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Structural changes in zein protein during dough formation for developing gluten-free formulas

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The incidence of celiac and other gluten intolerances is growing worldwide. At present the only effective remedy is strict lifetime adherence to a gluten-free diet. However, the quality of gluten-free products available in the market is not comparable to that made from wheat, and the search for gluten alternatives is needed. A major gap in the current knowledge is how to modify proteins from gluten-free grains to mimic functionality of wheat gluten. Zein is a class of prolamins obtained from corn fractionation as a by-product. Zein could hold a potential to replace gluten in gluten-free formulas due to its ability to form a viscoelastic protein network when mixed with water and held above its glass transition temperature (30°C). The objective of this study was to assess protein secondary structure of zein during dough mixing at 40°C. The effect of different additives (hydrocolloids, cross-linking enzymes and proteins) on structure of zein-starch dough was investigated. Dough properties were evaluated by a Farinograph. Secondary structure analysis was conducted by deconvoluting the amide I band (1600-1700 cm⁻¹). Results demonstrated that some additives were able to induce extensive and stable β -turns which resulted in zein-starch dough with similar functionality to a wheat viscoelastic system. More data will be presented and discussed.

Biography

Sanaa Ragaei is an Adjunct Professor and Cereal Program Manager at the Department of Food Science having extensive research experiences working with the grain industry in Canada such as millers, bakers and food developers. She is highly skilled in the fields of Grain Chemistry and Biochemistry. She has been working in the areas of effects of processing on bioactive components in cereal products, functionality of different prebiotics on the shelf life and quality of frozen dough, ingredient interactions and their functionality in different formulas, gluten-free products and developing high fiber functional wheat products for the functional food industry. All research projects in her laboratory are supported by several food industries in Canada.

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