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New antibodies to specifically detect deamidated gluten in food.

Olivier Tranquet, Colette Larré, Sandra Denery-Papini

Diversification of gluten applications was achieved through the production of water-soluble gluten also named wheat isolates. Deamidation, one of the methods for this purpose, may be obtained with either chemical (acid or alkali) or enzymatic treatment and lead to the conversion of glutamine into glutamic acid. These types of products can be found both in cosmetics and food.

From the 2000’s severe allergic reactions to deamidated gluten (DG) have been reported in individuals although they are tolerant to native wheat protein. Management of these allergies is extremely difficult both for patient and food manufacturers. However for clinical purposes a wheat isolate has been proposed for skin-prick-test (Battais et al., 2006) And more recently specific epitopes linked to this allergy were identified (Denery-Papini et al., 2012). Up to now none of the available analytical methods are suitable to detect DG. The main aim of this study was to produce and characterise antibodies to detect DG in food.

Five mouse monoclonal antibodies were produced and characterized with classical immunochemical methods. Interestingly, all bind specifically deamidated gluten with high affinity and without any reaction to native wheat gluten. A competitive ELISA assay to detect deamidated gluten was developed with our best antibody. Compared to the reference ELISA method based on the R5 antibody (Valdes et al., 2003), our assay enable the detection of industrial deamidated product in the ng range while R5 method didn’t. Further experiments are performed in order to validate this assay on a larger set of food products. This new method is expected to contribute to a better risk assessment associated with deamidated gluten.

