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

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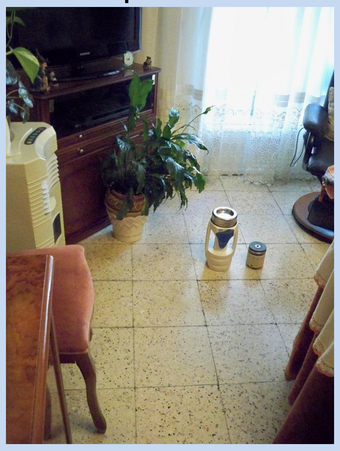
Introduction

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.



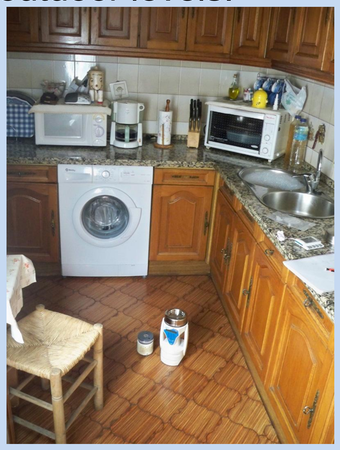


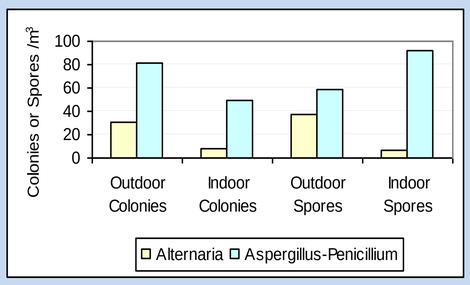
Fig 1. Personal sporetraps for spores and colonies (left). Sampling in the living room (center) and in the kitchen (right).

Results

On average for all samples, 741 spores/m^3 and 317 CFU/m^3 were recorded indoors, while outdoors there were 1890 spores/m^3 and 487 CFU/m^3. 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).



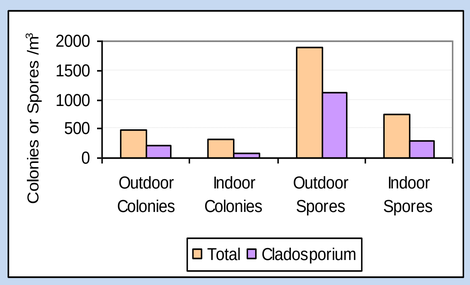
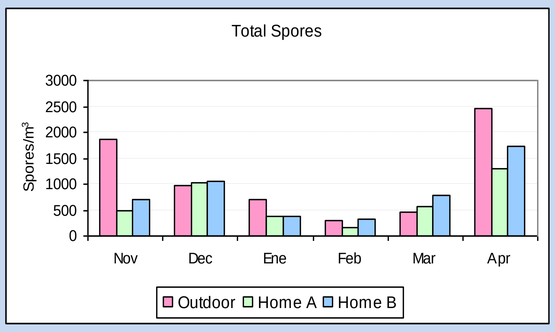


Fig. 4. Total concentration comparing outdoor and indoor from colonies and spores.

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 no 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/m^3. A Sampl'air AES Chemunex 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/m^3 (Fig. 1). Three rooms were selected in each home: living room, kitchen and bathroom. Temperature and relative humidity were registered at each sample.



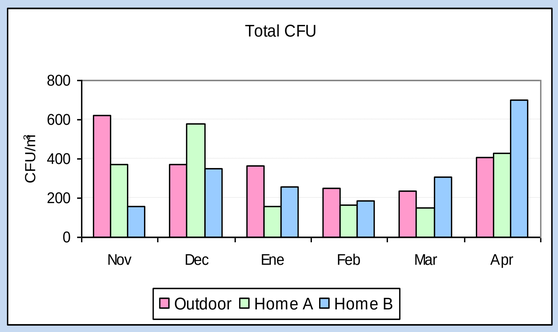
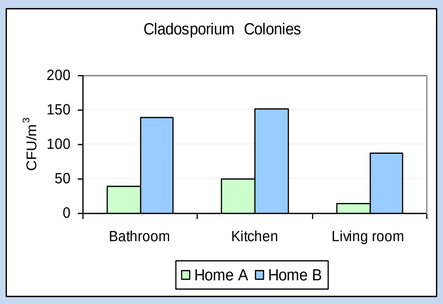
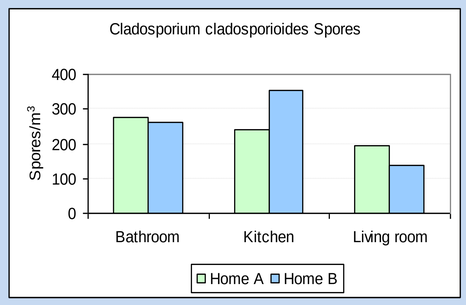
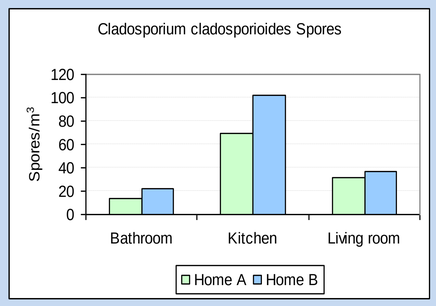
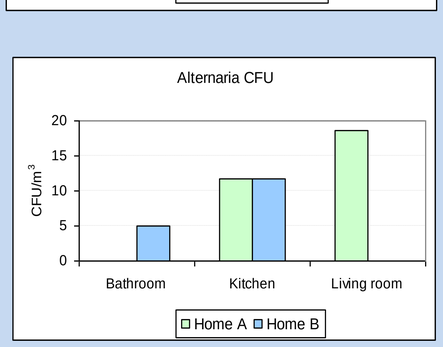


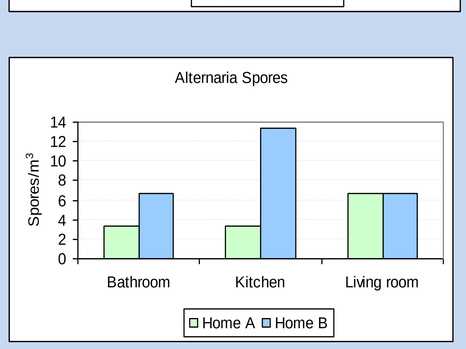
Fig. 2. Monthly cocentration of spores and colonies.











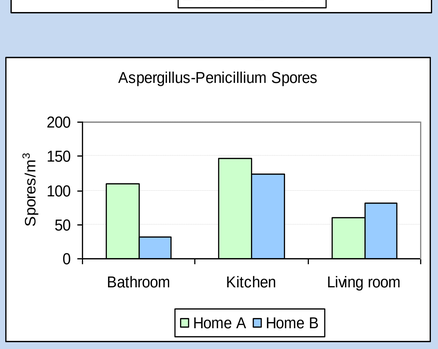


Fig. 3. Average concentration depending on the room, home and fungi type.

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.

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