

# ELISA Based Immunoreactivity Reduction of Soy Allergens through Thermal Processing

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## **Abstract:**

Allergens are proteins and are, therefore, likely to be denatured when subjected to thermal treatment. Traditional cooking has so far been able to reduce allergen sensitivity by around 70-90%. This study was aimed at evaluating the effect of a broad range of thermal treatments on the reduction of soy immunoreactivity (IR) in a 5% slurry using a sandwich ELISA technique. Cooking at 100 °C (10-60 min) and different thermal processing conditions, such as in commercial sterilization (with a process lethality ( $F_0$ ) between 3 and 5 min) and selected severe thermal processing conditions ( $F_0 > 5$  and up to 23 min) were used in the study to evaluate their influence on allergen IR. Based on an IR comparison with an internal soy allergen standard, the allergen concentration in the untreated soy sample was calculated to be equivalent to 333 mg/kg (ppm). Cooking conditions only reduced the IR sensitivity to about 10 mg/kg (~1.5 log reductions), while the thermal processing treatments lowered the allergen IR up to  $23 \times 10^{-3}$  mg/kg (or 23 ppb) (>4 log reductions). FTIR analysis indicated significant changes in protein structure resulting from the thermal processing treatments, with a higher degree of allergen reduction corresponding with a higher value of random coil percentages. The influence of process severity on color and rheological properties was, however, minimal.

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