CASE REPORT

Occupational Asthma Induced by *Chrysonilia sitophila* in a Worker Exposed to Coffee Grounds

Beata Francuz,1* Helene Yera, 2 Laurent Geraut,1 Lynda Bensefa-Colas,1 Zuong Hung Nghiem,3 and Dominique Choudat1

**Occupational Health Department, Cochin Hospital Group, AP-HP, Université Paris Descartes, Paris, France; Laboratory of Parasitology-Mycology, Cochin Hospital Group, AP-HP, Université Paris Descartes, Paris, France; and Association pour la Prévention et la Médecine du Travail, Paris, France**

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A new case of occupational asthma caused by *Chrysonilia sitophila* (asexual state of *Neurospora sitophila*) was diagnosed by molecular identification of the mold and confirmed by skin prick test, peak expiratory flow rate measurements, and experimental immunoglobulin E analysis.

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A 43-year-old previously healthy man, who was a non-smoker, was examined for repetitive episodes of coughing, dyspnea, rhinitis, and conjunctivitis related to his job. He was employed as a coffee dispenser operator for 13 years. His job consisted of emptying containers of coffee grounds and placing new powdered coffee into beverage dispensers. After 9 years of employment, he developed respiratory and ophthalmological symptoms when he collected coffee grounds that had been stored for longer than a week. These coffee grounds were covered with an orange powder, which dispersed into the air when he cleared the machine. He had no symptoms during weekends and holidays or when the coffee dispenser was emptied frequently and the coffee grounds were not covered by the orange powder.

The patient had no history of rhinitis or asthma. He had no pets at home and stopped smoking 15 years ago. His father and sister have a history of pollen rhinitis.

We performed a mycological analysis of the orange powder covering a coffee grounds sample brought by the patient. Only one type of mold grew quickly and displayed floccose salmon-colored colonies. Microscopic examination showed septate hyphae with lateral branches forming chains of conidia and arthroconidia. These aspects are characteristic of *Chrysonilia sitophila*, as described by de Hoog et al. (2). The last colonies were subcultured successively twice to obtain pure cultures of *C. sitophila*. A fresh coffee sample, brought by the patient was examined for fungal culture and was negative. DNA extraction, amplification, and sequencing of the intergenic transcribed spacer and 5.8S regions of fungal ribosomal genes were performed from the pure culture (8). The nucleotide sequence obtained was deposited in GenBank and aligned and compared with reference sequences present in the database, using Basic Local Alignment Search Tool (BLAST) searches at the National Center for Biotechnology Information (NCBI) web interface (http://blast.ncbi.nlm.nih.gov/BLAST.cgi). Molecular diagnosis confirmed the mycological identification.

Skin prick tests (SPTs) were performed with 20 common allergens and included phosphate codeine (positive) and saline (negative) as controls. SPTs were positive for extracts of grass pollen and birch pollen (Stallergènes, France), revealing wheal and flare responses of 7/30 mm and 5/30 mm, respectively. SPTs were negative for mold extracts of *Alternaria* and *Cladosporium*. The SPT with the coffee grounds covered by the orange powder, prepared as a 1/100 (wt/vol) solution and diluted 1/10, was positive and induced a wheal and flare response of 7/25 mm. The SPT with a fresh coffee sample brought by the patient was negative.

Basal spirometry and chest X-ray were normal. Nonspecific bronchial challenge with metacholine (100 μg) confirmed the diagnosis of asthma (45% decrease in forced expiratory volume in 1 s [FEV1] reversed by salbutamol). Serial measurements of the peak expiratory flow rate (PEFR) showed an immediate decrease, by more than 20%, when the patient was exposed to the coffee grounds covered by the orange powder during his occupational activity. The patient had normal values during weekends and holidays. The patient provided informed consent before SPTs performed in the medical department and before PEFR measurements during his usual occupational activity.

Specific immunoglobulin E (IgE) measurements were positive for *Betula verrucosa* and *Dactylis glomerata* (birch and grass pollens, respectively), as well as *Alternaria tenuis* (72.8 kU/liter, 7.9 kU/liter, and 0.19 kU/liter, respectively), and negative for a mixture of *Aspergillus* spp., using ImmunoCAP (Phadia, Upsala, Sweden). Specific IgE measurements for *C. sitophila* pure culture isolated from the coffee grounds were determined by streptavidin ImmunoCAP, a solid phase assay for the coupling of new allergens (6). *C. sitophila* extract was prepared by freeze-drying from the pure culture in Phadia’s laboratory in
developed sensitivity to the mold Neurospora sitophila, which consists of a coffee dispenser operator who published in the coffee industry (3, 5). We report a third case with orange powder. We identified dermal symptoms and occupational exposure to coffee grounds and demonstrated that the patient was sensitive to this mold through skin prick test results, peak expiratory flow rate (PEFR) decrease, and specific IgE antibody levels. The atopic status of the patient was probably a risk factor in his sensitization and development of allergic occupational asthma. Frequent occupational exposure was probably necessary to induce sensitization and asthma.

The recognition of a new causal occupational allergen is essential for diagnosis, therapy, and prevention. Measurement of specific IgE antibody levels in relation to a new allergen, if no other validated test system is available, requires a valuable method for coupling the new allergen. We used the streptavidin ImmunoCAP assay, a particularly useful tool for detecting IgE antibodies to new allergens in the field of occupational allergies.

C. sitophila should be considered as an allergen for OA in the coffee industry. To our knowledge, this is the first report in which fungal molecular identification of this allergen was performed.

**Nucleotide sequence accession number.** The nucleotide sequence obtained in this study has been deposited in GenBank under accession no. GU192459.

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**REFERENCES**


