

Highlighting of an allergenic cross-reaction between crustaceans, house dust mites and crickets using 2D Western blot

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Introduction

Entomophagy is a promising alternative source of protein in food which is becoming more common in European countries. However, the protein composition and the potential molecular allergens present in this new food matrix have still not been studied in detail or described in the literature. The aim of the present study was to analyze the potential cross-reactivity between the widespread allergens of shrimps and house dust mites (HDM) and those of crickets (*Gryllodes sigillatus*).

Material & Method

Twelve patients aged 7 to 50 y.o. and presenting a shellfish and/or HDM allergy were selected on the basis of their positive specific IgE (sIgE) results on ImmunoCAP250 (Thermo Fisher Scientific) in particular against two tropomyosins, Der p 10 (HDM, from 0.01 to > 100 kUA/L) and Pen a 1 (shrimps, from 14.3 to >100 KUA/L). A total *Gryllodes sigillatus* protein extraction was performed and proteins were separated on the basis of their isoelectric point (Ip) and their molecular weight. In addition, 1D and 2D Western blots (WB) were carried out to determine the molecular allergen reactivity profile of each patient serum to the extract.

Results & Discussion

The 1D WB confirmed the anti-HDM and anti-shrimp sIgE reactivity to a 37 kDa molecular weight of cricket protein that could be either tropomyosin or arginine kinase (AK). The 2D WB confirmed the reactivity against a 37 kDa protein with an Ip of 3-4 that could be tropomyosin and/or against a 37 kDa protein with an Ip of 6-7 that could be AK. Furthermore, another spot of interest located around 17.5 kDa with an Ip of 4 could be troponin C, another protein described as a molecular allergen in HDM and shellfish. These last results indicated a high sequence homology with insect proteins.

Conclusion

These preliminary results showed a clear IgE cross-reactivity between the cricket tropomyosin and sIgE in the serum of 12 shrimp and/or HDM allergic patients with positive sIgE to Der p 10 and/or Pen a 1. The proteins identified as responsible for this cross-reactivity are tropomyosin, arginine kinase as well as troponin C. These hypotheses will be confirmed by a precise identification by mass spectrometry (UHPLC-MS/MS).