

Process induced changes in IgE binding of the cow's milk allergen β -lactoglobulin - Influence of heat, fermentation and proteolysis

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ABSTRACT

It is important to gain better knowledge of the influence of food processing on the structure and allergenic potential of food proteins. Cow's milk allergy is the most common food allergy in early childhood and also occurs in adults. β -Lactoglobulin (BLG) is one of the major cow's milk allergens.

Aims: To study how the allergenicity, in form of the IgE binding ability, of the cow's milk protein BLG is affected of different processes and treatments. Three different treatments were studied: heat, fermentation and tryptic digestion.

In the first study the effect of heat treatment on the IgE binding ability of β -lactoglobulin, as pure protein or in whole milk, was studied by inhibition of IgE antibody binding, using FEIA-CAP inhibition. As a source of specific IgE serum pools from milk allergic patients were used. A slight but significant decrease in IgE binding was seen in heat-treated β -lactoglobulin solution at 74°C. A more pronounced decrease was found at 90°C. The IgE binding of BLG in milk after heat treatment at 90°C was also significantly decreased. However, none of the heat treatments totally eliminated the IgE binding ability of the protein. In some commercial fermented acidified milk products the IgE binding ability of BLG was significantly impaired compared to non-fermented milk

In the second study an ELISA method was developed, which made it possible to use less volumes of sera. The effect of fermentation by *Lactobacilli* and tryptic digestion in whole milk on the IgE binding ability of BLG was studied with individual sera. The sera showed similar changes in inhibition pattern for the IgE binding to BLG. There was no additional effect on IgE-binding of bacterial fermentation beside the effects of heat treatment, but chromatography data showed a gradual degradation of BLG. BLG in some commercially fermented milk products showed similar IgE binding as not fermented high pasteurized milk. Proteolysis with trypsin gave an extensive degradation of BLG. The IgE binding ability was strongly decreased.

Conclusions: Heat treatment of BLG decreases the IgE binding ability of BLG, but it is not eliminated. Fermentation did not affect the IgE binding. Trypsin digestion strongly decreased the IgE binding.