

The Impact of Transglutaminase on Soy Protein and Tofu Texture

ABSTRACT

The enzyme transglutaminase was investigated for its cross-linking effect on the soy proteins of tofu. In vitro incubations confirmed that soy proteins are excellent substrates for transglutaminase, especially when denatured. The macroscopic effects resulting from the addition of transglutaminase were compared to changes at the microstructural and molecular level. Treatment produced a firmer tofu, with a significantly increased fracture force. Examination by SEM showed a change in the matrix structure, with transglutaminase resulting in a finer-stranded, uniform network that accounted for the increase in fracture force. At the molecular level, little, if any, cross-linking occurred within the tofu matrix in situ. This suggests that the change in functional properties afforded by addition of transglutaminase to tofu is due to a side reaction of the enzyme, for example hydrolysis of glutamine residues, rather than its cross-linking activity. These ideas are further explored in the accompanying paper.