

Original article

Occupational asthma caused by soybean hull: a workplace equivalent to epidemic asthma

A case showing that soya hull exposure at work causes occupational asthma without flour-related bronchoconstriction.

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Soybean has caused occupational asthma in handlers of soybean flour (1–3) and asthma epidemics in populations living near harbors where it was unloaded (4–8). We report here a case of occupational asthma due to soybean in a man exposed to this vegetal during the manufacture of animal food, who presented a bronchoconstrictive response when challenged with soybean hull dust but no response when exposed to flour, confirming that the exposure to hull parts of the plant may cause occupational asthma in the absence of disease related to soya flour.

A 29 year old man came to a clinic reporting wheezing from the last 3 months. He began to work in an animal feed factory 5 years earlier, separating the soybean grain from the hull before grinding. The patient reported symptoms mainly during soybean handling. Forced spirometry was normal, but a methacholine challenge test was positive at a cumulative dose of 230 mg. Skin testing was negative for storage mites and positive for house dust mites, cat, dog, sunflower, mustard, chestnut and soybean (Leti S.A., Barcelona, Spain). The concentration of specific immunoglobulin E (IgE) to commercial soybean extract was 4.09 kU/L (CAP System, Pharmacia Diagnosis AB, Uppsala, Sweden). We proceeded to perform a specific bronchial challenge with soybean following the brassing procedure. A first challenge with soya flour was negative up to a 2-h exposure, but a second challenge with soybean hull was positive after an expo-

sure of 5 min, with an immediate 40% decline from baseline FEV1 and the appearance of wheezing, and recovery 30 min later (Fig. 1).

Soybean flour contains high-molecular-weight proteins (18–51 kDa) able to cause asthma attacks in sensitized subjects (9,10). The soybean hull, on the other hand, contains a high concentration of low-molecular-weight proteins (<14 kDa), which are present only in very low concentrations in soya flour (11). Most patients who suffered asthma attacks during soybean-related epidemics showed a IgE positive response to three low-molecular-weight proteins from the hull (Gly m 1a, Gly m 1b and Gly m2) (12–16). The case we report here is the first to demonstrate a selective bronchial response to hull components of the soya plant in an occupational setting, with negative response after exposure to flour. This situation must be considered different from occupational asthma in soya flour workers, who are exposed to concentrations of low-molecular-weight proteins unable to cause asthma (3,9,10). We consider that the different responses to soybean hull and flour observed in our patient are related to the antigenic composition of these components of the plant. Subjects sensitized to low-molecular-weight proteins from the soya hull may develop asthma when exposed to this part of the plant, both in the environment and at work during the manufacture of food products, where the disease will manifest as occupational asthma.

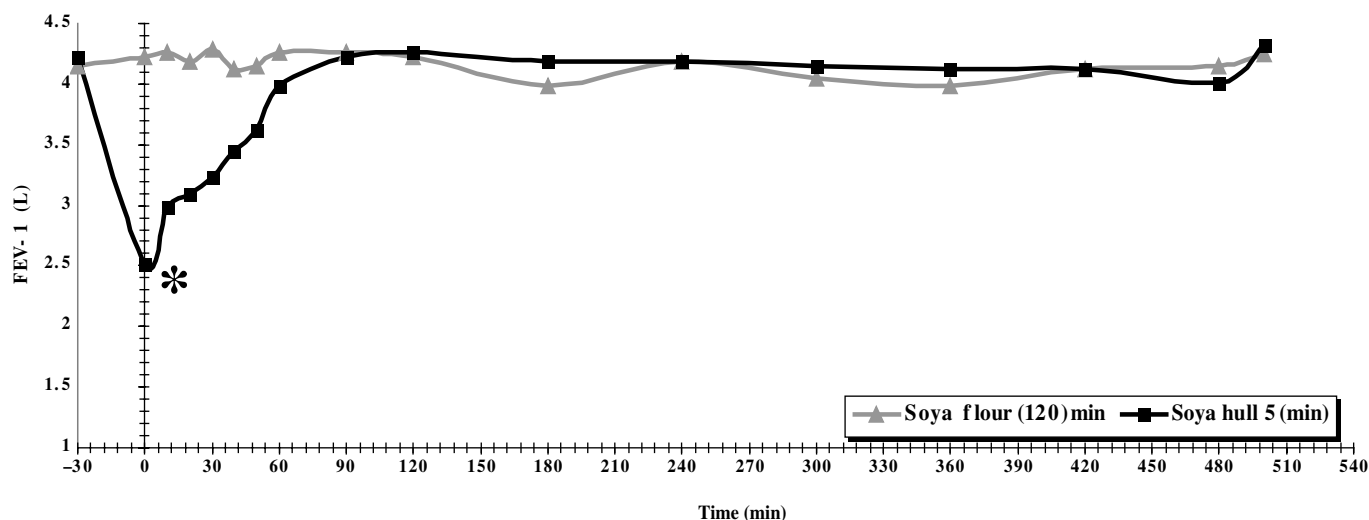


Figure 1. Bronchial provocation challenge with soya flour and soya hull dust. (*) Measurements with a $\geq 20\%$ decline from baseline FEV1.

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