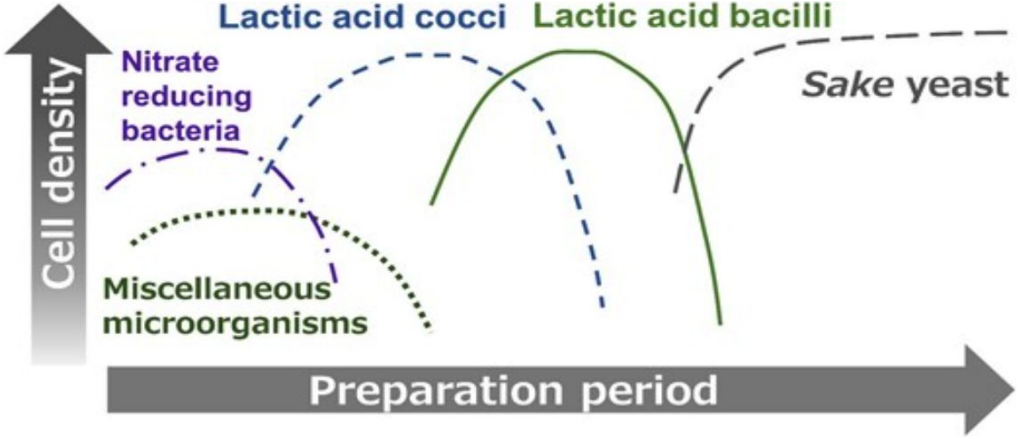
Why is Kimoto?

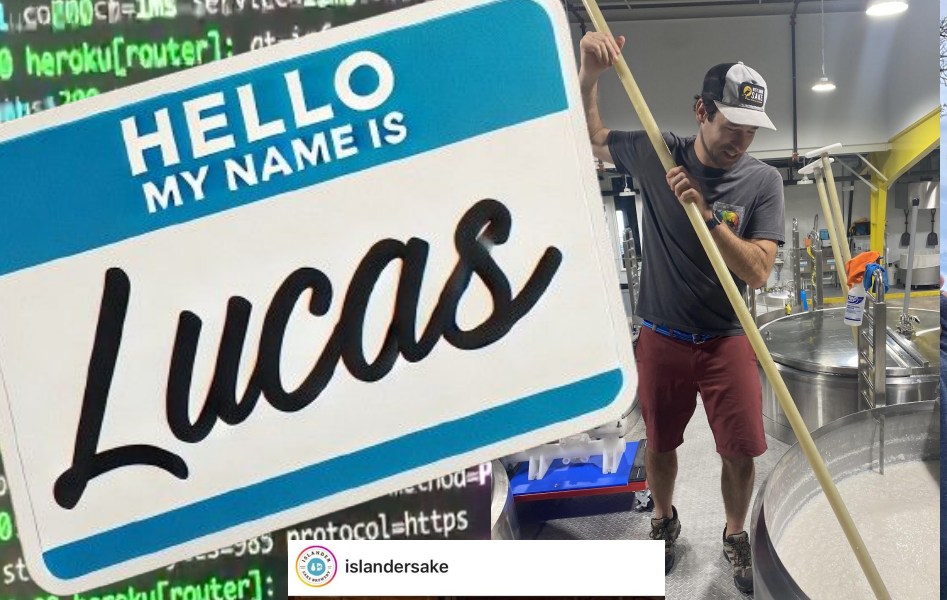
The yeast starter formerly known as kanmoto

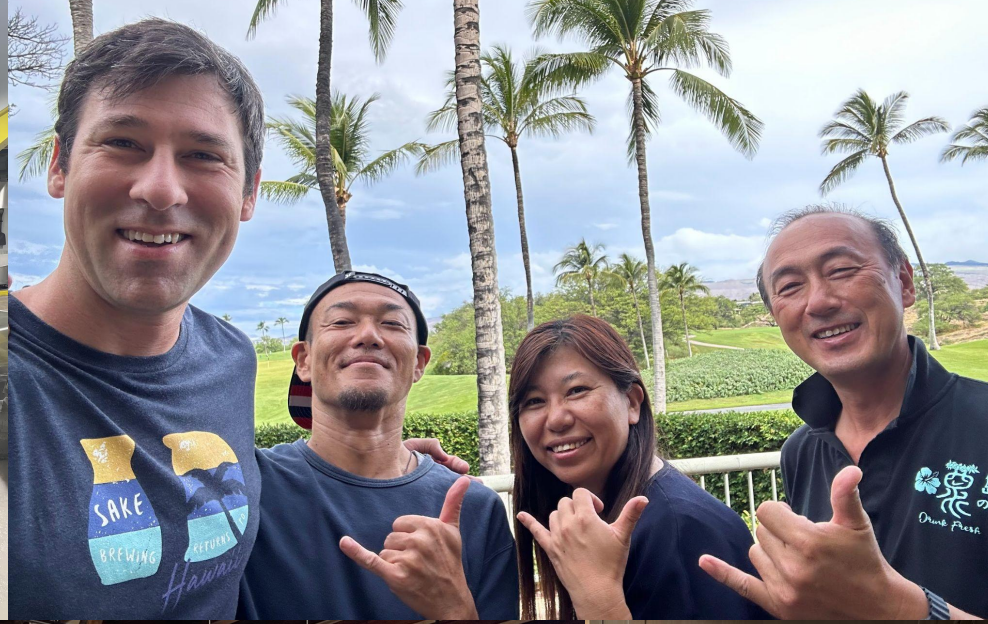
Symbiotic Relationships

Last Year:
Aspergillus - Yeastcidin - Sake Yeast

This Year:
Yeast - Lactic Acid Bacteria







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koji

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Rheubes: I'm looking at putting in an order through Higuchi an
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General Koji Kin Topics
junmai_gaijinjo (lucas): (aspergillus) Research / Information
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Sake Brewing Seminars

Sparkling Sake

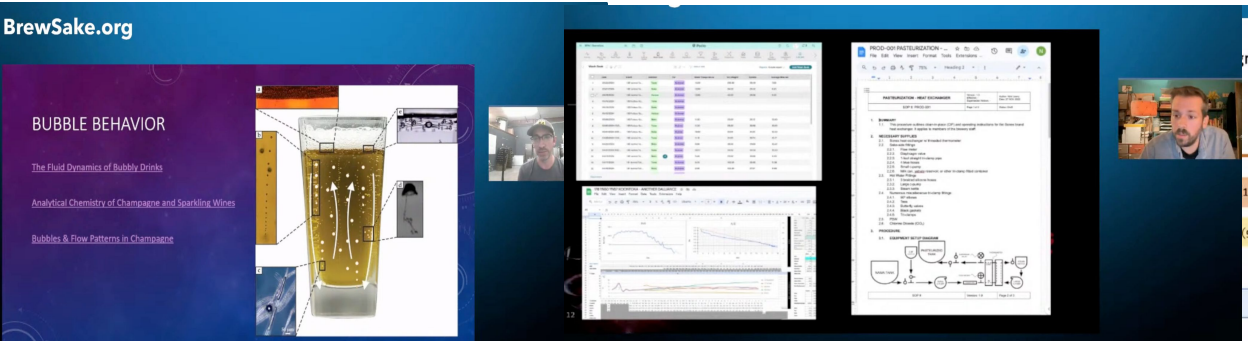
Justin LeVaughn
The Void Sake

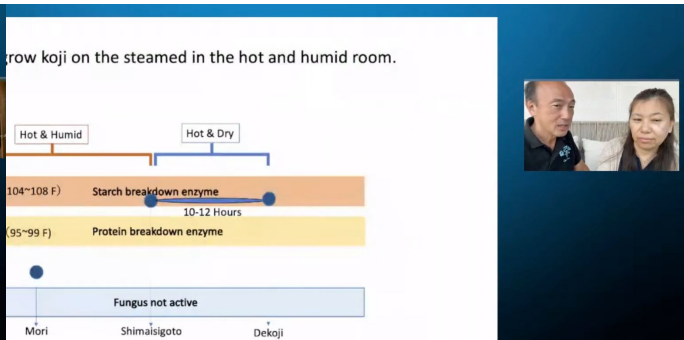
Byron Stithem

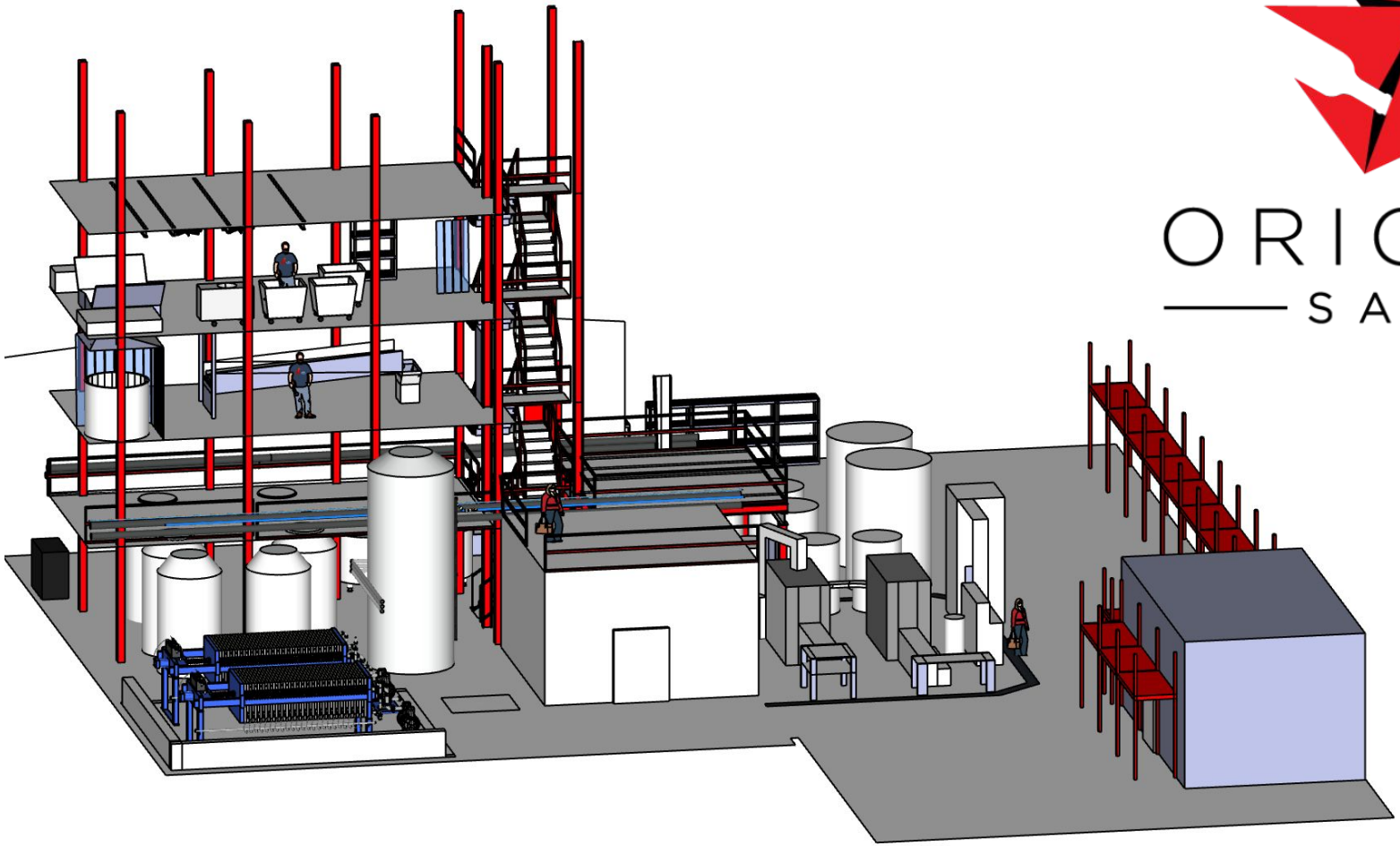
Jake Myrick

Brandon Doughan

Shinobu Kato







ORIGAMI

SAKE

Just shout it out.

How Are Lambic Beers Made?

Why is Kimoto Yeast said to be Strong?

福島県二本松市竹田一丁目六十六
大七酒造株式会社
DAISHICHI SAKE BREWERY CO.,LTD.

Yeast	"Today I'm going to meet Daishichi's lactic acid bacteria in the new *kimoto* room. How are you doing?"
Daishichi's Lactic Acid Bacteria	"Hi, Yeast! We're very fine. When we were moved from the old brewery to the *kimoto* room in the new brewery, everyone was very careful."
Yeast	"I'm relieved to hear that – all of you are the greatest treasure of the brewery."
Daishichi's Lactic Acid Bacteria	"Sometimes. When *kimoto* is made in a skillful way, the result will be perfect, but if the technique is crude, it will fail. In the Meiji period 8% of total *kimoto* production in Japan failed. That's why the National Research Institute developed *yamahai* and *sokujomoto*."
Daishichi's Lactic Acid Bacteria	"But the taste is not the same as *kimoto*. The strong point of *kimoto* is the quality of the yeast which has been carefully selected in a competitive environment."

Why is Kimoto Flavor Said to be Rich and Funky?

"Sake made with the kimoto method tends to have a richer and more mellow profile, often exhibiting elevated umami and complexity. In contrast, sokujo-moto sake is comparatively milder and cleaner in flavor."

"Many kimoto and yamahai-brewed sake feature powerful and complex flavors because they are made using natural bacteria. Such characteristics also make these sake more attractive when served warm."

"Kimoto method is an ancient method to produce shubo... The taste is complex and wild. High acidity influenced by lactic acid is the most remarkable feature. It’s very heavy and rich type, but there is clearness in aftertaste at the same time."

"The lactic acid bacteria give sake made in this kimoto style a richer taste with some acidity compared to the sokujo-kei."

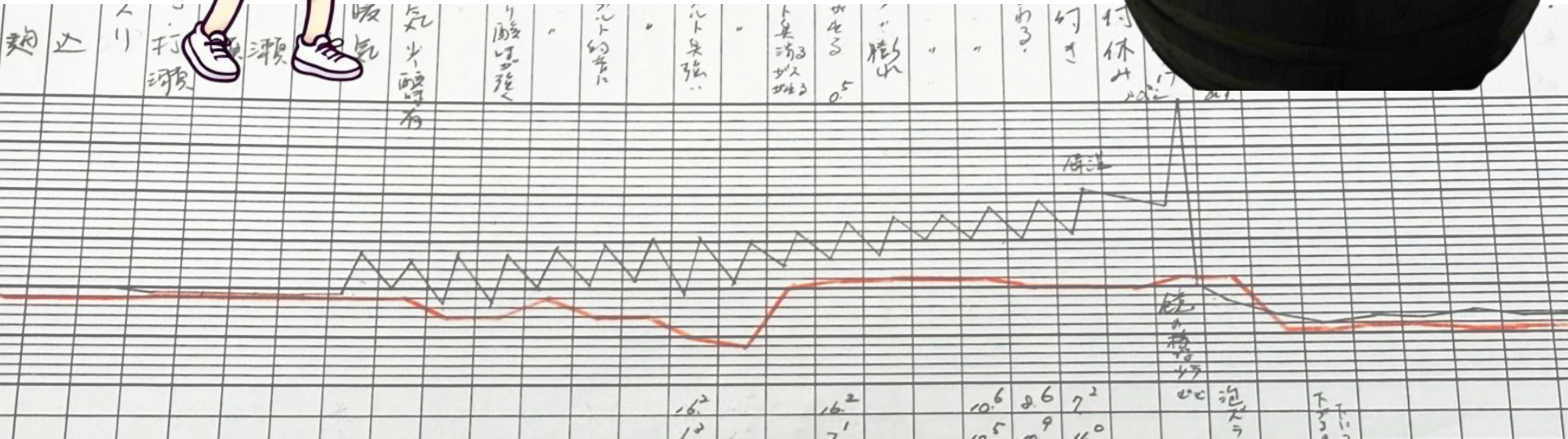
"The yamahai method, much like the kimoto method, is known for producing a deeper and richer, even earthier sake. In the sokujo method, lactic acid is added at the beginning, resulting in a lighter and cleaner flavor profile.

Simple Fermentations:

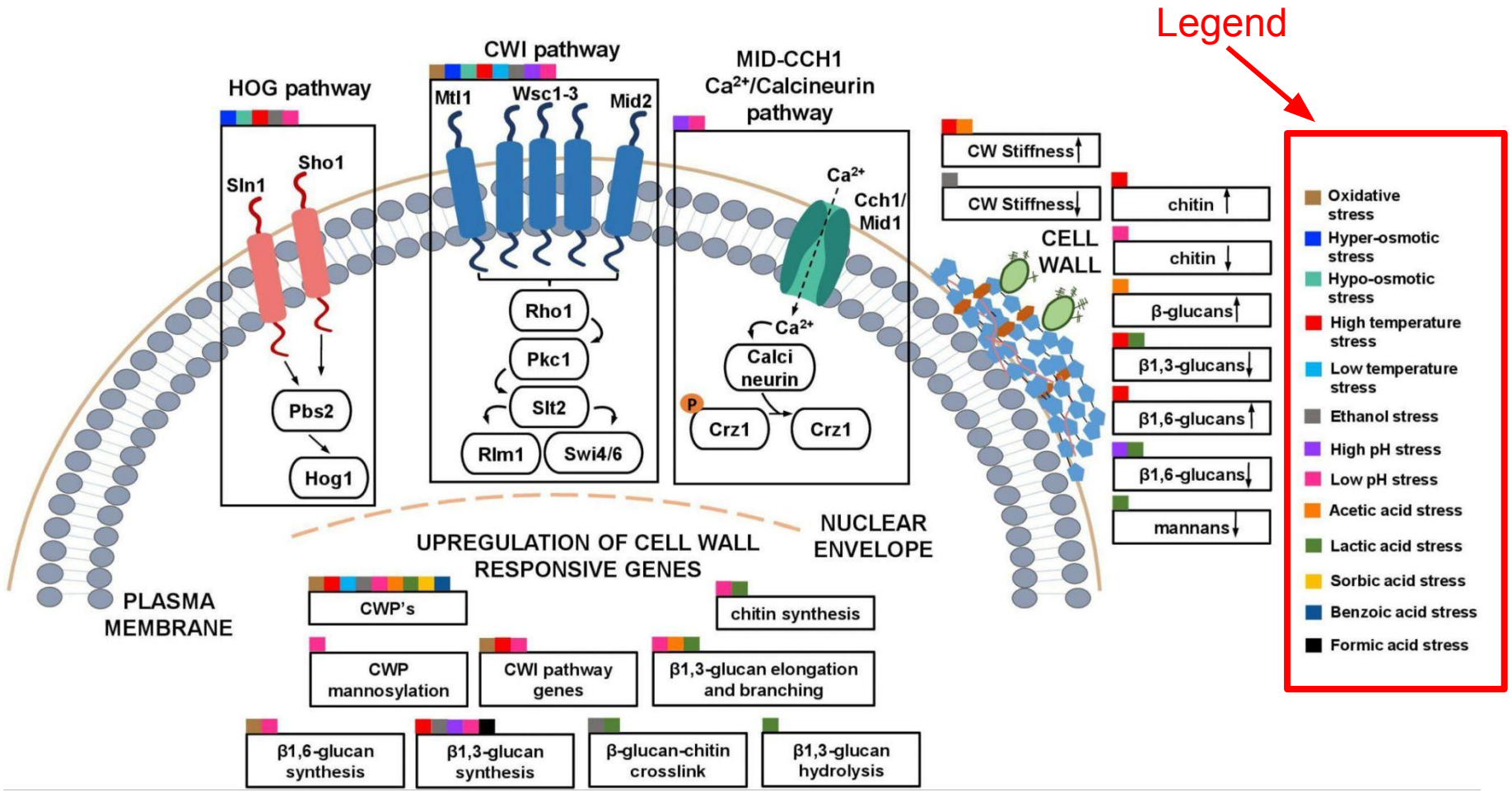
“Cultivate”
Yeast

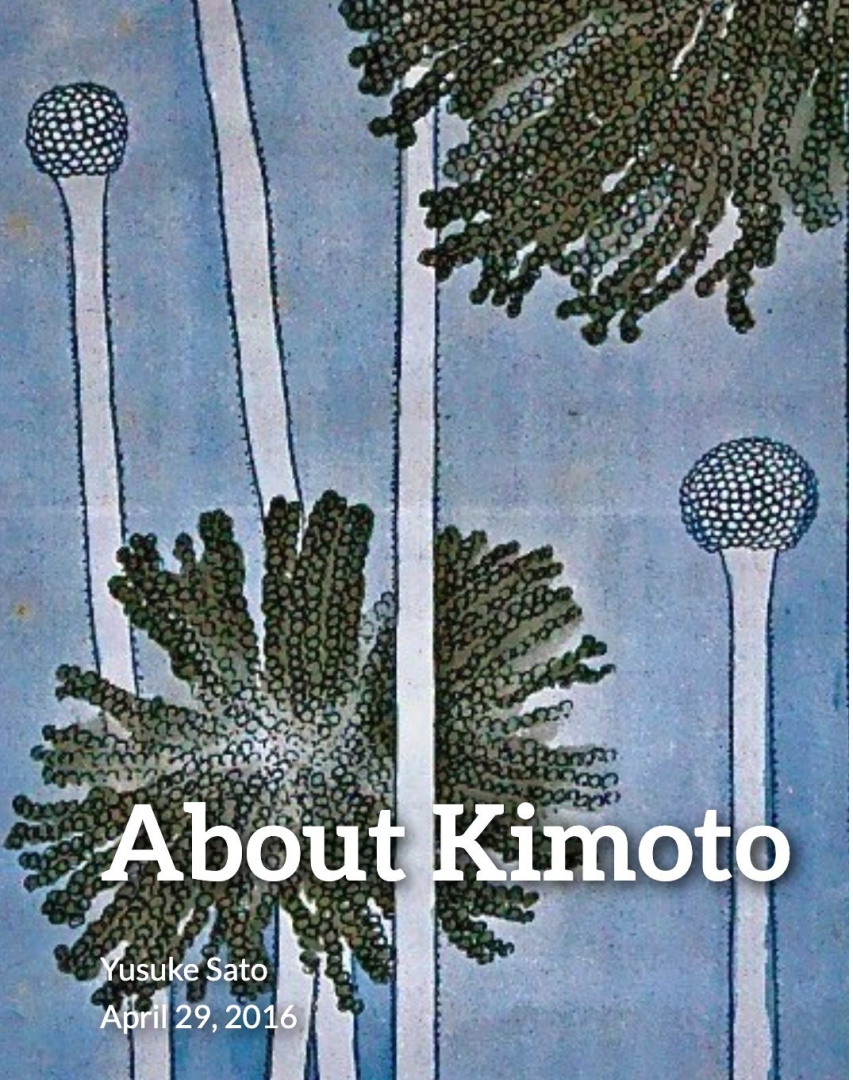
Sake Fermentations:

“Condition”
Yeast



Conditioning: Yeast Stress Defense





About Kimoto

Yusuke Sato

April 29, 2016

Aramasa's Kimoto Blog Article

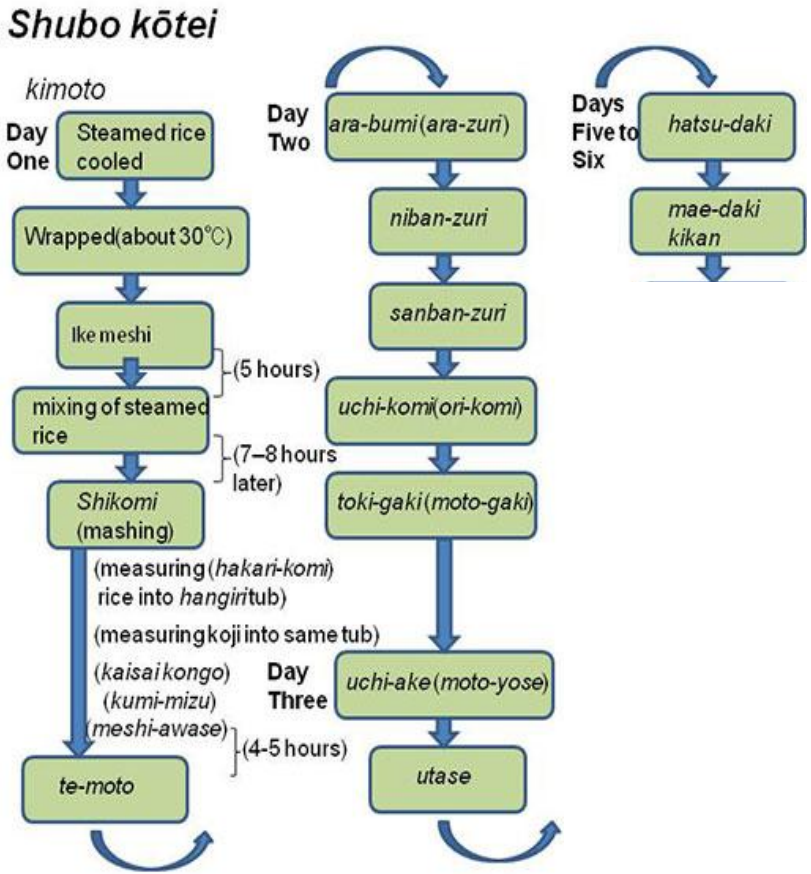
Kimoto Process

Day 1
Soak/Steam/Cooling Rice
Mix Koji, Water, Rice together
Hand-mashing (2-3 times every 2 hours)

Day 2
3 x mixes (stomp, poles, paint mixer)
(Separating isn't technically necessary)

Day 3
Combine tubs into single tank (utase)

Day 5-6
Start Warming Process
*when Nitrite reaction ends

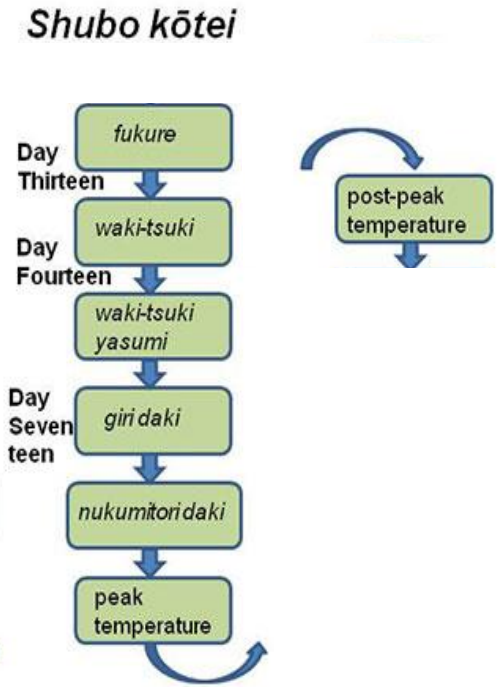


Kimoto Process

Day 13
Add yeast.

Day 14
Let it rest for a few days.
Fermentation heat only.

Day 17
Vigorously stir the shubo with the water jug
Warm that baby up to saccharify the rice
Spike the temperature all the way to 30°C



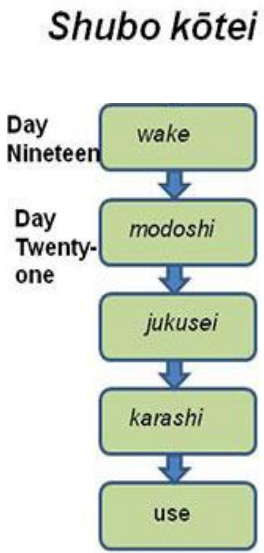
Kimoto Process

Day 19
Observe the baume drop
Cool it down to avoid excessive alcohol (previously “wake”)
You can just use glycol these days.

Day 21
Keep cold (10°C)
Maturation (5-15 days)

The standard baumé content is 5 to 8, alcohol 10 to 13%, acidity 10 to 11, and amino acidity 6 to 7

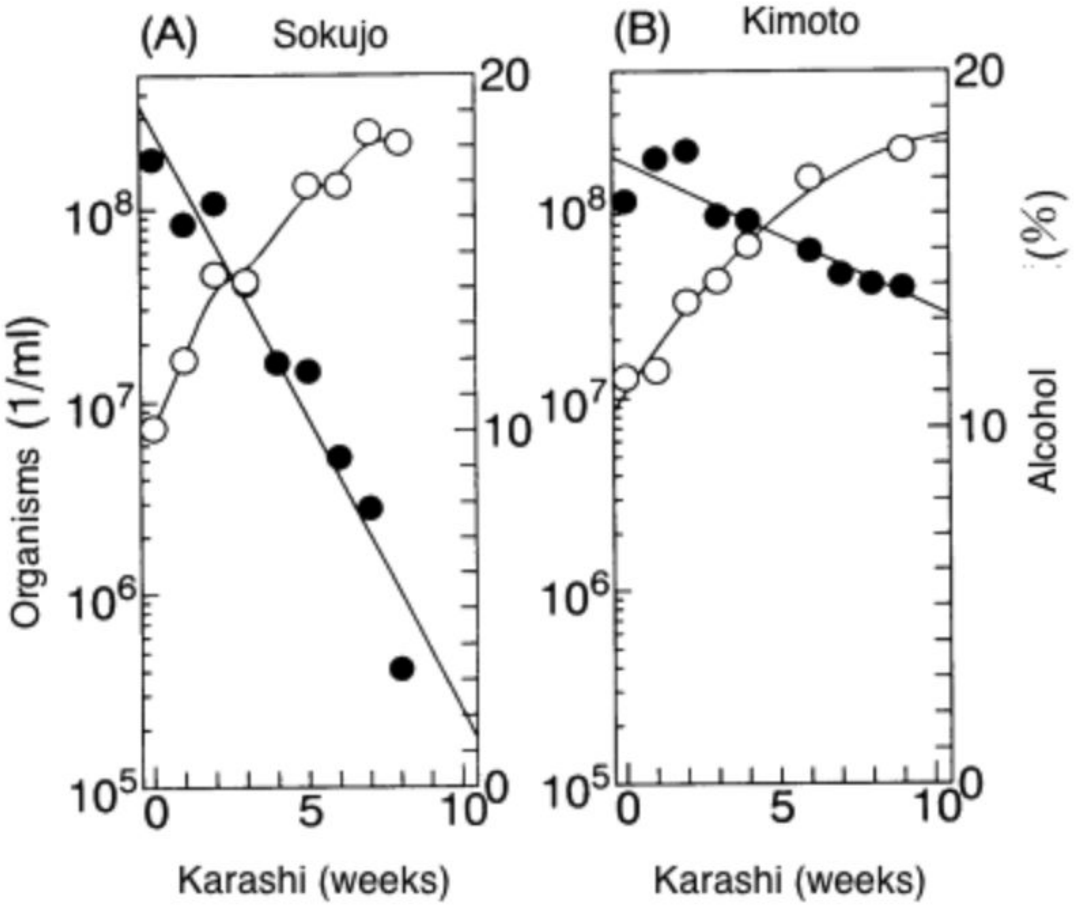
Use within 2-30 days



Time to Lose 80% of viable yeast cells at 10°C:

Sokujo: 2-3 weeks

Kimoto: 8-10 weeks

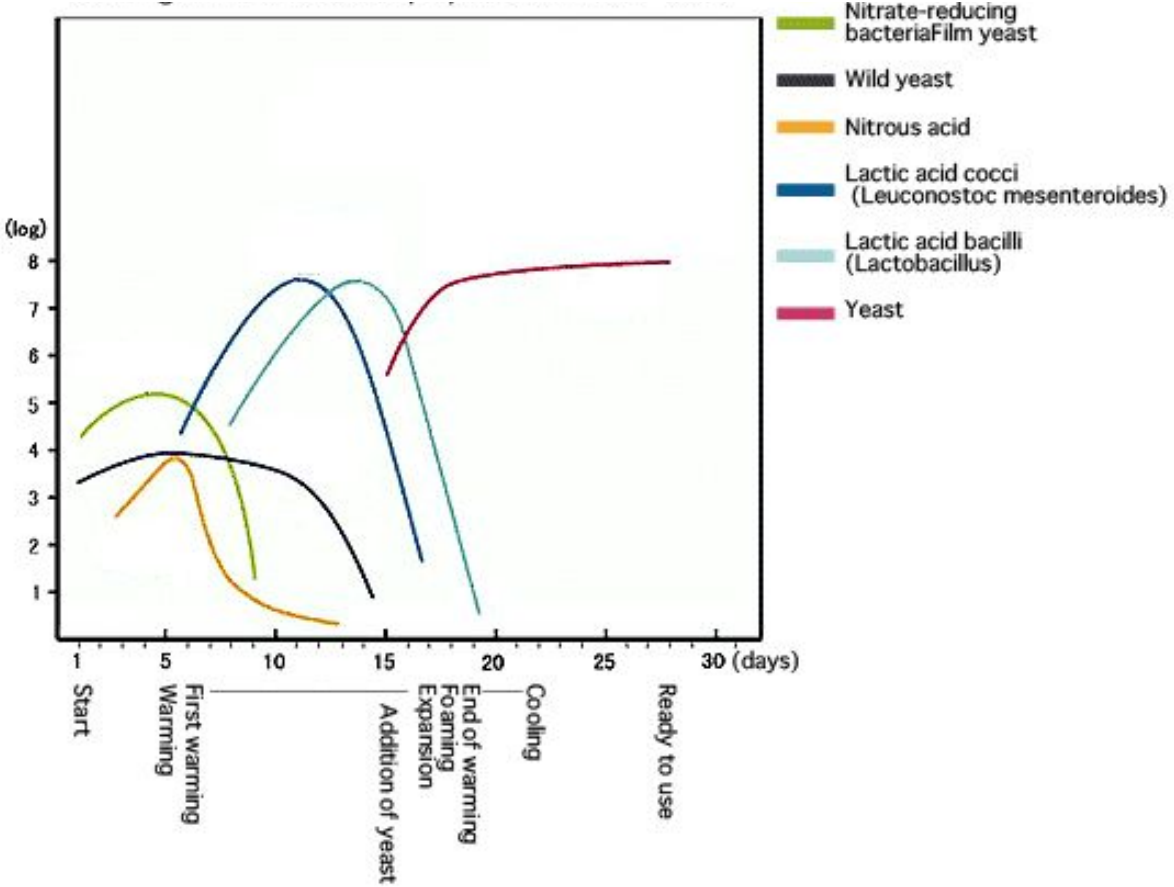


Changes in Microbial Population Over Time

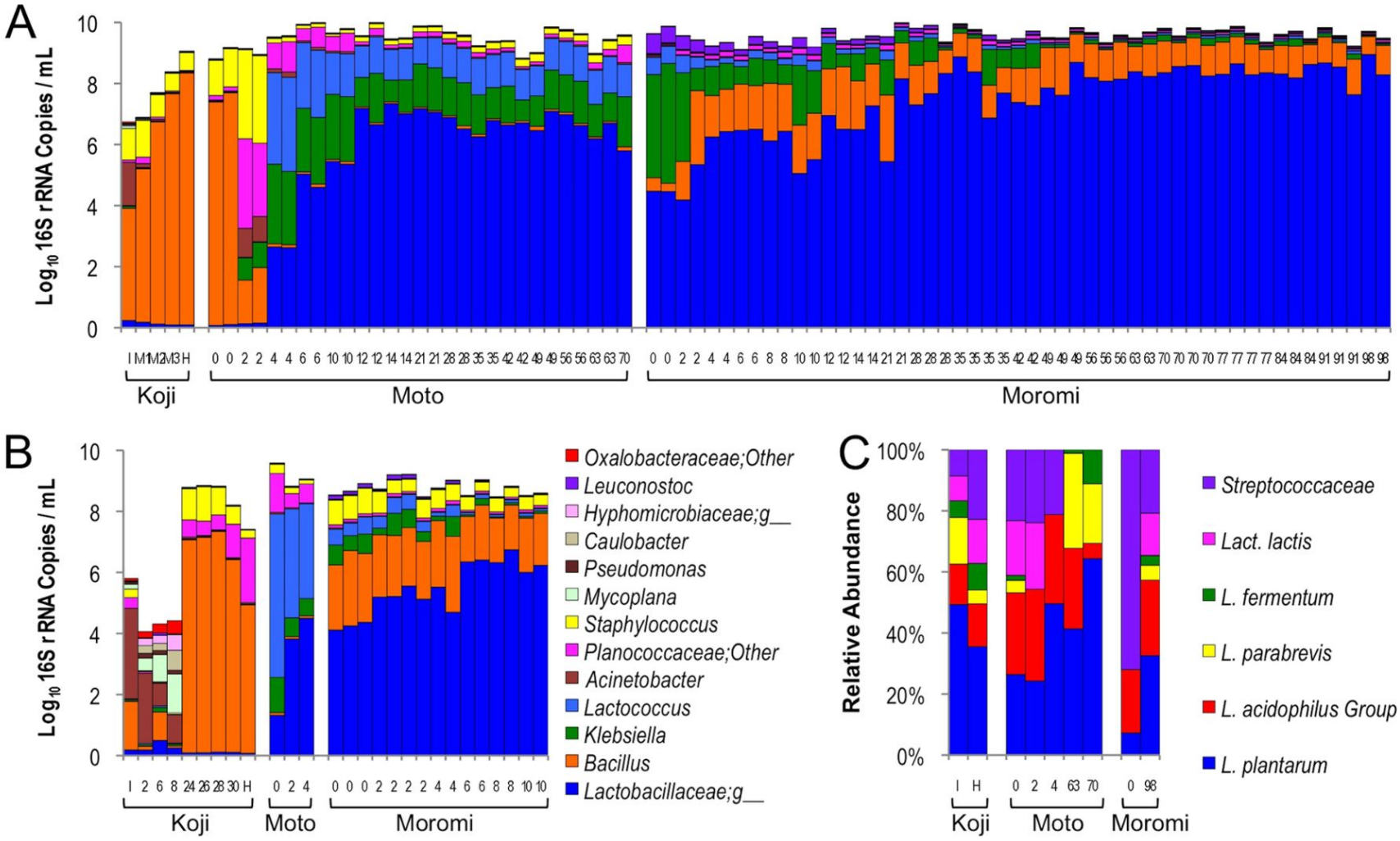
Nitrate Reducing:
- Pseudomonas
- Enterobacter
- Staphylococcus

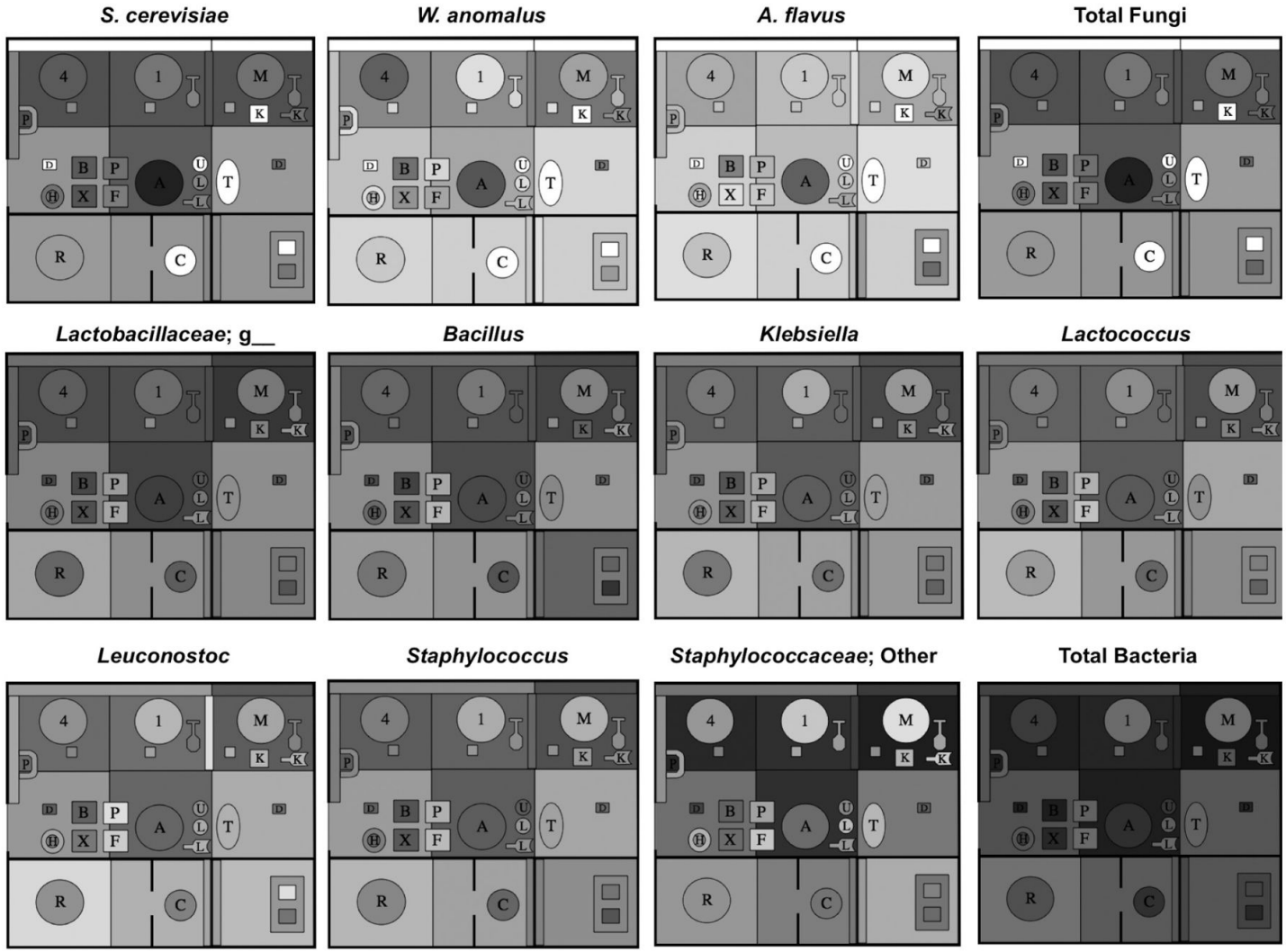
Lactococcus:
- Leuconostoc mesenteroides
- Lactococcus lactis

Lati-lactobacillus
- Lactobacillus Sakei
- Lactobacillus curvatus
- Lactobacillus plantarum



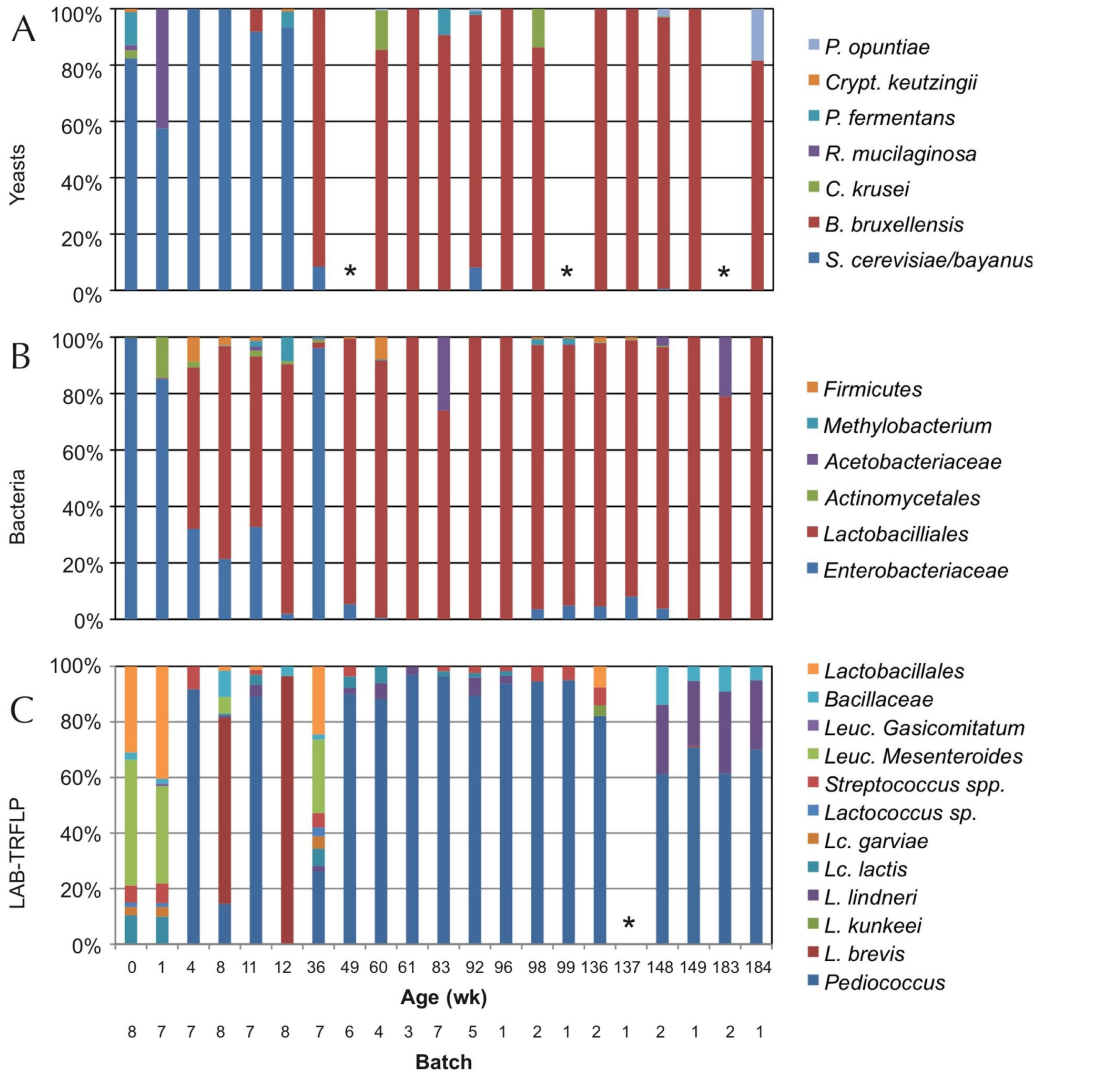
Consultant: Dr. Yuichi Akiyama, Chairman of the Brewing Society of Japan


A
Log10 16S r RNA Copies / mL
10
8
6
4
2
0
I M1 M2 M3 H
0 0 2 2 4 4 6 6 10 10 12 12 14 14 21 21 28 28 35 35 42 42 49 49 56 56 63 63 70
0 0 2 2 4 4 6 6 8 8 10 10 12 12 14 14 21 21 28 28 35 35 35 42 42 49 49 56 56 63 63 70 70 70 77 77 77 84 84 91 91 91 98 98
Koji
Moto
Moromi
B
Log10 16S r RNA Copies / mL
10
8
6
4
2
0
I 2 6 8 24 26 28 30 H
0 2 4
0 0 0 2 2 2 4 4 6 6 8 8 10 10
Koji
Moto
Moromi
Oxalobacteraceae;Other
Leuconostoc
Hyphomicrobiaceae;g__
Caulobacter
Pseudomonas
Mycoplana
Staphylococcus
Planococcaceae;Other
Acinetobacter
Lactococcus
Klebsiella
Bacillus
Lactobacillaceae;g__
C
Relative Abundance
100%
80%
60%
40%
20%
0%
I H
0 2 4 63 70
0 98
Koji
Moto
Moromi
Streptococcaceae
Lact. lactis
L. fermentum
L. parabrevis
L. acidophilus Group
L. plantarum


S. cerevisiae
W. anomalus
A. flavus
Total Fungi
Lactobacillaceae; g__
Bacillus
Klebsiella
Lactococcus
Leuconostoc
Staphylococcus
Staphylococcaceae; Other
Total Bacteria
M Moto Tank
1,4 Fermentation Tanks
K Koji Scoop/Bucket
A Aging Tank
T Mixing Tub
U Moromi Bucket
L Lees Scoop/Bucket
B Bottler
P Moromi Press
X Heat Exchanger
F Filter Press
D Drains
H Transfer Hoses
R Rice Steamer
C Rice Container
W Wooden Beams
S Koji Sheets

Same Same.
But Different.

Take a guess…
What style is this?



What Makes Kimoto Yeast Stronger?

“genes express themselves in environments”

Reared at 20°C or less

Reared at temperatures above 30°C

Glucose Repression

- Prioritize Alcohol Production
- Stockpile Glucose as Alcohol
- Poison Competitors

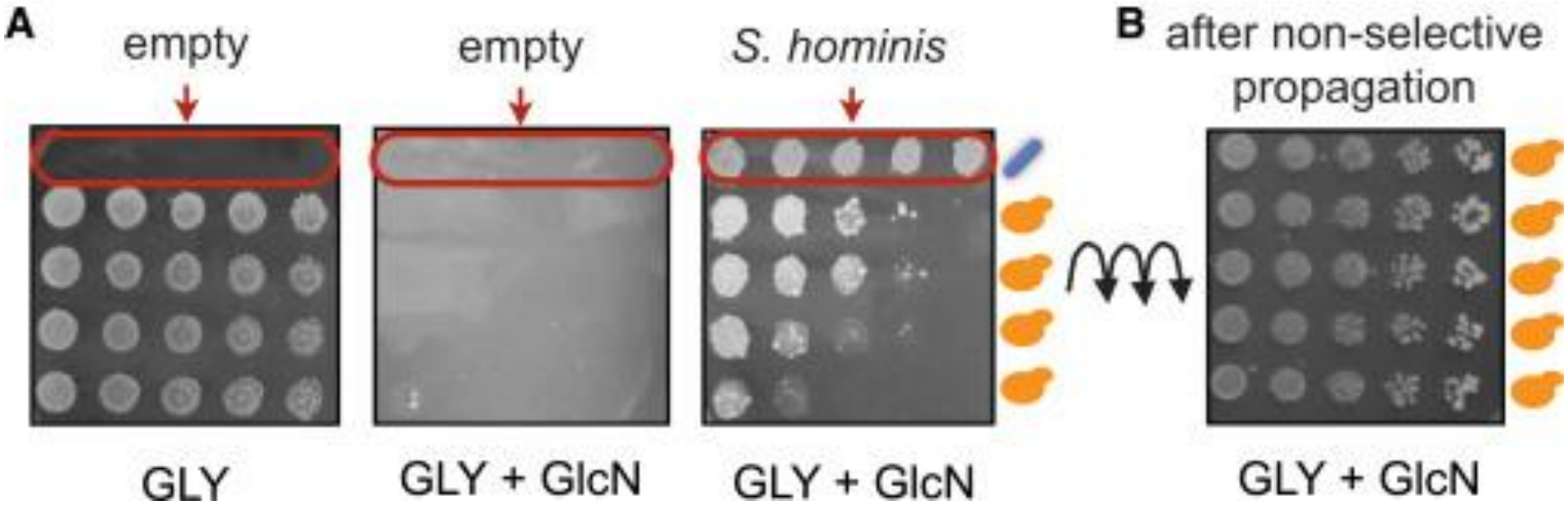
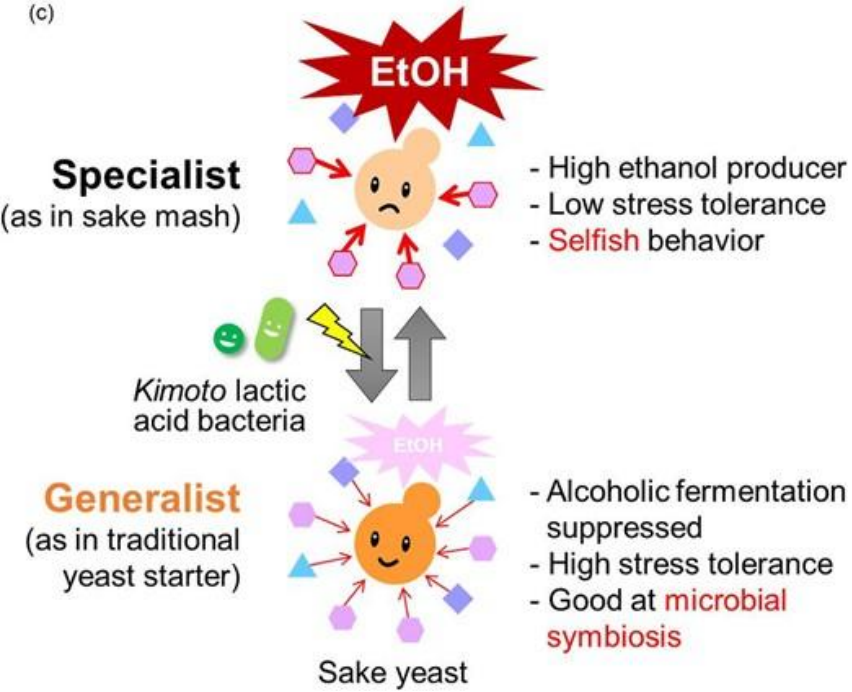


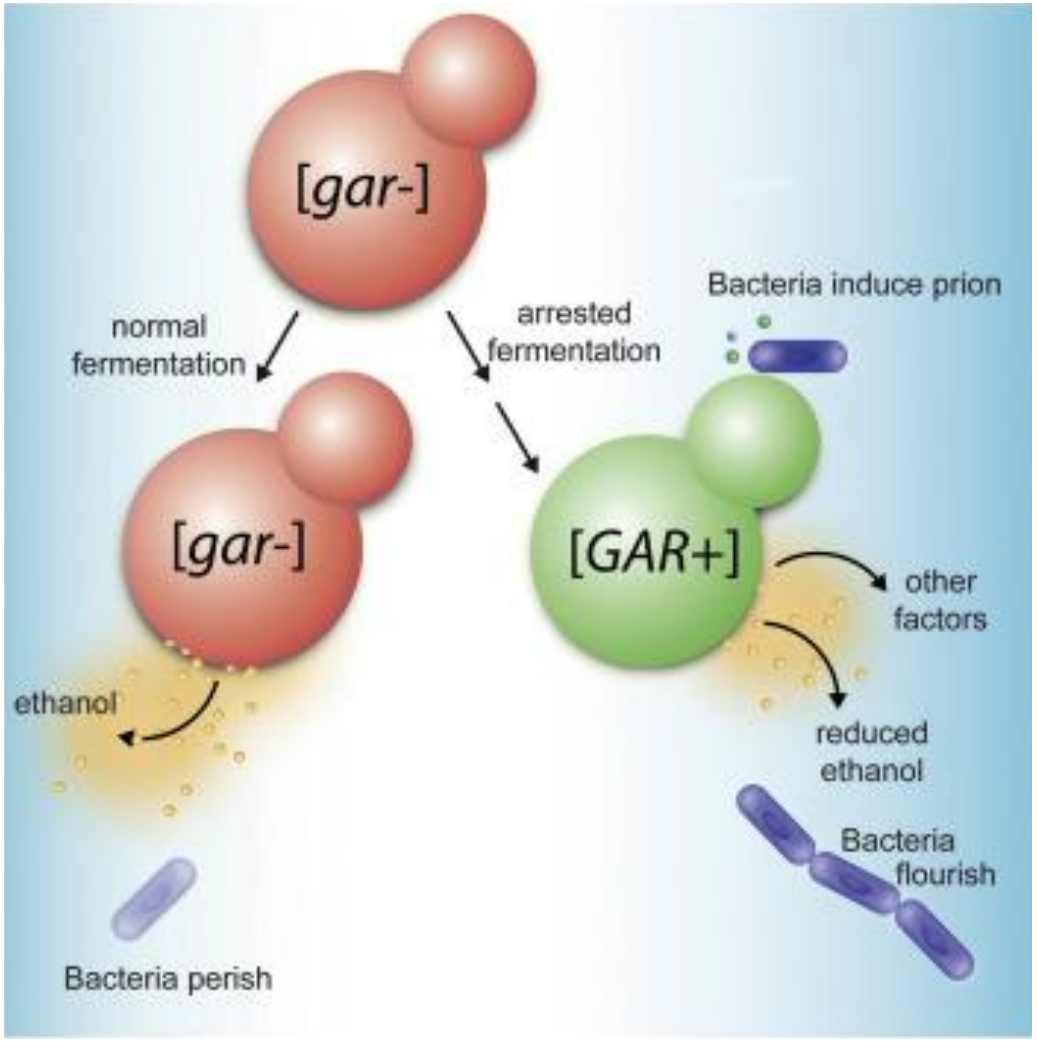
Figure 1. *S. hominis* Induces a Stable Circumvention of Glucose Repression

(A) Growth of *S. hominis* adjacent to [*gar*⁻] *S. cerevisiae* on Gly+ GlcN plates induces the yeast cells to acquire a glucosamine-resistant trait. Both organisms are plated in 5-fold serial dilutions.

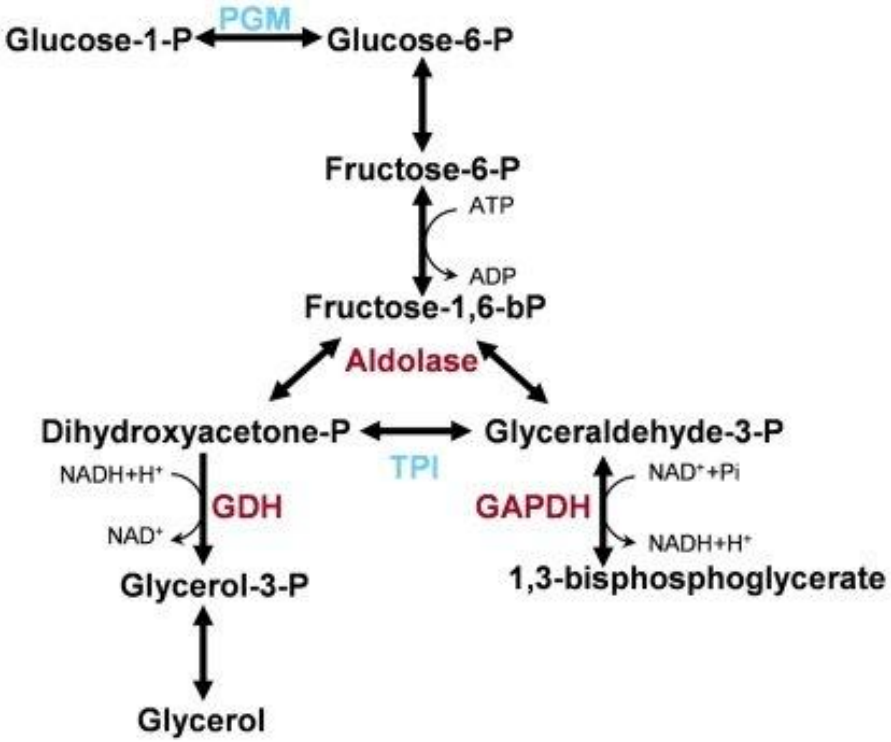
(B) This trait is stable after hundreds of generations of growth on nonselective media followed by retesting on Gly+ GlcN plates (top).

(c)

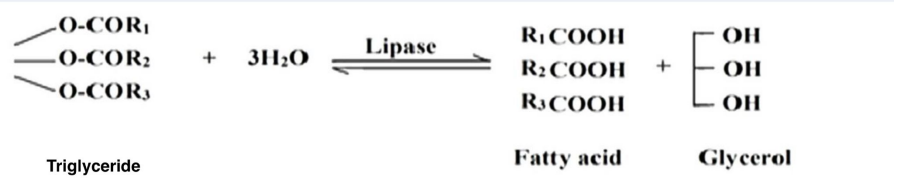

EtOH
Specialist
(as in sake mash)
- High ethanol producer
- Low stress tolerance
- Selfish behavior
Kimoto lactic acid bacteria
EtOH
Generalist
(as in traditional yeast starter)
- Alcoholic fermentation suppressed
- High stress tolerance
- Good at microbial symbiosis
Sake yeast


[gar-]
normal fermentation
arrested fermentation
Bacteria induce prion
[gar-]
[GAR+]
other factors
ethanol
reduced ethanol
Bacteria flourish
Bacteria perish

Glycolysis



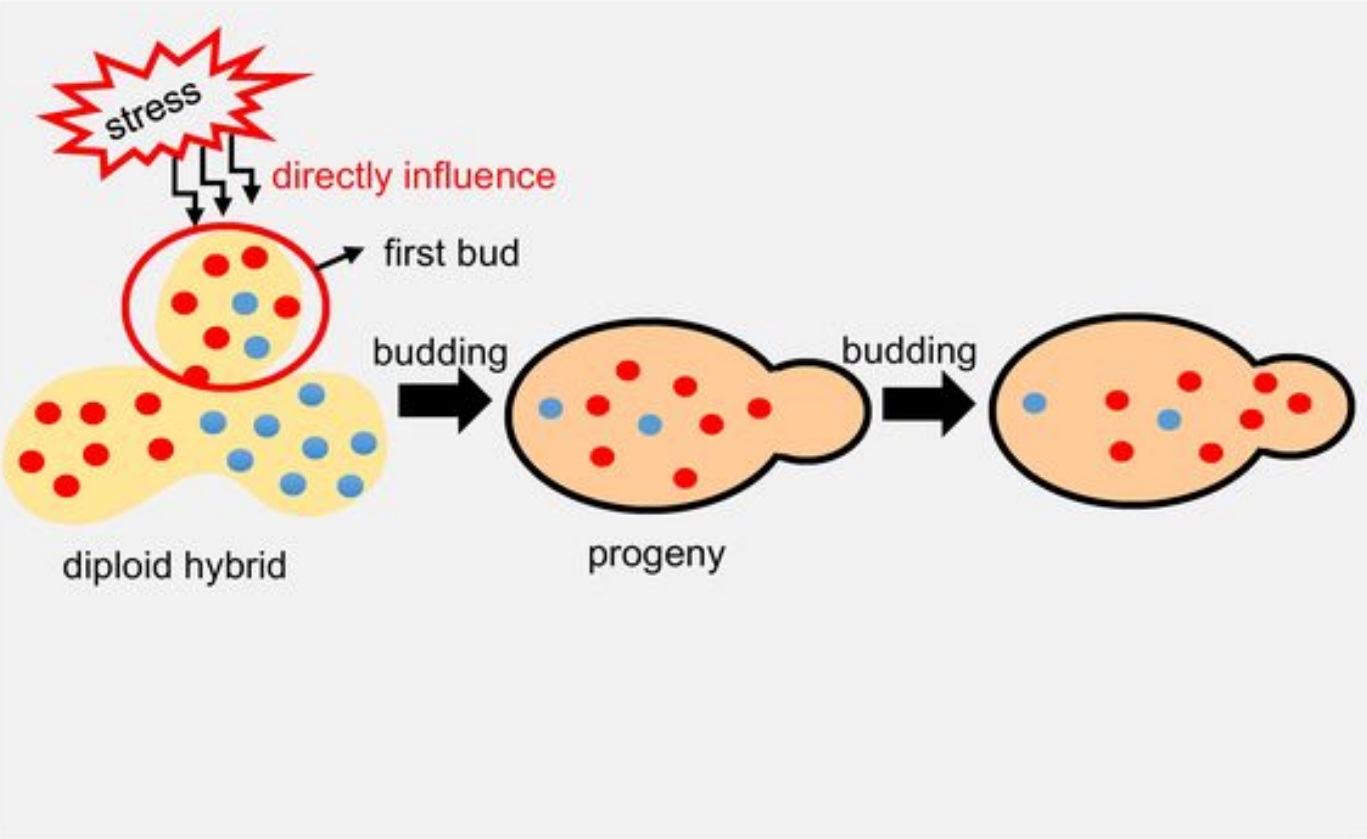
Koji Produced (indirectly)



Legend(ary)

- Oxidative stress
- Hyper-osmotic stress
- Hypo-osmotic stress
- High temperature stress
- Low temperature stress
- Ethanol stress
- High pH stress
- Low pH stress
- Acetic acid stress
- Lactic acid stress
- Sorbic acid stress
- Benzoic acid stress
- Formic acid stress

Non-Genetic Inheritance



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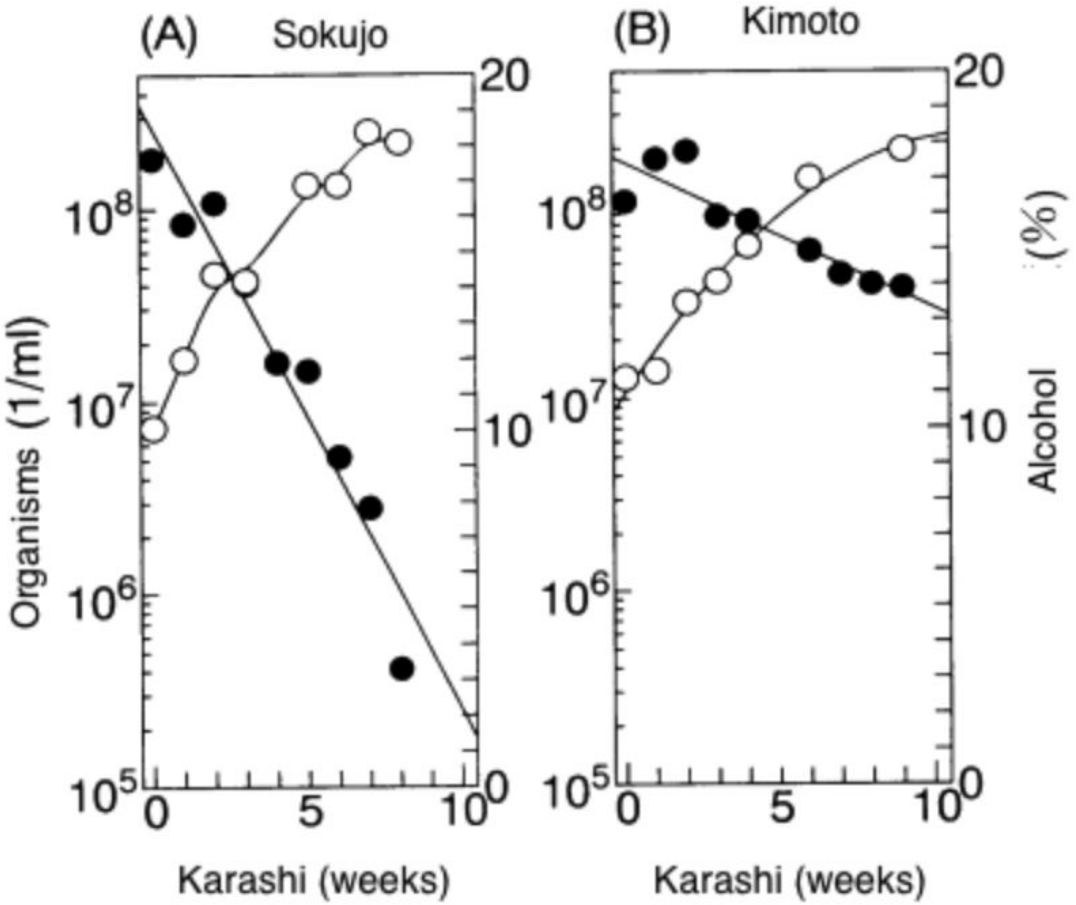


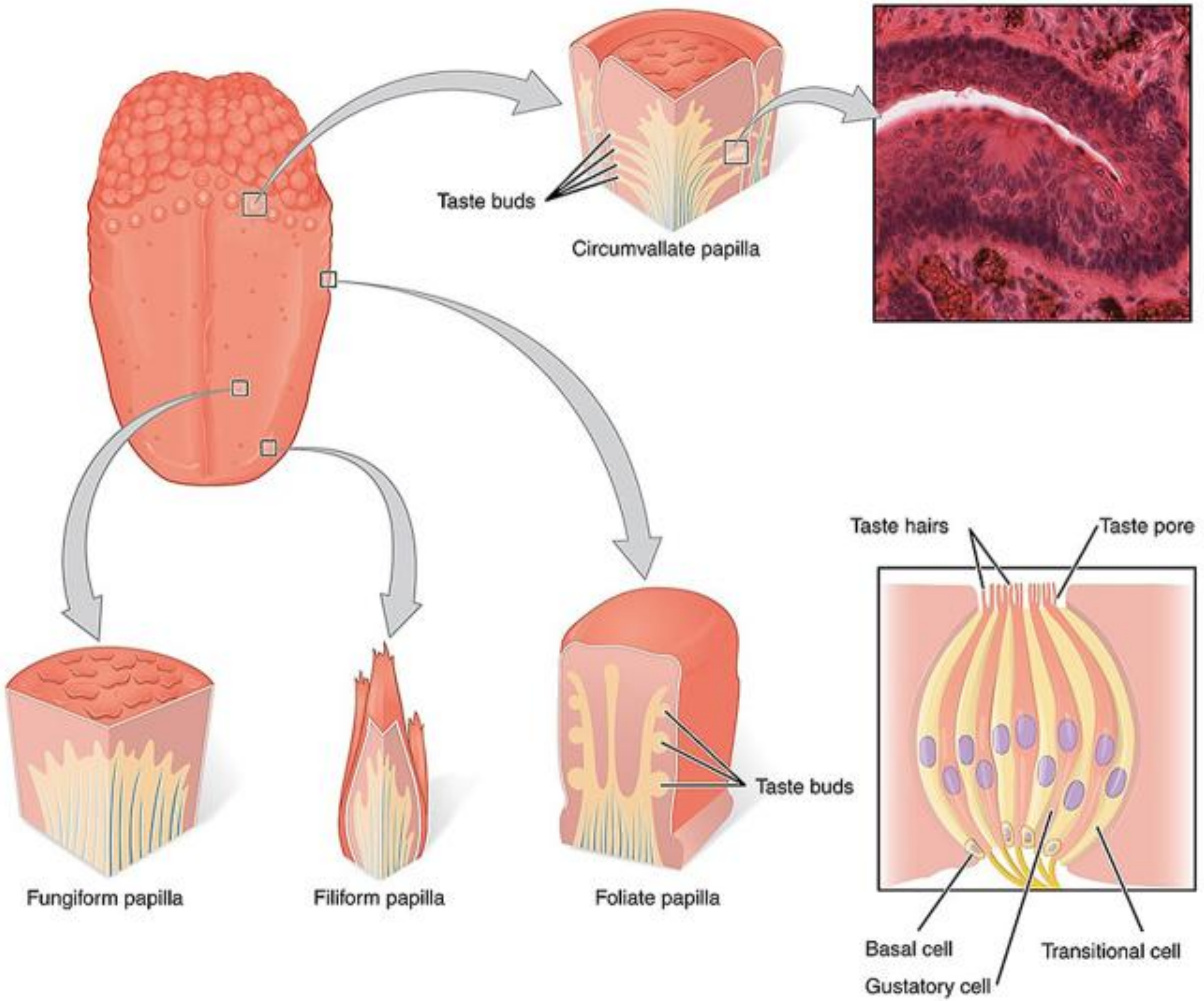
What Makes Kimoto Taste Smooth/Rich/etc..?

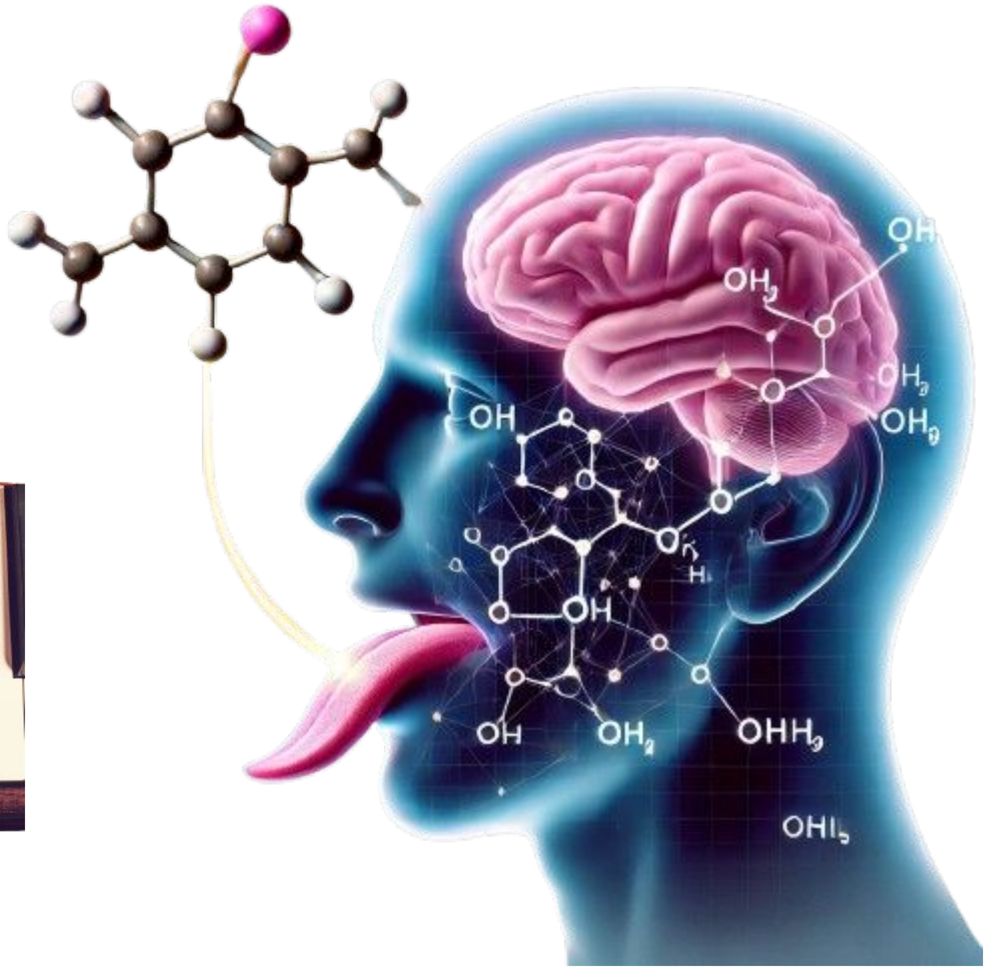
Kimoto is……

“rich, mellow, rough, gamey, funky, fine-grained, complex, mild acidity, high acidity, wild, rustic, savory, etc”

The existence of the tongue map has long been discredited.

Taste receptors in the oral cavity respond to all tastes regardless of their location.




OH
OH
OH

How Amino Acids Taste in **Sokujo** Moto

(vast majority)

L-Amino Acids are the most commonly occurring form in Nature.

Produced by Koji Enzymes + Yeast

Amino Acid	L Taste (Wieser)
Alanine	Sweet
Arginine	Bitter
Aspartic acid	-
Glutamic acid	Neutral
Glycine	Sweet
Histidine	Bitter
Hydroxyproline	Sweet
Isoleucine	Bitter
Leucine	Bitter
Lysine	Sweet/Bitter
Methionine	Bitter
Phenylalanine	Bitter
Proline	Sweet/Bitter
Serine	Sweet
Tryptophan	Bitter
Valine	Bitter/Sweet

How Amino Acids Taste in **Kimoto** Moto

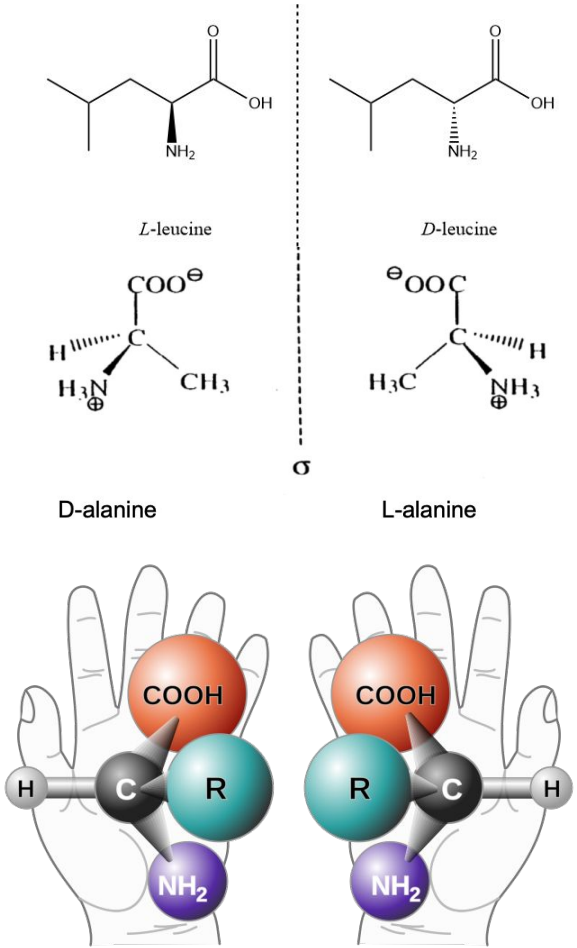
(vast majority)

Amino Acid	L Taste (Wieser)	D Taste (Wieser)
Alanine	Sweet	Sweet
Arginine	Bitter	Neutral
Aspartic acid	-	-
Glutamic acid	Neutral	Sweet
Glycine	Sweet	Sweet
Histidine	Bitter	Sweet
Hydroxyproline	Sweet	Neutral
Isoleucine	Bitter	Sweet
Leucine	Bitter	Sweet
Lysine	Sweet/Bitter	Sweet
Methionine	Bitter	Sweet
Phenylalanine	Bitter	Sweet
Proline	Sweet/Bitter	Neutral
Serine	Sweet	Sweet
Tryptophan	Bitter	Sweet
Valine	Bitter/Sweet	Sweet

Lactic Acid Bacteria Enzymatic Amino Acid Racemization

Creates Stereo Enantiomers
(mirror image amino acids)

Each play a different “chord” on taste buds and present with a different texture and body feel



Peptides

Sokujo (higher peptides)

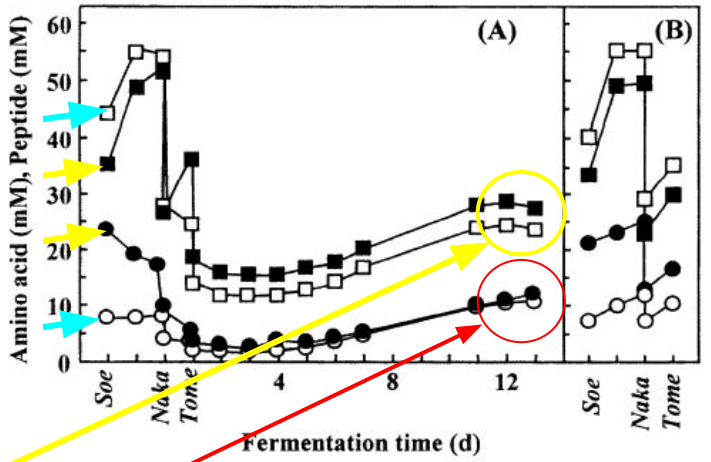
Kimoto (lower peptides)

Kimoto (higher amino acids)

Sokujo (lower amino acids)

Kimoto (slightly higher peptides)

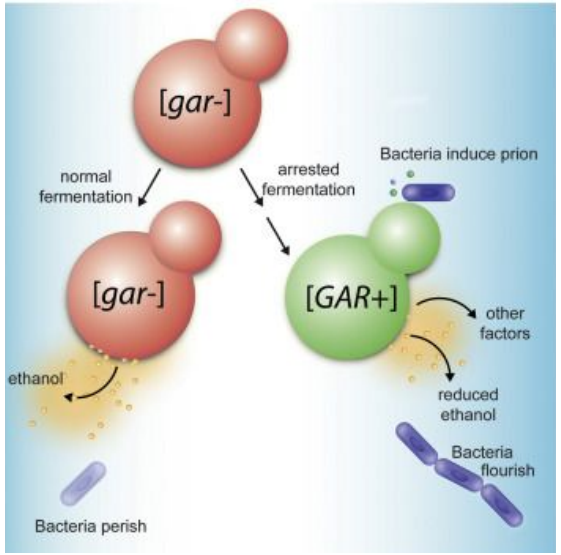
Same amino acids

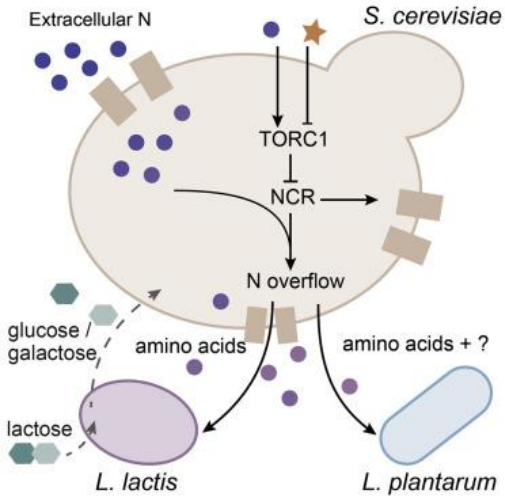


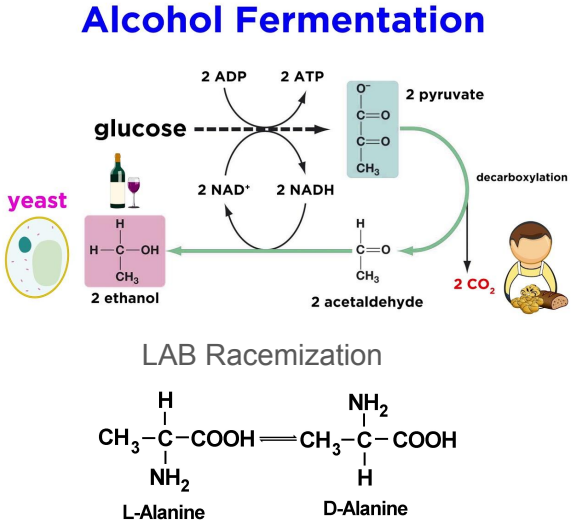
第 11 図　生酛および速醸酛で製造した清酒醪における遊離アミノ酸濃度とペプチド濃度の経時変化

●；生酛で製造した清酒醪の遊離アミノ酸濃度
○；速醸酛で製造した清酒醪の遊離アミノ酸濃度
■；生酛で製造した清酒醪のペプチド濃度
□；速醸酛で製造した清酒醪のペプチド濃度
(A)；通常の清酒醪，(B)；酵母による取り込みの影響を見るために調製した無菌清酒醪，ペプチド濃度は酸分解法により測定した。

Kimoto is about a Symbiotic Relationship between Yeast and Lactic Acid Bacteria





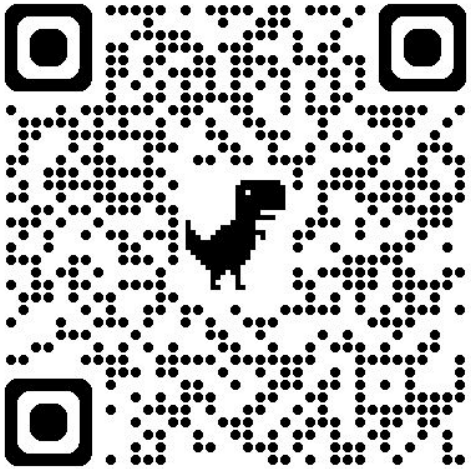


LAB helps Yeast

Yeast helps LAB

Yeast + LAB make us happy! 🥴

Thank You



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