

2ND INTERNATIONAL CONFERENCE ON
APPLIED MICROBIOLOGY AND BENEFICIAL MICROBES
OCTOBER 23-25, 2017 OSAKA, JAPAN

Chromosomal aneuploidy improves brewing characteristics of sake yeast

Yuki Fujimaru, Masafumi Kadowaki, Seiga Taguchi, Mayuko Sakamoto, Mai Sakatani, Ayami Fujikawa and Hiroshi Kitagaki
Saga University, Japan

Statement of the Problem: Breeding of brewery yeasts have been performed through acquisition of strains having single nucleotide polymorphisms. Here, we propose that aneuploidy of sake yeast is a novel target of breeding of novel brewery yeasts.

Methodology & Theoretical Orientation: We surveyed whether chromosomal aneuploidy affects the brewing characteristic of sake yeast. First, we obtained many haploid strains from an aneuploidy strain. Second, we analyzed karyotypes of the haploids, and found that chromosome of I, II, VII, IX, X, XI, or XVI are disomic. Finally, the effects of aneuploidy on brewing qualities are assessed by comparing between euploids and aneuploids.

Findings: We found that pyruvate-underproducing sake yeast is trisomic at chromosome XI and XIV. To prove the hypothesis that trisomy improves pyruvate assimilation, we obtained 45 haploids with various numbers of chromosomes. As a result, the haploids disomic at chromosome XI had lower levels of pyruvate.

Conclusion & Significance: Haploids disomic at chromosome XI produced lower levels of pyruvate. Haploids disomic at chromosome XI had metabolism which are characteristics of high mitochondrial activity. From these findings, we concluded that aneuploidy, especially the increase of chromosome XI, augments the mitochondrial activity of sake yeast and improves pyruvate productivity. This is the first report that aneuploidy of sake yeast improves the brewing characteristics of brewery yeasts, and paves a way to breed novel and favorable brewery yeast by targeting the number of chromosomes, which does not correspond to GMO.

Biography

Mr. Yuki Fujimaru has graduated Faculty of Agriculture, National Saga University. He is now a master course student of the graduate school of National Saga University. He has started his career as a brewing technician. He has learned the methodologies of the sporulation method of sake yeast, breeding technologies of sake yeast and metabolome analysis of sake yeast. He is now looking for a position as a brewing technician in the brewing industry.

ktgkhrs@cc.saga-u.ac.jp

Notes: