

Impact of carrageenan copolymers from two red seaweed varieties on dough and bread quality

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Abstract

The impact of cottonii (COT, *Kappaphycus alvarezii*) and spinosum (SPI, *Eucheuma denticulatum*) flour (1–10% w/w) on rheological properties of wheat (WHE) and quality of bread was investigated. Wheat-COT and WHE-SPI had higher water absorption capacities, dough development times, dough stabilities and farinograph quality numbers than WHE dough. Extensograms of composite dough were largely similar to those of WHE at the same incubation times. Dough energy decreased whereas elasticity ratio (ratio of maximum resistance to extensibility) increased when incubation time was increased from 45 to 135 min. Wheat-COT and WHE-SPI had lower pasting temperatures but higher peak, final, breakdown and setback viscosities than WHE flour. Specific volume of bread containing COT (5% w/w) or SPI (7.5% w/w) was not different ($p > 0.05$) from that of WHE bread. Crumb texture properties of these composite breads were also largely similar to those of WHE bread. The physical properties of WHE dough and bread were influenced by gluten, whereas those of WHE-COT and WHE-SPI were influenced by gluten in addition to κ -carrageenan in COT and ι -carrageenan in SPI. Protein, ash and dietary fibre contents increased ($p < 0.05$) whereas carbohydrate content of bread decreased ($p < 0.05$) when WHE was replaced with COT or SPI (5% w/w).

Keywords: Wheat, dough, energy