chest tightness, fatigue nasal congestion, wheezing, sneezing, nasal discharge, headache, throat irritation and fever. These symptoms are generally non-specific and may improve during periods away from work.

The presented results suggest that ventilation has an important influence in fungal contamination and in volatile organic compounds concentration. The continuous work of the ventilation system, rather than only triggered by high temperatures, seems to be the best option to minimize the exposure to fungi and volatile organic compounds.

Like in others settings, investments in ventilation systems could bring important advantages and significant improvements in work conditions, especially regarding workers' health and also, in this case, public health.