

Physicochemical Modification and Sequestration of an Immunodominant Gliadin Peptide by Dietary Polyphenols

Charlene B. Van Buiten
Department of Food Science

Abstract

Celiac disease (CD) is an autoimmune enteropathy stimulated by the consumption of gluten, a protein found in wheat, barley and rye. The biological structure of gliadin, the immunostimulatory subunit of gluten, plays an important role in CD propagation, as its proline-rich sequence induces the formation of polyproline-II helices (PPII) which are preferentially recognized by enzymes and antigen presenting cells. This structure is also favorable for interaction with polyphenols, which are commonly consumed in plant-based foods. The proposed study will investigate the potential of dietary polyphenols to interact with α_2 -gliadin, a form of gliadin that has been implicated as a dominant immunostimulatory peptide in CD due to its high frequency of proline residues and native PPII structure. We will first characterize the interaction mechanisms that drive the formation of complexes between a panel of dietary polyphenols and α_2 -gliadin. We will then determine the impact of complex formation on the PPII motif in α_2 -gliadin structure. This study will be the first to investigate the potential of natural compounds to act as immunomodulatory agents in CD through structural modification of gliadin, and will provide the foundation for further exploration of dietary polyphenols as therapeutic agents for CD *in vitro*.