Editorial
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Is There Any Necessity to Prescribe Consumption of Walnuts Cooked by Different Processing Techniques to Patients With Walnut Allergy?

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The present study focused on identifying the usual methods of cooking walnuts in order to investigate changes in walnut allergen activity caused by cooking and evaluated the allergenic changes in walnut proteins within raw, dry-fried and boiled walnuts. Previous studies have reported a decrease in the allergen activity of walnut by thermal processing methods, which are not used in Korean kitchens, such as dry-frying and boiling. In Korea, Walnuts are consumed with rice and usually boiled and stir-fried with seasoning. Thus, the present study clarified the protein bands corresponding to raw walnuts and confirmed that the patterns of each walnut protein differ depending on cooking methods. This concern may be a very crucial point to understand the other tree nuts allergy as well as walnut allergy. The results of the present study differ from those of previous studies performed in Europe, although further studies with older participants are needed in order to draw more definite conclusions on lipid transfer protein (LTP). The other crucial point is that the findings of the present study support existing findings that the allergenic components of walnut have varying antigenicity depending on cooking methods. The allergenic components of walnut identified using diagnostic tests for walnut allergic patients could be reduced in walnuts cooked by different processing techniques. The allergenic components of walnut have varying allergen activity depending on cooking methods. Therefore, the allergenic components of walnuts identified using diagnostic tests for walnut allergic patients could allow physicians to prescribe consumption of walnuts cooked by different processing techniques to patients with walnut allergy.

Key Words: Walnut allergy; food processing; dietary restriction

Tree nut allergies have become a public health issue over the past decades and management of nut allergies is a remaining clinical challenge.[1] Walnuts, especially English walnuts (*Juglans regia*), are among the most common allergenic tree nuts.[2,3] Walnut allergies, which can be fatal or near-fatal, account for a large percentage of total cases of tree nut allergies affecting children.[4,5] Walnuts are currently the third most common food to induce anaphylaxis and the fourth most common food to induce immediate-type food allergy among Korean children.[5,6]

To date, 4 allergens have been identified from *Juglans regia*: Jug r 1, a 2S albumin; Jug r 2, a 7S vicilin-like globulin; Jug r 3, a non-specific lipid transfer protein (nsLTP); and Jug r 4, an 11S legumin-like globulin.[7-10] Allergens from different nuts belonging to the same protein family can present homologies in their amino acid sequences, which can contribute to the IgE cross-reactivity observed among tree nuts.

Otherwise, very little is known about how individual walnut proteins are affected by thermal processing in the context of a food system and frequently undergo some form of thermal processing prior to consumption. Interestingly, there are regional differences in walnut allergen activity patterns according to cultural cooking styles.

Food processing methods have the potential to modify food proteins, which can alter food allergen activity. Thermal processing operations used to achieve safe and palatable food products can have a multitude of physical and chemical effects on proteins in foods including allergens. Physical changes due to heating such as protein denaturation and aggregation can affect structural characteristics of food proteins, potentially altering their allergenic activity.[11,12] These physical changes can also affect detection of food allergens by impacting on protein solu-

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bility.[13,14] In addition to physical changes, chemical reactions occurring during thermal processing can also affect food allergens. Thus, it can be hypothesized that a decrease in IgE-binding capacity after some treatments could be caused by a decrease of protein solubility. As far as peanut allergy is concerned, it has been paradoxically shown that standard roasting of peanuts increases IgE binding to Ara h 1 and Ara h 2.[15,16]

The present study on this issue focused on identifying the usual methods of cooking walnuts in order to investigate changes in walnut allergen activity caused by cooking and evaluated the allergenic changes in walnut proteins within raw, dry-fried and boiled walnuts.[17] In addition, the effects of different cooking methods showed that of the 66 proteins, 57 were found in untreated walnuts with dry-fried walnuts and only 4 were seen in boiled walnuts. Interestingly, the remaining allergenic components of cooked walnuts cause serious reactions when consumed by children. Previous studies have reported a decrease in the allergen activity of walnut by thermal processing methods, which are not used in Korean kitchens, such as dry-frying and boiling. In Korea, walnuts are consumed with rice and usually boiled and stir-fried with seasoning. Thus, the present study clarified the protein bands corresponding to raw walnuts and confirmed that the patterns of each walnut protein differ depending on cooking methods. This concern may be a very crucial point to understand the other tree nuts allergy as well as walnut allergy.

A few studies have looked for combinations of processing methods to alter the allergenicity of foods.[17,18] However, there are different views with regard to walnut allergy. Some treatments, such as dry-roasting can reduce IgE-binding capacity *in vitro*. Pressure and thermal treatments have also been used to diminish the cross-linking capacity of IgE to walnut effector cells. Pressure treatment at 138°C can decrease the IgE binding of walnut proteins *in vitro* and IgE cross-linking capacity on effector cells, which are more decreased with high pressure treatment at a low temperature.

The results of the present result differ from those of previous studies performed in Europe, although further studies with older participants are needed in order to draw more definite conclusions on LTP. A crucial point is that the findings of the present study support existing findings that the allergenic components of walnut have varying antigenicity depending on cooking methods. The allergenic components of walnut identified using diagnostic tests for walnut allergic patients could justify different dietary restrictions on walnut cooked by different methods.

The allergenic components of walnut have varying allergen activity depending on the cooking method. Therefore, the allergenic components of walnuts identified using diagnostic tests for the allergic participants could allow physicians to prescribe consumption of walnuts cooked by different processing techniques to patients with walnut allergy.

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