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DEVELOPMENT OF REAL-TIME PCR ASSAYS FOR THE DETECTION OF ALLERGENIC SPECIES IN FOOD

GRAZIANO S., PAFUNDO S., GULLÌ M., MARMIROLI N.

Division of Genetics and Enviromental Biotechnology, Department of Environmental Sciences, University of Parma, Viale G.P. Usberti 11/A, 43100 Parma (Italy)

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Food allergies are a major health concern in industrialized countries and may affect up to 3% of the adult population and 6-8% of the children in Europe. A large number of anaphylactic reactions to food are treated in emergency department each year, and it is estimated that food allergy causes several deaths annually. The level of exposure necessary to provoke a reaction varies from food to food and from person to person. Most often, reactions are elicited after exposure to 1-100ppm of an allergen, but sometimes, only minute amounts are required. Thus, the European Commission proposed the European Food Labelling Directive 2000/13/EC, 2003/89/EC and 2006/142/EC. The proposal contains a list of liable ingredient to cause allergies. The EU allergen list is intended to be dynamic, and more allergens may be included over time. Detection of hidden allergens may be difficult by the consumer, because of products mislabelling or unintentional cross-contamination during food production. Any molecule that is specific for the allergenic ingredient can serve as a marker of its presence in food: mostly protein and DNA are targeted for the purpose. DNA analysis, as compared to protein, is more specific, reproducible, sensitive, rapid and inexpensive. DNA is also highly stable during food processing; DNA-based tests have proven to be very useful to authenticate the species used in foodstuff production.

This study describes the comparison of several DNA-extraction methods utilised on several food matrices like nuts, fruits and vegetables and on different food products such as biscuits, yogurt and baby foods. PCR, Real-Time PCR and Multiplex PCR with SYBR®GreenER™ assays have been designed to specifically detect different allergenic plant species, and they have been tested on several commercial food products.