

Occupational rhinitis and asthma by *Lathyrus sativus* flour: Characterization of allergens

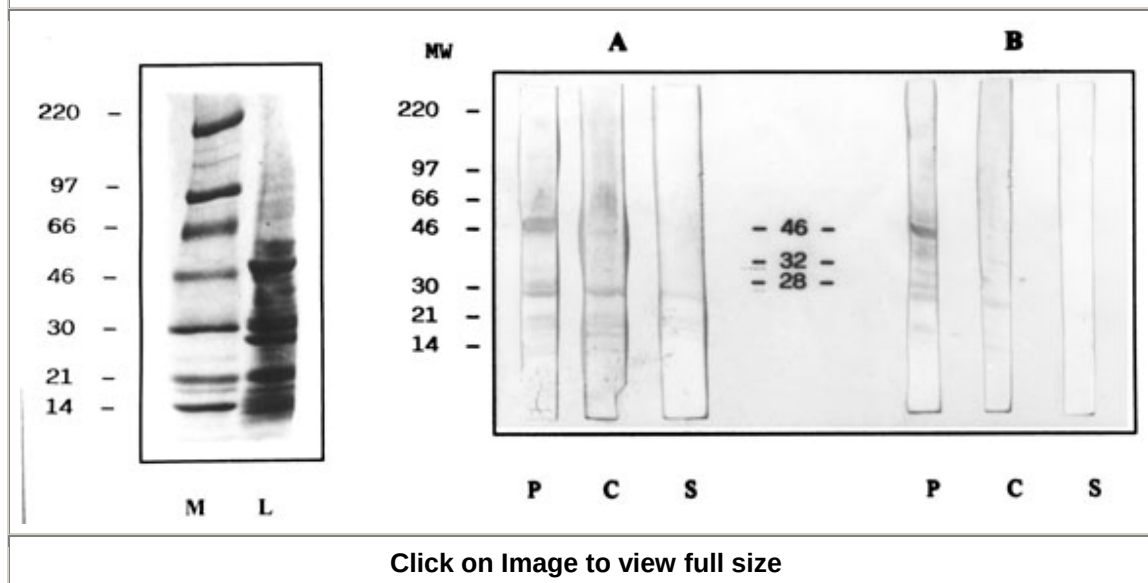
To the Editor:

Lathyrus sativus (grass pea) is a plant belonging to the Leguminosae family. Its flour (LSF) is used in cattle feeding and occasionally for human consumption, despite being the causative agent for lathyrism. We report the case of a 55-year-old male nonsmoker, without any previous history of atopy, who was referred with a 1-year history of rhinorrhea, paroxysmal sneezing, nasal pruritus, and wheezing dyspnea related to his work environment. The patient had been working for 15 years at a parquet (hardwood flooring) factory, making a mixture of LSF and water that is used to seal the junctures between the wooden panels. He never consumed grass pea, and he usually ate other legumes with good tolerance.

Sequential peak expiratory flow rate in the workplace showed a diurnal variability greater than 20% that normalized during weekends and during a 2-week break from work. Nonspecific bronchial challenge testing with methacholine revealed bronchial hyperreactivity, with a PC₂₀ value of 6 mg/mL. We prepared a 1:10 wt/vol aqueous LSF extract, 8.8 mg/mL as determined by the Bradford assay¹ (Bio-Rad, Munich, Germany). Skin prick test results were positive, and there was an immediate response with both dialyzed (7 × 5-mm wheal and 10 × 10-mm erythema) and nondialyzed (8 × 5-mm wheal and 12 × 10-mm erythema) LSF extract and a negative responses in 20 atopic and nonatopic control subjects. The patient did not have any positive reaction to either common inhalants or commercially available cereal flour extracts (Bial-Aristegui, Bilbao, Spain). Specific serum IgE against LSF (9.57 KU/L, with total serum IgE of 341 KU/L) was demonstrated by CAP assay (Pharmacia Diagnostics AB, Uppsala, Sweden). We performed gradient SDS-PAGE² (Bio-Rad, Hercules, Calif) of the LSF extract. After the electrophoretic separation, one set of proteins was stained with Coomassie brilliant blue, showing several protein bands in the range of 97 to 10 kd (Fig 1, *left panel*). Another set of proteins was subjected to IgE Western blotting,³ which identified specific reactivity toward 3 main antigens, with approximated molecular weights of 46, 28, and 21 kd (Fig 1, *right panel*). Finally, the specific bronchial challenge test with LSF extract (1:100 vol/vol) elicited an immediate clinical and spirometrical response, with a 20% decrease in FEV₁ at 5 minutes that was maximal at 20 minutes and a 26% decrease from basal values. Albuterol administration was required because the patient experienced chest tightness and severe dyspnea; FEV₁ returned to baseline levels 1 hour later. No late reaction was observed. Two control subjects with asthma showed no significant response.

Fig. 1. Left panel, Coomassie blue staining of a 4% to 15% gradient SDS-PAGE. Left lane, molecular weight standards (in kilodaltons). Right lane, LSF extract (40 µg). Right panel, IgE

immunoblotting of LSF. A, Samples were reduced with β -mercaptoethanol. B, Unreduced samples. P, Patient; C, control serum; S, secondary antibody alone (goat anti-human IgE).



The clinical diagnosis and peak expiratory flow rate pattern at work, in addition to their improvement while the patient was away, strongly suggested the occupational nature of the patient's rhinitis and asthma. The positive immediate response to skin prick testing and the demonstration of specific serum anti-LSF IgE showed the underlying type I hypersensitivity mechanism. The positive specific bronchial challenge test results confirmed that LSF was the etiologic agent. The molecular weights of the newly identified allergens did not correspond with those of other LSF antigens identified so far.⁴⁻⁶ The IgE reactivity was preserved with reduced and nonreduced antigen, as well as after denaturation, suggesting that the involved epitopes are not conformational or dependent on SH₂ groups and that they are likely encoded in the amino acid primary sequence.

In summary, we describe a new cause of occupational asthma and rhinitis due to an unreported source of allergenic exposure to LSF in the industrial processing of parquet. As far as we know, there has been only one previous report of IgE-mediated bronchial asthma to LSF in a 10-year-old child whose symptoms were related to LSF exposure in a bakery.⁷ We also report the first characterization of allergens in this legume. LSF sensitization has to be taken into account in the industrial processing of parquet as a possible causative agent of occupational asthma in these workers.

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