

A case of occupational asthma and rhinitis caused by Sanyak and Korean ginseng dusts

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Key words: ginseng, occupational asthma, *Panax*, Sanyak.

Sanyak has been used as a food and herbal material for various symptoms in oriental medicine. There have been few reports of occupational asthma induced by herb materials (1–6). Until now there has been no account of occupational asthma caused by Korean ginseng. We describe a case of occupational asthma and rhinitis caused by Sanyak (*Dioscorea batatas*) and Korean ginseng (*Panax ginseng*), as confirmed by specific inhalation challenge tests.

A 29-year-old female patient was presented to the emergency department (ED) of Eulji University Hospital in Daejeon, Korea, for the treatment of dyspnea, wheezing, and cough. The patient had been incidentally exposed to airborne Sanyak dust, during the process of grinding dried Sanyak into powder, 5 min before the onset of symptoms. She had been a merchant of herbal materials for the previous 26 months. Twelve months before her visit, she had been admitted to another hospital and diagnosed with bronchial asthma after the sudden onset of dyspnea following an exposure to airborne ginseng dust. The patient had been suffering from nasal itching, sneezing, rhinorrhea, and nasal obstruction during the spring season for 6 years and had also experienced itching and swelling of the lips, tongue, and throat after ingesting fresh chestnut, sweet potato, and ginseng. The patient was a non-smoker and had no family history of allergic diseases.

The patient appeared acutely ill and had tachypnea. Diffuse expiratory wheezes

were noted over both lung fields. Arterial blood gas measurements at the ED indicated a pH of 7.414, PaCO₂ of 30.8 mmHg, PaO₂ of 70.4 mmHg and SaO₂ 94.6%. The total IgE level was 663.0 IU/ml. After pharmacological treatment, her symptoms resolved in a day.

Proteins were extracted from Ginseng and Sanyak, and used for skin-prick tests, inhalation challenge tests, and laboratory studies. The skin-prick testing was expressed as mean wheal diameter/mean erythema diameter (in millimeters): *Dermatophagoides pteronyssinus* 6.5/23.5 (Allergopharma, Reinbek, Germany); alder tree pollen 5.5/33.5 (Allergopharma); birch tree pollen 3.5/17 (Allergopharma); ginseng (1 : 100 w/v) 3/12; Sanyak (1 : 100 w/v) 3.75/19; histamine 4/17.5; and saline 0/0. Nonspecific and specific challenge tests were performed during her stable state. The methacholine bronchial challenge test revealed a 20% decline of forced expiratory volume in 1 s [FEV₁] at the concentration of 0.75 mg/ml. The bronchoprovocation tests showed early asthmatic responses to both Sanyak and ginseng extracts (1 : 1000 and 1 : 100 w/v, respectively). Serum-specific IgE and IgG4 antibodies to Sanyak were detected by enzyme linked immunosorbent assay [ELISA], but there was no specific antibody binding to ginseng. The sodium dodecyl sulphate-polyacrylamide gel electrophoresis [SDS-PAGE] and an IgE-immunoblot, a 35-kDa IgE-binding component was detected in the Sanyak extracts (Fig. 1), but no IgE-binding component was noted in the ginseng extract. The ELISA inhibition test, specific IgE binding, and IgG4 binding to Sanyak demonstrated specific, dose-dependent inhibition by Sanyak extracts but not by other control agents.

The patient in this study showed the occurrence of occupational asthma induced by Sanyak and Korean ginseng. Although there is a report of occupational asthma being induced by Brazilian ginseng (1) no cases of bronchial asthma caused by Korean ginseng have been previously reported. Brazilian ginseng and Korean ginseng are different plants in terms of taxonomic classification. Brazilian ginseng (*Pfaffia paniculata*) belongs to the Amaranthaceae family; in contrast, the Korean ginseng (*Panax*



Figure 1. IgE-immunoblotting of Sanyak (*Dioscorea batatas*) extract. Lanes: 1, patient serum; 2–4, control sera; 5, buffer (allergen: 0.5 µg/ml, serum dilution: 1/2 dilution).

ginseng) belongs to the Araliaceae family (1).

This study, it is suggested that Sanyak-derived allergen can induce IgE-mediated allergic reactions. We were unable to demonstrate specific IgE and IgG4 antibodies to Korean ginseng extract despite the fact that the patient showed a positive bronchial provocation and positive responses to a skin-prick test. Further studies are needed to investigate the pathogenic mechanism of occupational asthma caused by Korean ginseng.

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Allergens of *Ficus benjamina* (weeping fig): unique allergens in sap

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Key words: *Ficus elastica*; allergen; *Ficus benjamina*; weeping fig.

Ficus benjamina (weeping fig) is a common indoor plant, which causes commonly occupational allergy in plant keepers and less often in general allergy practice (1, 2). Approximately 3–4% of all atopics exhibit an immediate skin reaction to *F. benjamina* (3). The immunoglobulin (Ig)E-binding components of *F. benjamina* sap extracts (FbSE) have been characterized

in an immunoblotting study (4). However, the components of widely used green leave extracts have not been analysed.

We analysed 19 serum samples from patients with positive skin prick test (SPT) to *F. benjamina* with sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) and IgE immunoblotting using green leave extract

Table 1. IgE-binding bands of *Ficus benjamina* sap (FbSE) and green leave (FbLE) extracts and *F. elastica* sap (FeSE) extracts analysed by seven anti-FbSE IgE-positive sera

MW (kDa)	FbSE (%)	FbLE (%)	FeSE (%)
49	29	29	–
44	43	43	–
39	14	14	–
37	14	–	–
33	43	–	–
31	43	–	–
29	29	14	–
27	14	14	–
23	29	14	–
21	29	14	–
14	29	14	–
12	29	29	29

IgE, immunoglobulin E; MW, molecular weight.

from *F. benjamina* (FbLE; 5-min sonication of homogenized green leave suspension in NH_4HCO_3) and sap extracts (sap collected in NH_4HCO_3 to a 25% suspension) from *F. benjamina* and *F. elastica* (FeSE), another common indoor plant. Antigens and molecular weight markers (Electrophoresis Low-molecular Weight Calibration Kit, Pharmacia Fine Chemicals, Uppsala, Sweden) were separated with SDS-PAGE in a 10% gel and transferred to nitrocellulose sheets as described earlier (5). The IgE detection was performed with ^{125}I -labelled anti-IgE antibodies (CapRAST, Pharmacia Diagnostics, Uppsala, Sweden) and phosphorimager screens as described earlier (5).

Altogether seven (37%) of the 19 studied sera exhibited positive IgE response to FbSE in IgE immunoblotting. The FbSE included 12 IgE-binding bands, listed in Table 1. Of these bands the 49, 44, 39, 23, 21 and 12 kDa bands were also present in FbLE (Fig. 1). The 33 and 31 kDa bands appeared to be unique to FbSE. The patterns of the IgE-binding bands are similar to previous findings of FbSE, taking into consideration the usual variations in the molecular weight determinations in SDS-PAGE (4).

The FeSE was clearly less allergenic and contained only the 12 kDa band with diminished IgE-binding capacity. The FbSE and FeSE have previously been

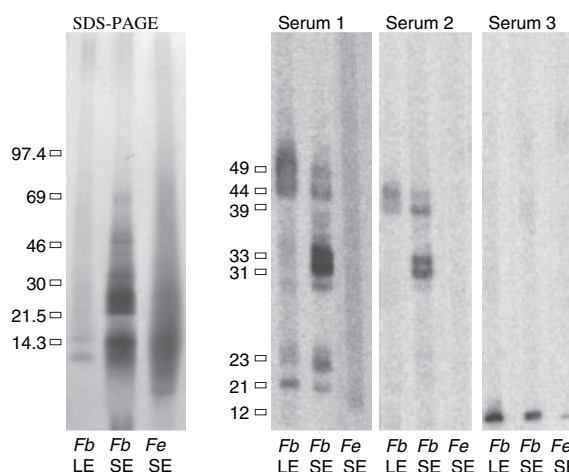


Figure 1. *Ficus benjamina* (Fb) and *F. elastica* (Fe) green leave (LE) and sap (SE) extracts run in a 10% sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE; Coomassie Brilliant Blue staining) and probed with three allergic sera and ^{125}I -labelled anti-immunoglobulin (Ig)E after immunoblotting.