

Case of rice allergy induced by epicutaneous sensitization to rice bran due to handling rice bran pickles

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Dear Editor,

There have been several reports of immunoglobulin (Ig)E-mediated reactions following contact with raw rice, inhalation of vapors from boiling rice and ingestion of cooked rice.^{1–3} However, rice bran allergy has never been reported. In this report, we describe the first case of occupational contact urticaria in a housewife due to the handling of rice bran in the form of rice bran pickles; this initial reaction was followed by allergic reactions after the ingestion of cooked, unpolished and unwashed rice in paella.

A 50-year-old Japanese housewife was referred to our clinic for a history of oral itch, face angioedema and cough after the ingestion of paella while travelling in Spain. She had begun pickling vegetables in rice bran paste 3 years previously. However, 6 months previously, she developed wheals and itch on the hands and forearms, while handling rice bran paste. Thereafter, she also felt oral itch after the ingestion of rice bran pickles and cooked, unpolished rice. Furthermore, wheals on the hands had developed during the washing of raw polished rice, although she regularly consumed polished rice, which was cooked after washing, without symptoms. Her past history included pollinosis due to Japanese cedar pollen but not to grass pollen.

Serum total IgE level was 652 IU/mL. The specific IgE measurements using the ImmunoCAP system (Phadia, Uppsala, Sweden) showed positive for rice, which was extracted from unpolished rice, wheat, barley and rye, whereas they were negative for ingredients of paella, such as shrimp, squid and scallop. The elicited response of skin prick tests (SPT) was considered positive when the average wheal diameter induced by the allergen was 50% of the positive control response induced by histamine chloride at 10 mg/mL. SPT with commercial extracts (Torii Pharmaceutical, Tokyo, Japan) for rice and wheat were positive. SPT with rice bran at 0.2 g/mL in saline, and unpolished and polished rice at 0.5 g/mL in saline were also positive. Additionally, the average wheal diameter (17.8 mm) induced by polished rice was diminished by washing (8.4 mm) and cooking (7.9 mm). The SPT with extracts of rice bran, unpolished and polished rice was negative in five control subjects.

In IgE immunoblotting, IgE binding at approximately 50 kDa was shown by the serum of the patient, whereas not by two controls without rice allergy (Fig. 1).

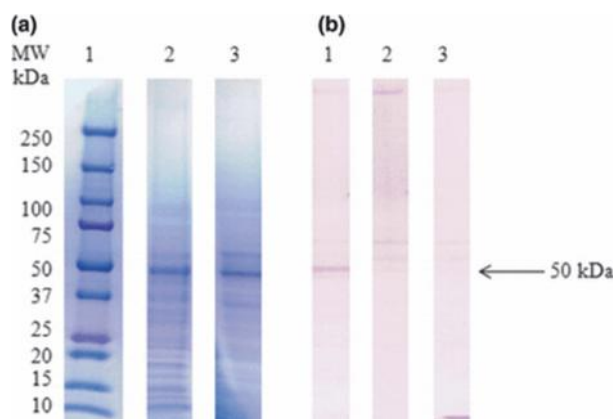


Figure 1. Sodium dodecylsulfate polyacrylamide gel

electrophoresis and blotting analyses of rice bran. (a) Gel stained with Coomassie Blue. Lane 1, molecular weight; lane 2, rice bran under the non-reducing condition; lane 3, rice bran under the reducing condition. (b) Immunoglobulin E immunoblotting using rice bran. Lane 1, patient's serum; lanes 2 and 3, non-allergic patients.

Rice bran is the layer between the inner white rice grain and the outer hull and is a by-product of the rice polishing process. Rice bran is used for foods and skin care products such as soap in not only Asian countries but also westernized nations because it is rich in vitamins and minerals. Rice bran pickles, nukazuke, are a traditional Japanese food. This patient first developed IgE-mediated contact urticaria due to rice bran during pickling vegetables in rice bran paste. Furthermore, continuous skin exposure to rice bran while dealing with rice bran pickles and washing rice was found to result in allergic reactions after ingestion of cooked, unpolished rice and unwashed rice, such as that found in paella.

Contact urticaria to rice while handling raw rice or throwing it during weddings has been reported in both Southern Europe and Japan.^{1,2} The relevant allergens in rice causing contact urticaria have never been identified, although several allergenic components in rice have been described, including Ory s 1 (35 kDa), a 14–16-kDa member of the α -amylase/trypsin inhibitor family, a 33-kDa allergen with glyoxalase I activity, and a 9-kDa lipid transfer protein.^{4,5} The molecular weight of the allergen involved in rice bran allergy in this patient was 50 kDa, indicating that the allergen involved in epicutaneous sensitization of rice bran can be different from the inhalant and food rice allergens reported. Additionally, in SPT, cooked rice induced much smaller wheals than uncooked rice, indicating that the rice bran allergens could be unstable during heating.

References

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