Molecular fragmentation of wheat-germ agglutinin induced by food irradiation reduces its allergenicity in sensitised mice

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WGA, an agglutinin from wheat germ which is largely responsible for many of wheat’s allergies, was used as a model to investigate the action of ionising radiation on WGA’s anti-nutritive effects in sensitized mice. Based on the molecular structure, the present study also examined the structural modification of WGA in relation to the range of dose. Structural integrity was monitored using HPLC, fluorescence spectrometry and circular dichroism. To study in depth the effect of irradiation on food allergenicity, we analysed weight loss, plasma levels of cytokines and leucocytes as well as the histological profile of the gut of animals sensitised and subjected to oral challenge with WGA for 7 days. Results showed a loss of intrinsic activity and the formation of insoluble amorphous aggregates with a lack of native conformational structures after irradiation. Current findings suggest that the allergenic epitopes of WGA became less active and antigenic after high-dose radiation. The reduction of cytokines typical of allergic reactions, with decreased lymphocytic infiltrate, was observed in the gut of mice given irradiated versus native WGA. Food irradiation proved effective and safe in combating immunological and allergic effects of WGA.

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