

Whey protein structure discovery heralds next generation gluten-free breads 31 March 2011

Bakeryandsnacks.com (31/03/2011) reported that researchers in The Netherlands claim to have pushed back boundaries on gluten-free bread formulation by using whey protein and locust bean gum structured into a 'mesoscopic' protein particle suspension.

Removing gluten from bread poses technological challenges because the protein possesses properties which are vital for both the retention of gas during fermentation, and the preservation of moisture levels in the dough.

Previously, the same researchers showed that mesoscopically structured whey protein results in a mixture with good bread making properties, such as strain hardening - an attribute which has not been reported in gluten-free mixtures before.

The aim of this study was to analyse whether the mixture can be used in a regular bread-making process that uses dough as the starting material, as opposed to a batter system as is often used to make gluten-free breads.

Whey protein (WP) was transformed into three different mesoscopic structures: WP aggregates, a WP gel and WP particles. These were combined with wheat starch, locust bean gum, salt, yeast, sugar and water, resulting in a mixture with a protein concentration of 2.4%. A fourth 'reference formulation' was also produced with the same ingredients but with gluten instead of WP.

Two different proving methods were used: with sheeting and without sheeting. For each mixture, the amount of gas produced and the increase in volume during proving were analysed. After proving, the mixtures were baked at 200°C for 35 minutes. The breads were then cooled for analysis of volume and structure.

When the sheeting step was omitted, the volumes of the baked gluten-free breads were 2.4ml/g for the WP aggregate bread, 3.6ml/g for the WP gel bread and 3.7ml/g for the WP particle bread. These values are within the typical range for wheat breads.

The breads with the WP particle networks resulted in a larger volume than the reference bread, when the amount of WP was only 2.4%. The fact that this amount was sufficient to obtain breads with a large volume is related to the protein structure. However, although the volumes of the breads with the WP gel and WP particles were comparable, their crumb structures were significantly different.

And they believe that even better results could potentially be achieved in a commercial context, concluding: "The results shown in this study were obtained with a gluten-free mixture that contained a limited number of ingredients. Further improvements of the bread properties can surely be obtained through the addition of more components often used as bread improvers in the baking industry."

Source: Journal of Cereal Science

Published online ahead of print, doi: 10.1016/j.jcs.2011.02.006

"Preparation of gluten-free bread using a meso-structured whey protein particle system."

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