

## Effect of Salt on the Structure and Function of Egg Yolk Antibody

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### Summary

Egg yolk is a good source of immunoglobulins, one egg containing more than 100 mg of IgG-type immunoglobulins (called IgY). The IgY antibody is therefore expected to be used for passive immune foods and for various processes in food technology. However, IgY has been only partially characterized and effects of food processing or storage conditions on the properties of IgY have not been well understood. It is necessary to characterize IgY more in detail for the use of IgY in food industry.

One of the interesting properties of IgY already reported is its high agglutination activity in a high salt solution, although the reason of this high agglutinability is not known. In this study, the effect of high concentrations of salt on the behavior of IgY was investigated.

Agglutination of antigen-coated latex microparticles by IgY antibodies was enhanced by adding 1~2 M NaCl. Precipitin line formation by immunodiffusion in an agar plate was also enhanced by high concentrations of NaCl. In spite of the high agglutination activity of IgY in high salt solutions, the reactivity itself between IgY antibodies and antigens measured by enzyme-linked immunosorbent assay (ELISA) was not changed by the addition of salt. Gel filtration and Laser light-scattering analyses demonstrated that polymer formation of IgY antibodies, which would produce multivalent antibody complexes, was not occurred by addition of salt. UV and fluorescence spectra indicated that no distinctive change in the conformation of IgY happened in high salt solutions. The high agglutination activity was therefore due to subtle changes in the electrical charges of the IgY molecule in the presence of high concentrations of salt.

The stability of IgY, especially under acidic conditions, was shown to be decreased by adding salt. The acid stability of IgY was variable depending on the ions contained in the acidic solutions. The activity of IgY antibodies seemed to be markedly reduced in the presence of potassium, chloride or citrate ions. The high sensitivity of IgY antibodies to such ions may relate to its unique agglutinability in the presence of high concentrations of salt.