Accepted Manuscript

Improving freeze tolerance of yeast and dough properties for enhancing frozen dough quality - A review of effective methods

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PII: S0924-2244(17)30504-6

DOI: 10.1016/j.tifs.2017.11.017

Reference: TIFS 2127

To appear in: *Trends in Food Science & Technology*

Received Date: 28 July 2017

Revised Date: 18 October 2017

Accepted Date: 28 November 2017

Please cite this article as: Luo, W., Sun, D.-W., Zhu, Z., Wang, Q.-J., Improving freeze tolerance of yeast and dough properties for enhancing frozen dough quality - A review of effective methods, *Trends in Food Science & Technology* (2018), doi: 10.1016/j.tifs.2017.11.017.

Abstract

Background: Frozen dough technology could effectively extend the shelf life of bread to ensure the freshness, which is widely used and gradually replace the traditional bread production. However, during the production and storage of frozen dough, a series of problems could take place, such as inhibition of yeast activity, damage of the structure of the dough, leading to the deterioration of dough quality.

Scope and Approach: This review summarizes the factors that affect the final quality of frozen dough, including yeast activity, dough structure and dough properties. Some effective methods for improving freeze tolerance of yeast, dough structure and dough properties are discussed, including addition of various additives, use of genetic engineering technique, optimization of freezing and storage conditions, and employment of novel freezing technology.

Key Findings and Conclusions: The addition of additives can not only improve the freeze tolerance of yeast but also maintain the rheological and thermophysical properties of dough. Through the modification of gene, freeze tolerance and fermentation ability of yeast can be improved. Optimizing freezing and storage conditions ensures the activity of yeast as well as dough network structure so that freezing damage due to ice crystals can be minimized. In addition, novel freezing technology such as ultrasound-assisted freezing can simultaneously accelerate the freezing process as well as generate fine and uniform ice crystals, thus protecting dough network structure.