MARKET DEMAND

Performance of Pea vs. Cellulose Fibre in White Bread

White bread enriched with pea fibre had several benefits over cellulose fibre. However, specific dough handling and bread quality characteristics need improvement to enhance the competitiveness of pea fibre in the U.S. market.

DEMAND FOR DIETARY fibre has increased due to its ability to reduce cholesterol, blood glucose and some types of cancer, among other health benefits. The recommended daily fibre intake is 20–35 g, but most of the population only consumes 10–15 g/day.

As more consumers are drawn to the health benefits of fibre consumption, there is a greater demand for fibre-rich foods. White pan bread is a staple of western diets, but it typically lacks fibre.

Fibre can be derived from many sources, including peas, wheat, oats and cellulose (wood), with each fibre ingredient possessing unique functional, nutritional and quality attributes. In Canada, pea hull fibre can be used for bread enrichment, but cellulose fibre is not permitted. In the U.S., lower-priced cellulose fibre is allowed in bread and has replaced pea fibre in that market.

The objective of this research was to identify advantages and challenges associated with using pea fibre in bread that might lead to greater competitiveness in the U.S. market.

Three pea fibres and two cellulose fibres from different manufacturers were added to white bread, targeting 2 g fibre/50 g bread serving. Fibre properties (content, particle size, water-holding capacity, antioxidant level), dough mixing properties (development time, mixing tolerance index, mixing time and energy), bread quality indicators (oven spring, loaf volume, moisture) and sensory attributes (crumb grain and texture, aroma, flavour) were evaluated. Bread quality and sensory properties were assessed after one and seven days.

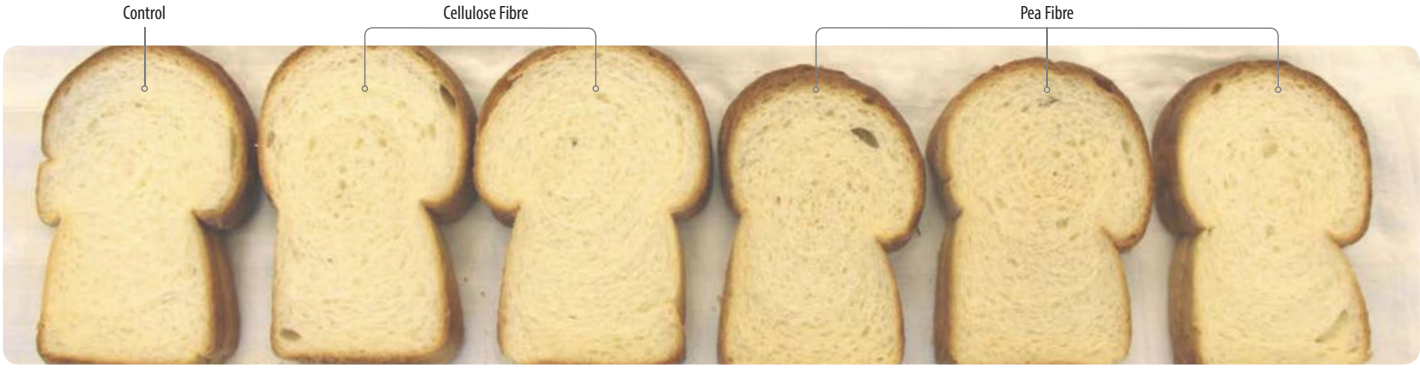
Bread enriched with pea fibre had a similar flavour and overall quality as breads made with cellulose fibre and those without added fibre (control). Compared to the cellulose and control breads, pea fibre bread had a softer crumb, better moisture retention and more antioxidant activity after seven days of storage. Pea fibre addition also reduced dough mixing time, improved mixing tolerance and required slightly less energy to develop the dough over cellulose fibre.

Challenges associated with pea fibre addition included longer dough development time and reduced loaf volume and oven spring (i.e., final burst of rising when a loaf is put in the oven), compared to the cellulose and control breads. However, adding either type of fibre generally reduced loaf volume and oven spring because the fibre replaced flour (gluten), which provides dough structure to aid rising.

Compared to cellulose fibre, pea fibre had less total dietary fibre content but more soluble fibre and antioxidants. More pea fibre was needed than cellulose fibre to obtain 2 g of total dietary fibre per slice of bread. Pea fibre also increased the cost of the flour/fibre blend (+$2.06 to $5.57/kg as of 2013) compared to cellulose fibre.

This research suggests that pea fibre can be used to produce fibre-enriched white bread with comparable dough handling and product quality to cellulose bread. Pea fibre also has several advantages over cellulose fibre. However, further research is required to improve certain dough handling and bread quality characteristics. Future research to enhance market competitiveness might include fibre hydration for quicker dough development time or the addition of wheat gluten for better oven spring and loaf volume.

The interior crumb of the control white bread compared to those enriched with cellulose and pea fibre.



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