

Accepted Manuscript

Rice ripened at lower temperature slows firming of bread

Noriaki Aoki, Takayuki Umemoto, Junichi Tanaka

PII: S0733-5210(16)30200-4

DOI: [10.1016/j.jcs.2017.10.009](https://doi.org/10.1016/j.jcs.2017.10.009)

Reference: YJCRS 2462

To appear in: *Journal of Cereal Science*

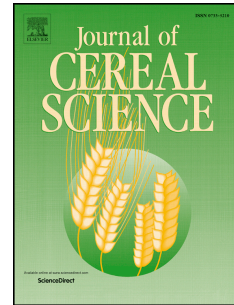
Received Date: 29 August 2016

Revised Date: 14 September 2017

Accepted Date: 16 October 2017

Please cite this article as: Aoki, N., Umemoto, T., Tanaka, J., Rice ripened at lower temperature slows firming of bread, *Journal of Cereal Science* (2017), doi: 10.1016/j.jcs.2017.10.009.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Rice ripened at lower temperature slows firming of bread

Noriaki Aoki¹, Takayuki Umemoto², Junichi Tanaka^{2,3,*}

¹ Kyushu Okinawa Agricultural Research Center, NARO (2421 Suya, Koshi, Kumamoto 861-1192, Japan)

² Institute of Crop Science, NARO (2-1-18 Kannondai, Tsukuba, Ibaraki 305-8518, Japan)

³ University of Tsukuba Graduate School of Life and Environmental Sciences (2-1-18 Kannondai, Tsukuba, Ibaraki 305-8518, Japan)

*Author for correspondence: Junichi Tanaka, Institute of Crop Science, NARO, 2-1-18 Kannondai, Tsukuba, Ibaraki 305-8518, Japan. Tel: +81-29-838-7135. Email: tanajun@affrc.go.jp

Key words: Amylopectin; Bread firming; Firming rate; Rice bread

Abstract

Firming of bread after baking leads to waste due to loss of palatability. Firming is affected mainly by amylopectin, a starch component. Here, we found that the firming rate of rice bread can be slowed by using flour made from rice grains which filled at lower temperatures, because temperature during grain filling (TGF) affects amylopectin chain synthesis. We found significant positive correlations between TGF and firming rate of gluten-containing rice bread (rice flour 80% + wheat gluten 20%) and rice-flour-containing wheat bread (wheat flour 80% + rice flour 20%) made from samples of rice grains filled at 21.0 to 28.3 °C. Regressions indicate that if TGF is decreased from 27 to 22 °C, the shelf life of gluten-containing rice bread will be extended by about 150%, and that of rice-flour-containing wheat bread by about 50%. The slow-firming effect was confirmed by sensory tests. This result is potentially applicable to other cereals such as wheat, whose amylopectin structure is also affected by TGF.

Abbreviations: DP, degree of polymerization; TGF, Temperature during grain filling

1. Introduction

Much bread is wasted owing to the loss of palatability after baking: in some countries, more than 20% of bread is wasted (Jörissen et al., 2015; Quested et al., 2013). Bread firming is one of the most important contributing factors. Reducing bread firming would extend bread shelf life, with great benefit to the bread industry and consumers.

Extensive research has been conducted to reveal the molecular basis of bread firming (Fadda et al., 2014). Starch, composed of amylose and amylopectin, plays a major role.

Download English Version:

<https://daneshyari.com/en/article/8881513>

Download Persian Version:

<https://daneshyari.com/article/8881513>

[Daneshyari.com](https://daneshyari.com)