

Effects of the Maillard Reaction on the Immunoreactivity of Amandin in Food Matrices.

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Abstract:

Amandin is the major storage protein and allergen in almond seeds. Foods, containing almonds, subjected to thermal processing typically experience Maillard browning reaction. The resulting destruction of amino groups, protein glycation, and/or denaturation may alter amandin immunoreactivity. Amandin immunoreactivity of variously processed almond containing foods was therefore the focus of the current investigation. Commercial and laboratory prepared foods, including those likely to have been subjected to Maillard browning, were objectively assessed by determining Hunter L* , a* , b* values. The L* values for the tested samples were in the range of 31.75 to 85.28 consistent with Maillard browning. Three murine monoclonal antibodies, 4C10, 4F10, and 2A3, were used to determine the immunoreactivity of the targeted samples using immunoassays (ELISA, Western blot, dot blot). The tested foods did not exhibit cross-reactivity indicating that the immunoassays were amandin specific. For sandwich ELISAs, ratio (R) of sample immunoreactivity to reference immunoreactivity was calculated. The ranges of R values were 0.67 to 15.19 (4C10), 1.00 to 11.83 (4F10), and 0.77 to 23.30 (2A3). The results of dot blot and Western blot were consistent with those of ELISAs. Results of these investigations demonstrate that amandin is a stable marker protein for almond detection regardless of the degree of amandin denaturation and/or destruction as a consequence of Maillard reaction encountered under the tested processing conditions.