

# Familiar presentation of occupational hypersensitivity pneumonitis caused by aspergillus-contaminated esparto dust

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## ABSTRACT

Esparto grass (*Stipa tenacissima*), which is commonly found in the Mediterranean area, has a wide variety of uses. Five plaster workers from the same family developed cough, dyspnea, malaise, and fever after exposure to the esparto fiber used in their work for the previous few years. They showed a significant decrease in symptoms when away from work. Precipitating antibodies against an esparto extract were found in the sera of all patients. Specific IgG antibodies against *Aspergillus fumigatus* were detected. *A. fumigatus* was identified after microbiologic evaluation of esparto fiber samples.

The dust derived from fungi-contaminated esparto fibers can cause hypersensitivity pneumonitis in exposed subjects. The causative antigen is *A. fumigatus*. When esparto fibers were strongly contaminated by fungi, all the workers developed a clinical picture compatible with hypersensitivity pneumonitis. The coincidental finding of an occupational and a familiar condition is unusual.

**Key words:** Esparto. Hypersensitivity pneumonitis. Occupational diseases. Familiar presentation. *Aspergillus fumigatus*. Molds. Extrinsic allergic alveolitis.

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## RESUMEN

La planta de esparto (*Stipa tenacissima*), habitual en la región mediterránea, tiene una amplia variedad de usos. Cinco escayolistas de la misma familia presentaron tos, disnea, malestar y fiebre después de la exposición a la fibra de esparto utilizada en su trabajo en los últimos años. Estos pacientes experimentaron una disminución significativa de los síntomas cuando dejaron el trabajo. Se descubrieron anticuerpos precipitantes contra un extracto de esparto en el suero de todos los pacientes. Se detectaron anticuerpos IgG específicos contra *Aspergillus fumigatus*. Se pudo identificar *Aspergillus fumigatus* después de la evaluación microbiológica de las muestras de fibra de esparto.

El polvo derivado de fibras de esparto contaminadas por hongos puede causar neumonitis por hipersensibilidad en sujetos expuestos. *Aspergillus fumigatus* es el antígeno responsable. Cuando las fibras de esparto están muy contaminadas por hongos, todos los trabajadores pueden sufrir un cuadro clínico compatible con neumonitis por hipersensibilidad. En este artículo, la peculiaridad es el hallazgo concurrente de un proceso familiar y laboral.

**Palabras clave:** Esparto. Neumonitis por hipersensibilidad. Enfermedades laborales. Presentación familiar. *Aspergillus fumigatus*. Mohos. Alveolitis alérgica extrínseca.

## INTRODUCTION

Esparto grass (*Stipa tenacissima*) is a gramineous plant widely found in the Mediterranean area. It has a

**Table I**  
**Clinical, radiologic and immunologic findings**

	Father	Son 1	Son 2	Son 3	Son 4
Age (yr)	51	27	25	24	22
Smoker	NO	NO	NO	NO	NO
Exposure time (yr)	36	10	7	6	5
Symptom onset (yr)	2	1	1.5	1.5	1
Dyspnea on effort	Yes	Yes	Yes	Yes	Yes
Cough	Yes	Yes	Yes	Yes	Yes
Fever > 38° C	Yes	Yes	Yes	Yes	Yes
Arthralgia/myalgia	Yes	Yes	Yes	Yes	Yes
Aspergillus-IgG	Positive	Positive	Positive	Positive	Positive
Aspergillus IgE	Negative	Negative	Negative	Negative	Negative
Fungi-contaminated esparto extract Ouchterlony's immune-diffusion	Positive	Positive	Positive	Negative	Negative
Non-contaminated esparto extract Ouchterlony's immune-diffusion	Negative	Negative	Negative	Negative	Negative
Chest x-ray	NORMAL	Bilateral patchy pattern	Bilateral micro-nodular patchy pattern	Diffuse interstitial pattern	NORMAL

wide variety of uses. The processing of esparto fibers includes the removal of blades from the plant, with posterior "soaking" in water pools for 15 to 20 days in order to make it resistant. During this process, the plant could be contaminated with some organisms because of the favorable moisture and temperature conditions. After that, the mass obtained is dried, crushed, and combed.

The first reports showing the esparto dust as a cause of respiratory disease appeared in the 1960s<sup>1</sup>. Recently, *Aspergillus fumigatus* has been reported as the etiologic agent of the hypersensitivity pneumonitis (HP) caused by esparto dust<sup>2</sup>. In this article, we report five patients of the same family (all of them plaster workers) who were seen with criteria consistent with HP caused by inhalation of dust derived from the esparto fibers used in their job.

## CASES REPORT

We studied five patients of the same family who had respiratory and systemic symptoms related to their work environment. The patients had all come to the emergency department of our hospital at different times along last 2 years, and were then referred together, as outpatients, to our allergy department. The clinical and laboratory findings are shown in table I. All were men between the ages of 22 and 51 years. All five patients were plasterers and hand-

led esparto fibers frequently. They worked together. The symptoms were developed after a period of 5 to 36 years of steady exposure to these fibers, and began 2 to 6 hours after subjects started to handle them. Initial symptoms consisted of cough and shortness of breath on effort. Later on, muscle and bone pain, malaise, fever, and dyspnea were associated. This above-mentioned symptoms were not presented every time they worked with esparto fibers; but they seemed to depend on the new batch of esparto fiber that the patients were predominantly handling in the last 2 years. The absence from work markedly decreased the severity of symptoms; however, they presented a variable degree of shortness of breath on effort even when on holiday. Chest roentgenograms showed a pathological pattern in 3 patients, it was normal in the other two. At the time of the study, patients were nearly free of symptoms because they had left their plasterer work for several weeks. They did not tell any symptom related to pollen or other allergens.

An esparto dust extract was made with several samples from the esparto fibers of the patients. These samples were crushed to obtain a thin dusty material. Two grams of this dusty material were diluted in 20 ml of phosphate-buffered saline (PBS). The solution was shaken for 24 hours and then passed through a 0.22 ttm Millipore filter (Millipore Corp., Bedford, Mass.) The samples of esparto grass provided by the patients were investigated to identify the

presence of microorganisms. The cultures showed a luxuriant growth of *Aspergillus fumigatus*. We looked for and found other esparto fibers which was not contaminated with molds, and then we performed another extract by the same method.

Skin prick tests with these extracts, and with a battery of common inhalants were performed. Skin prick testing was negative in father, son 1 and son 2. In sons 3 and 4 skin prick tests were positive to grass pollen. They did not tell any spring-related symptom.

Intradermal test with the fungi-contaminated esparto extract was positive at 6 hours in all patients. Intradermal test with the non-contaminated esparto extract was not positive in any patients. Intradermal tests with *Aspergillus fumigatus* extract was also positive at 6 hours, whereas no reaction was observed to other allergens. Grass pollen was not tested on intradermal testing in any patient.

Precipitating antibodies IgG to fungi and grass pollens were measured by fluoride-enzyme-immunoanalysis (FEIA, CAP system, Pharmacia, Upsala, Sweden). Precipitating antibodies were detected in all patients against *Aspergillus fumigatus*, *Aspergillus clavatus* and *Aspergillus ssp*.

The double immunodiffusion Ouchterlony's technique showed precipitation bands between patients sera and fungi-contaminated esparto extract and *Aspergillus* spp. However, Ouchterlony's technique was negative for fresh *stipa tenacissima* and the non-contaminated esparto extract in all patients.

The members of family told to us that they understood the origin of their diseases; so that, they refused the possibility of a bronchoalveolar lavage (BAL) study and a pulmonary inhalation provocation test.

They decided to change their esparto fibers for a synthetic analog and symptoms did not appeared again.

## DISCUSSION

An increasing number of organic and inorganic dusts have been able to cause hypersensitivity and disease in exposed subjects<sup>3</sup> In our opinion, the cases reported here meet sufficient criteria to be con-

sidered as HP caused by the dust inhaled while handling fungi-contaminated esparto.

Previous reports have demonstrated that *Aspergillus fumigatus* is the etiologic agent of esparto dust induced HP<sup>2</sup> During the esparto fiber manufacturing process, esparto grass is boiled in water pools in the soaking phase, resulting in a high degree of moisture. If it is then stored until the next manufacturing phase, the molds would have favorable moisture and temperature conditions for growth.

This report showed how the environmental conditions may affect to most persons working under these situations. It is important to exam the environmental conditions of each patient to assess the etiology of any case of HP<sup>3-6</sup>.

Our report implicates the whole members of a plasterers family. Our patients showed different levels of severity but they all were affected. We think that when esparto fibers are strongly contaminated by fungi, all the workers are able to suffer a clinical picture compatible with hypersensitivity pneumonitis. In this report, the peculiarity is the coincidental finding of an occupational and a familiar condition. A modification in their work conditions resulted in the resolution of their respiratory diseases.

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