

Protein cross-linking in food

Abstract

The aims of this paper are (1) to probe the relationship between molecular structure and protein cross-linking ability for a range of small molecules; (2) to establish whether this relationship holds within a food matrix; and (3) to test the impact of Maillard cross-linking on food functionality, particularly texture, in wheat- and soy-based food systems. A variety of molecules were obtained, either commercially or via organic synthesis. Cross-linking ability was tested using our standard model system, employing ribonuclease A and analyzing the results by SDS-PAGE. Molecules of varying reactivity were tested in wheat- and soy-based products, and the changes in functionality were correlated with changes in protein cross-linking. No simple relationship was found between molecular structure and ability to cross-link ribonuclease. Only the most reactive reagents were able to cross-link within the food matrix. Nevertheless, a low degree of cross-linking was shown to have significant consequences on the properties of wheat- and soy-based foods, suggesting that the Maillard reaction may represent a means to control food texture.