Evaluating fungi indoor presence in homes through viable and non-viable sampling

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Introduction

It is widely accepted that moulds are common and important allergens. Although they are more abundant outdoors, patients affected by this problem stay indoors much more time. Therefore, properly indoor sampling is the best way to study their possible influence on allergic symptoms. The aim of this study was to assess the relative efficiencies of two air sampling methods, viable and not viable, for the quantification of airborne indoor fungi in the homes of patients sensitized to Alternaria, and compared them with outdoor levels.

Results

On average for all samples, 741 spores/m³ and 317 CFU/m³ were recorded indoors, while outdoors there were 1890 spores/m³ and 487 CFU/m³. The monthly totals showed minimum values in February and the maximum appeared mainly in April and December depending on the sampling and home (Fig. 2).

Differences between homes were found only in Cladosporium colonies, so these differences were not found with Alternaria, Aspergillus or Penicillium colonies and spores. The kitchen was the room with more fungi, then the bathroom and finally the living room. Nevertheless, differences between rooms were found only in Alternaria colonies and Alternaria-Penicillium spores (Fig. 3). Temperature was positively correlated with Penicillium colonies and Alternaria spores, and relative humidity negatively with Alternaria spores.

Comparing colonies with spores, Alternaria and Aspergillus-Penicillium showed similar values. Notwithstanding, Cladosporium spores appeared nearly five times more abundant that colonies (Fig. 4).

Material and Methods

Sampling was taken for six months in Badajoz (SW Spain). Two houses were selected according to the presence of allergic patients to Alternaria. They were sampled once a month using both viable and non viable personal samplers at solar noon. A Burkard personal sampler was used to record spores for 5 minutes at 10 liters/minutes, using Petrolatum as adhesive, data are provided as spores/m³. A Smpair AES Chemunox sampler was used for viable colonies for 1 minute at 100 liters/minute, using MEA as culture media, data are provided as colonies forming units CFU/m³ (Fig. 1). Three rooms were selected in each home: living room, kitchen and bathroom. Temperature and relative humidity were registered at each sample.

Conclusions

The more accurate the information about indoor fungi presence is pursued, the more complete sampling is needed. The only advantage of viable methods is the identification to species level, but they have the disadvantage that spores from some ubiquitous species, as Cladosporium, do not always grow in those media, so the interest to use additionally non-viable methods.