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Relationship of Molecular Weight Distribution Profile of Unreduced Gluten Protein Extracts with Quality Characteristics of Bread

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Abstract

A statistical correlation was established among the molecular weight distribution patterns of unreduced gluten proteins and physicochemical, rheological and bread-making quality characteristics of wheat varieties. Size exclusion chromatography fractionated the gluten proteins apparently into five peaks. Peak I signified glutenins (30–30 kDa), peak II as gliadins (20–55 kDa), peak III as very low molecular weight monomeric gliadins (10–28 kDa), peak IV and V, collectively, as albumins and globulins (<10 kDa). Peaks I and II had appreciable effects on dough development time (r = 0.830** and r = –0.930**) and dough stability (r = 0.901** and r = –0.979**). Peak I was associated with R/E ratio (r = 0.745**), gluten index (r = 0.959**), and gliadin/glutenin ratio (r = –0.952**), while peak II influenced inversely as expected. Peak I exhibited positive statistical significance with bread loaf volume (r = 0.848**); however, peak II had negative (r = –0.818**) impact. Bread firmness increased with increment in peak II (r = 0.625**), and decreased with accretion in peak I (r = –0.623**).

1. Introduction

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