

Symposia | シンポジウムA

📅 Wed. Aug 27, 2025 2:30 PM - 5:15 PM JST | Wed. Aug 27, 2025 5:30 AM - 8:15 AM UTC 🏢 Room C(2F 123)

[SYA3] [A3] 発酵醸造文化の未来 — 伝統的酒造りのユネスコ無形文化遺産登録と次世代への継承

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4:05 PM - 4:35 PM JST | 7:05 AM - 7:35 AM UTC

[SYA3-04] Development of awamori brewing technology with new flavors utilizing microbial functions

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Awamori, Okinawa's representative distilled alcoholic beverage with a 600-year history, faces challenges in diversifying its quality due to limited microbial strains, partly from World War II's effects. This study focused on basic and applied research into microorganisms involved in awamori brewing to address this, leading to the commercialization of awamori with new flavors.

We improved flavor by breeding existing 101 awamori yeast strains. Detailed phylogenetic analysis and whole genome analysis of the widely used 101 strain, known for high ethanol productivity, led to the 18-T55 strain. This strain, with a mutated IPMS enzyme, significantly increased isoamyl acetate, a popular flavor component. Practical brewing confirmed improved flavor, resulting in Shinzato Shuzo Co., Ltd.'s "Kariyushi 30 degrees."

To diversify quality, we isolated two new *Saccharomyces cerevisiae* strains from Okinawa's natural environment: HC02-5-2 (from hibiscus) and 35a14 (from island banana).

Phylogenetic analysis showed HC02-5-2 belongs to the wine yeast group, while 35a14 is distinct. Both are highly productive of 4-vinylguaiacol (4-VG), a vanillin precursor.

Although their isoamyl acetate productivity was initially low, we bred them to obtain high-producing strains (T25 and BNNL80), clarifying the IPMS enzyme mutations responsible.

Kamimura Shuzo Co., Ltd. commercialized "Sho KAMIMURA 40%" using one, and Higa Shuzo Co., Ltd. commercialized "ZANPA Shima-Banana Yeast 25%" using the other.

Functional analysis and practical application of black koji mold and lactic acid bacteria also played a role. Whole genome information revealed detailed intraspecific phylogenetic relationships of the black koji fungus *Aspergillus luchuensis*, classifying it into two main groups (A and SK). Selecting the phylogenetically distant "Ryukyu strain" led to "University of the Ryukyus' Awamori II," commercialized by Kamimura Shuzo Co., Ltd. Finally, isolating lactic acid bacteria from awamori mash revealed *Lactococcus lactis*, which converts ferulic acid to 4-VG, and *Lactiplantibacillus plantarum*, which converts ferulic acid to dihydroferulic acid (DFA). These findings scientifically demonstrate the important effect of lactic acid bacteria in the mash on awamori's flavor development.

