“SouthernStar” the first LOX-less barley variety in Australia

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1. Sapporo Breweries Ltd., 2. University of Adelaide, 3. Cargill Malt Asia Pacific, 4. Coopers Brewery Ltd.

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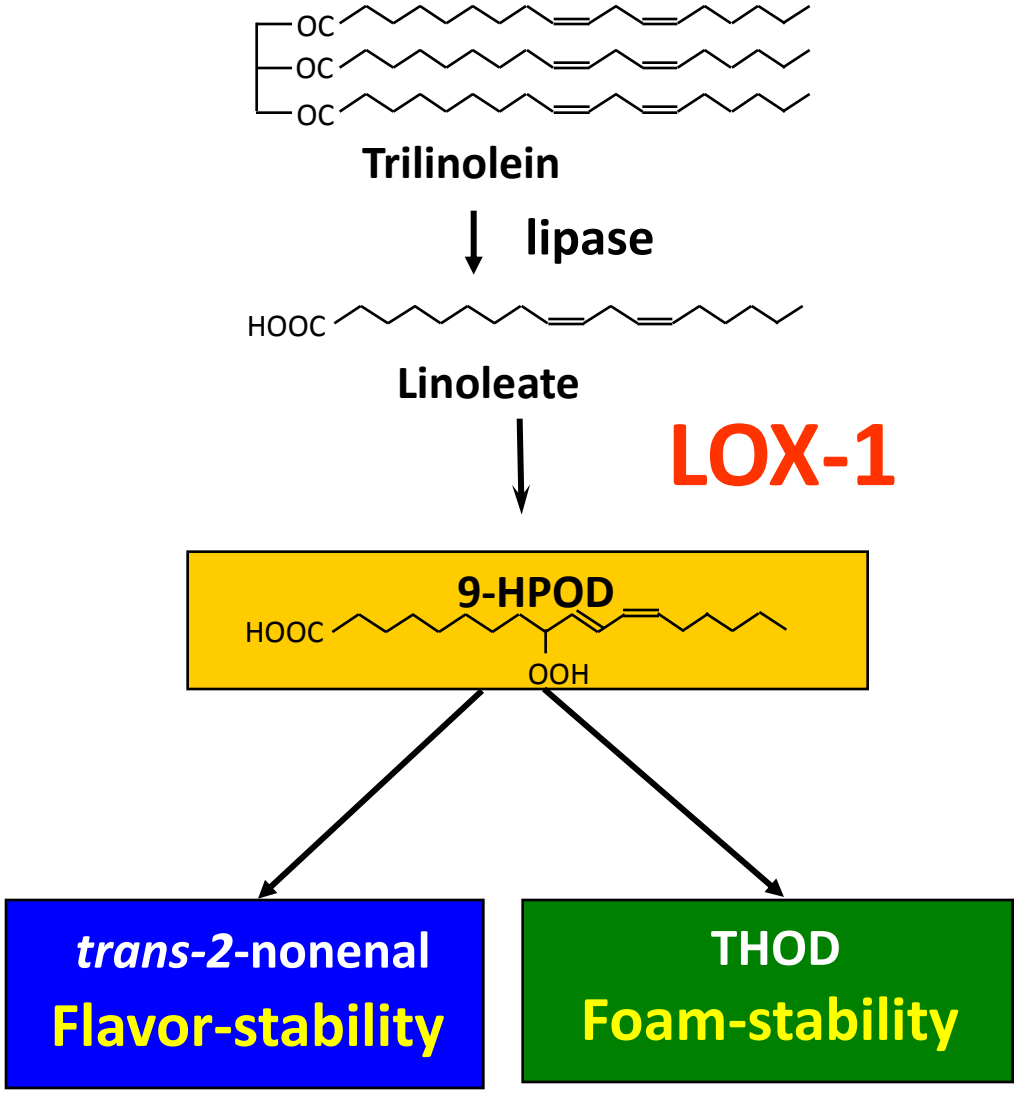
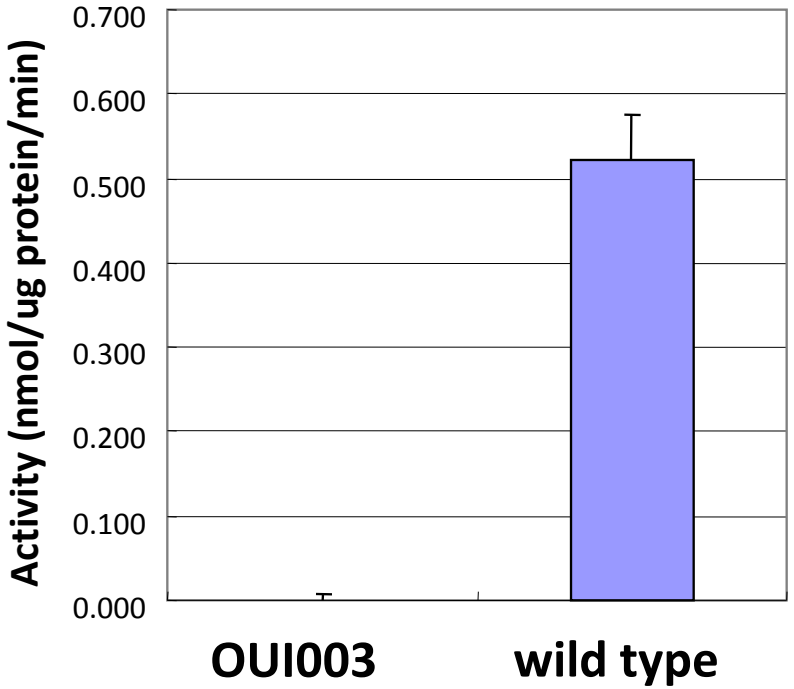
Function of LOX-1 in brewing and discovery of LOX-1 null (LOX-less) barley landraces





LOX activity of LOX-1 null line discovered from landraces

Hirota et al.(2006) MBAA TQ Vol.43

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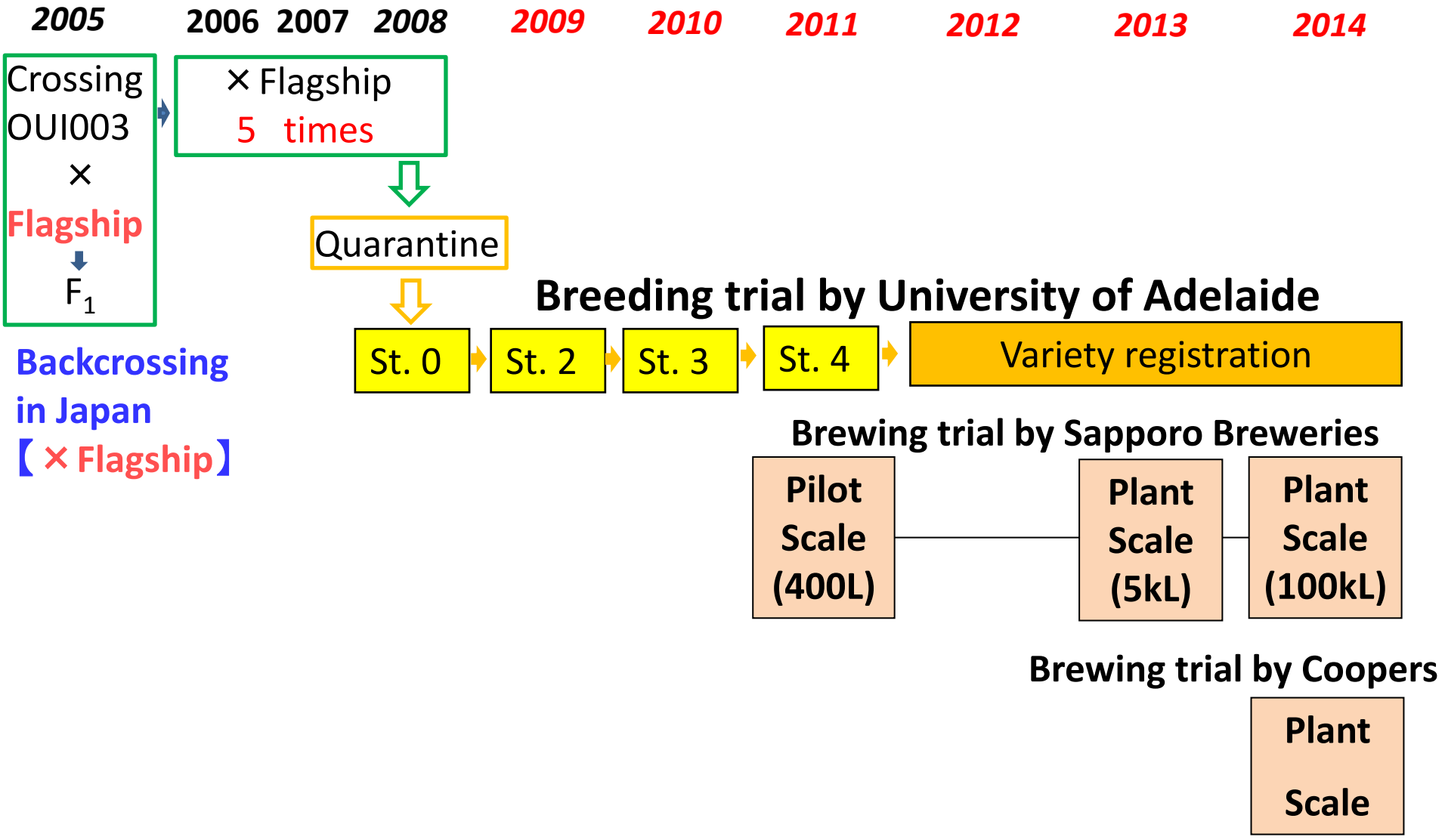
Breeding process of SouthernStar



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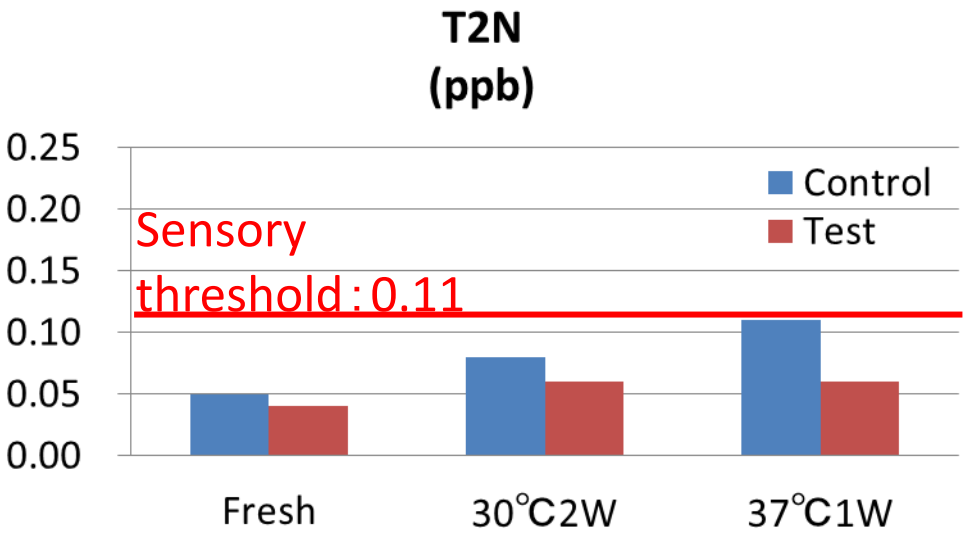
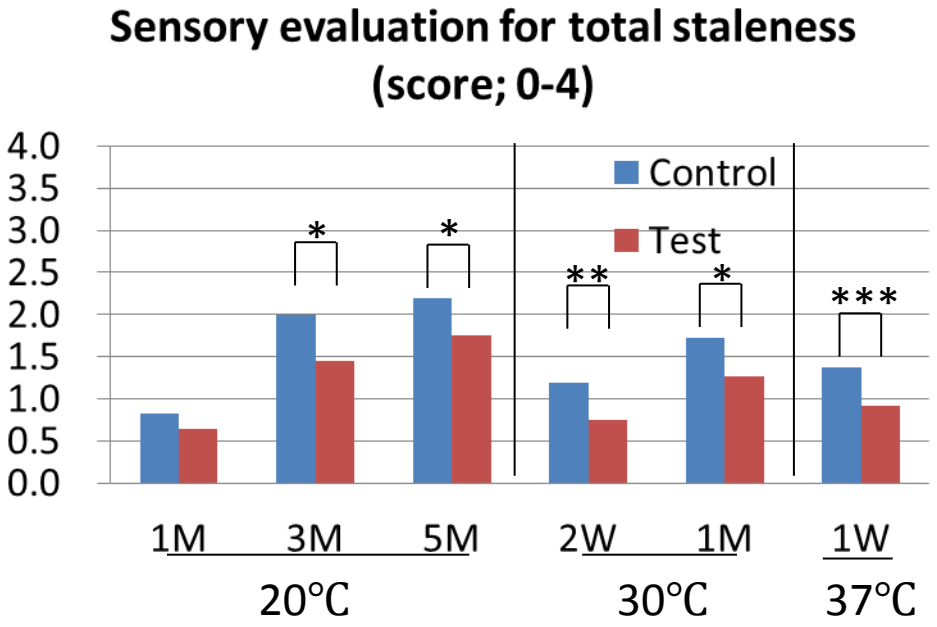
Outlines of brewing trials at Sapporo & Coopers

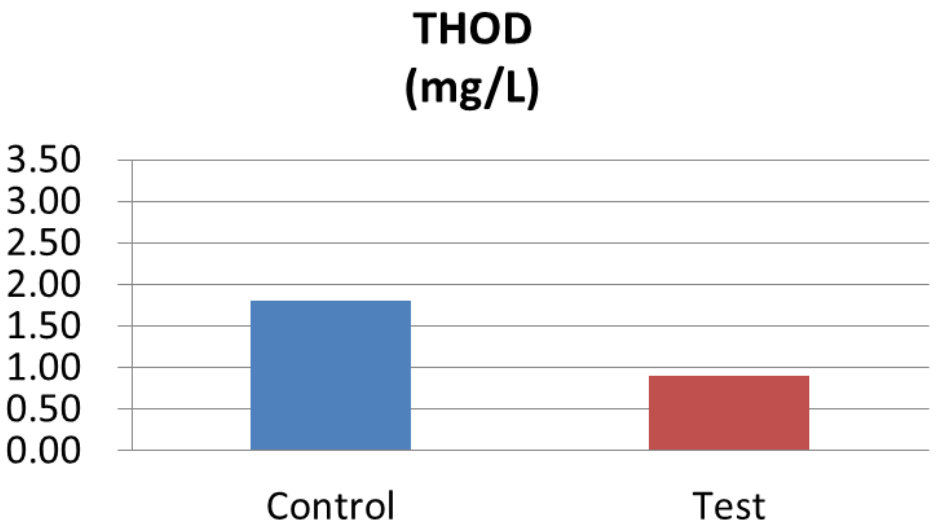
Year	Brewery	Scale	Test	Control
2011	Sapporo	Pilot scale (400L)	SouthernStar	Flagship
2013		Plant scale (5kL)	SouthernStar	Flagship
2014		Plant scale (100kL)	SouthernStar	Gairdner
2014	Coopers	Plant scale (85kL)	SouthernStar	Commander

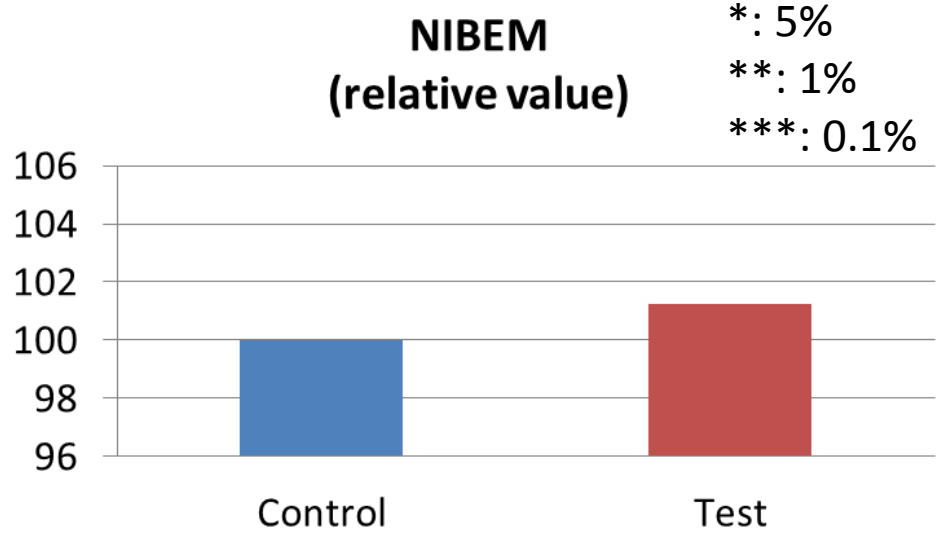
These varieties were malted by Cargill Malt Asia Pacific.

Result of Pilot scale (400L) brewing trial by Sapporo



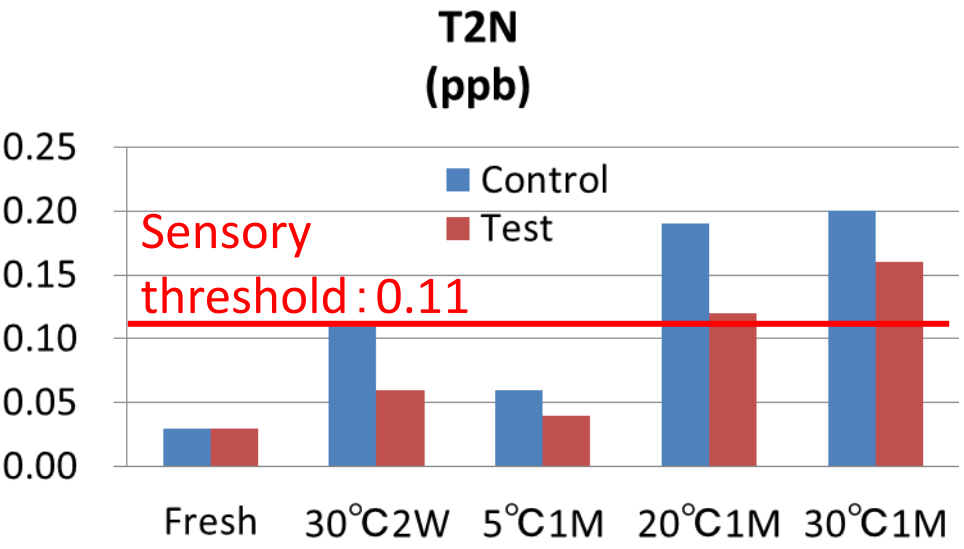


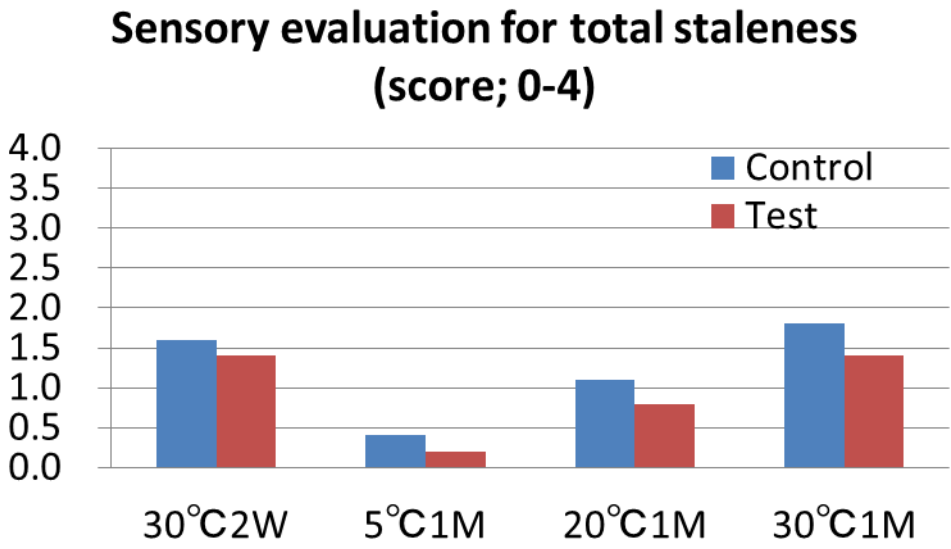


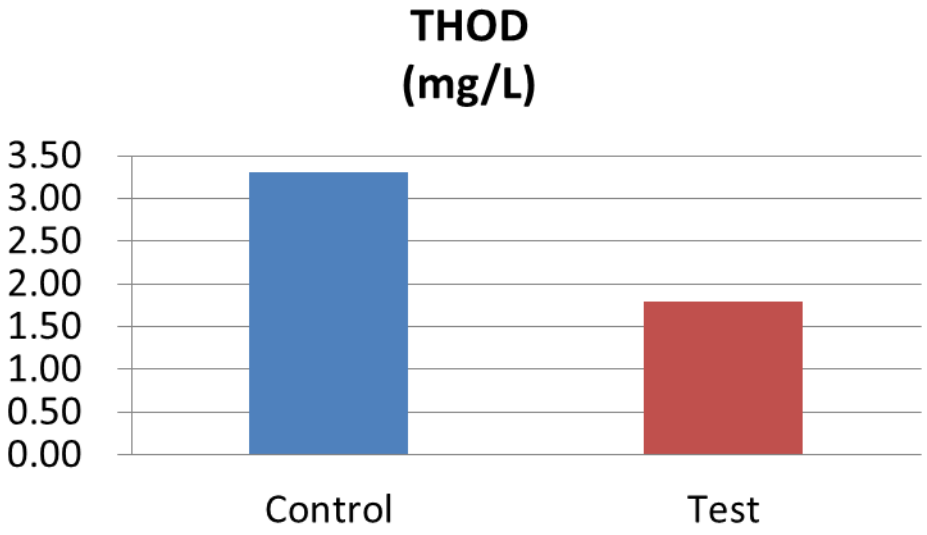


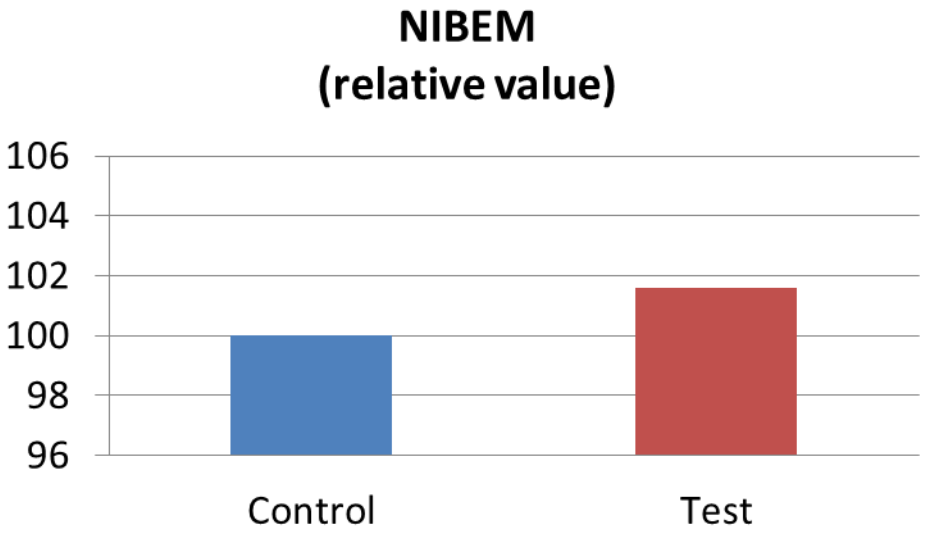
*: 5%
**: 1%
***: 0.1%

Result of Plant scale (5kL) brewing trial by Sapporo









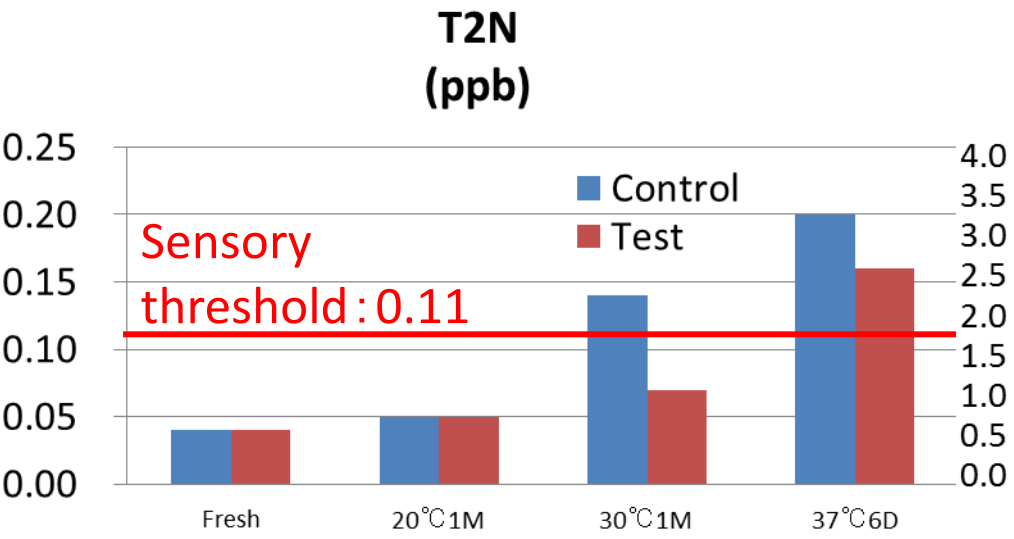
Result of Plant scale (100kL) brewing trial by Sapporo

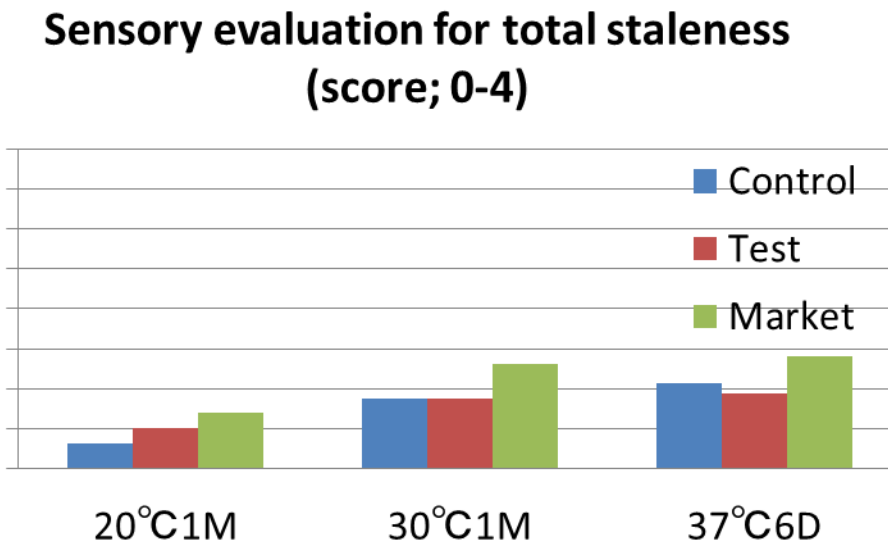
Malt blend of the plant scale (100kL) brewing trials

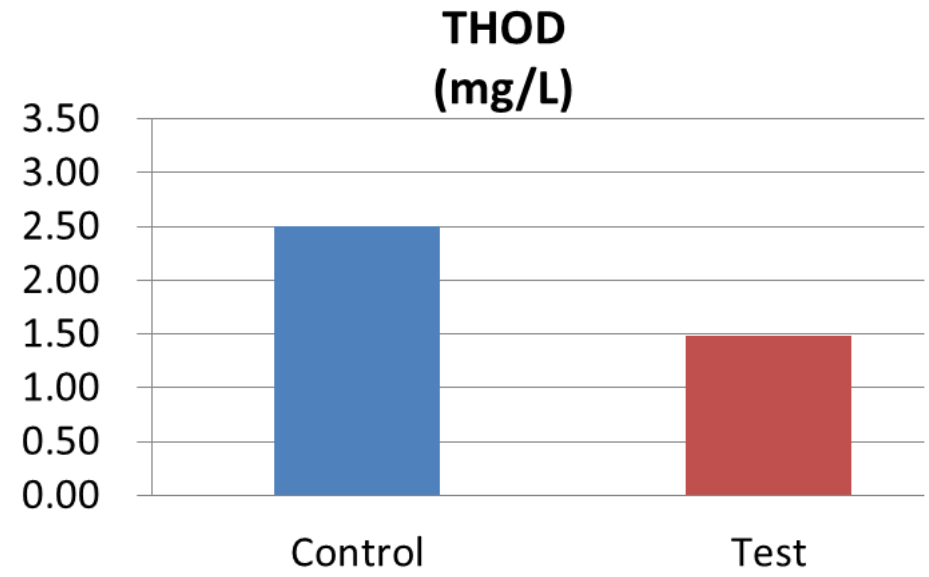
	LOX-less Malt		Normal malt
	SouthernStar	CDC PolarStar	
Control	0.0%	40.5%	59.5%
Test	33.8%	40.5%	25.7%

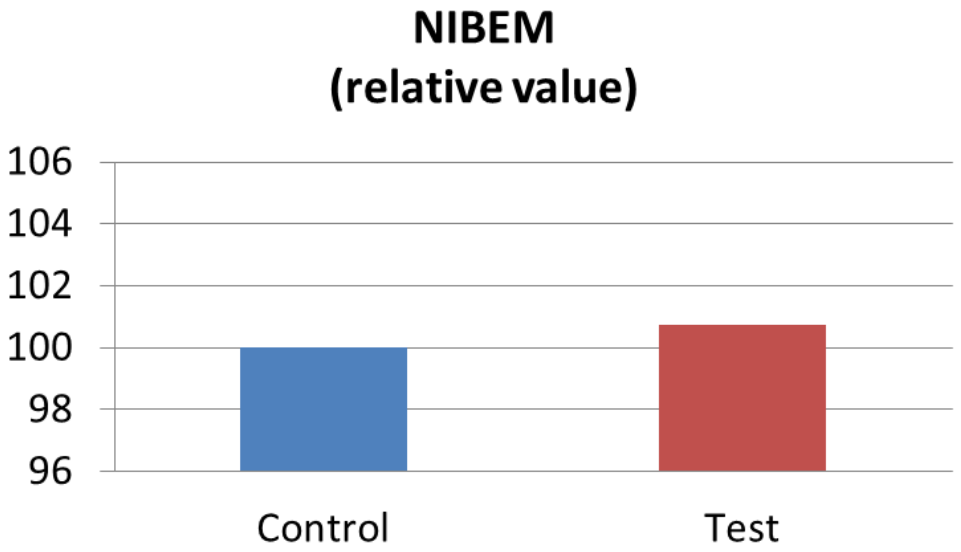
3. A) Result of Brewing trials at Sapporo

Result of Plant scale (100kL) brewing trial by Sapporo









Summary
-Sapporo's brewing trials-

- **T2N of test beers was lower than those of control beers, and sensory evaluation for total staleness of test beers was better than those of control beers.**

- **THOD of test beers was lower than that of control beers, and foam stability of test beer tended to be higher than that of control beer.**

- **Flavor stability could be further improved by application of higher ratio of LOX-less malt.**

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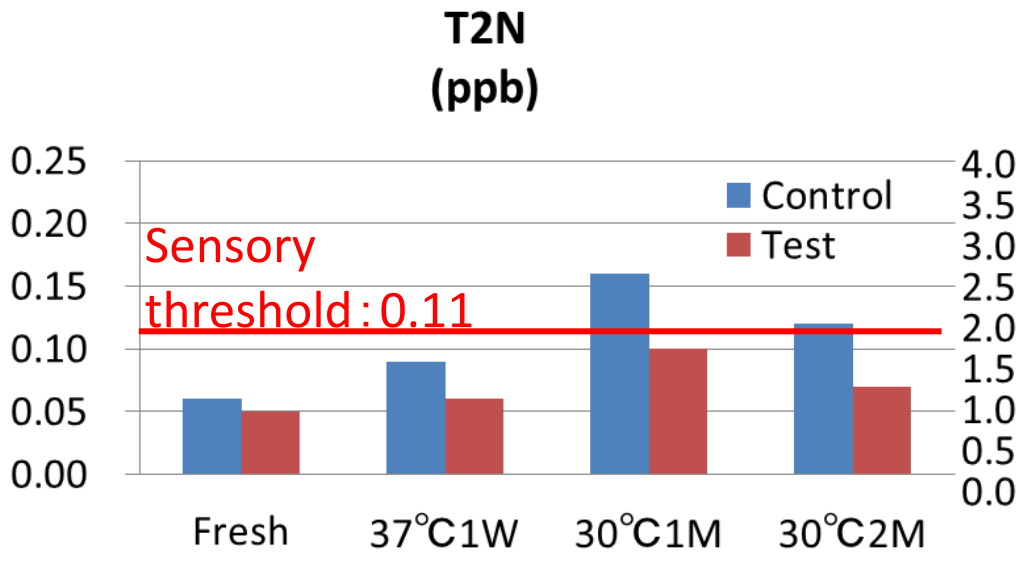
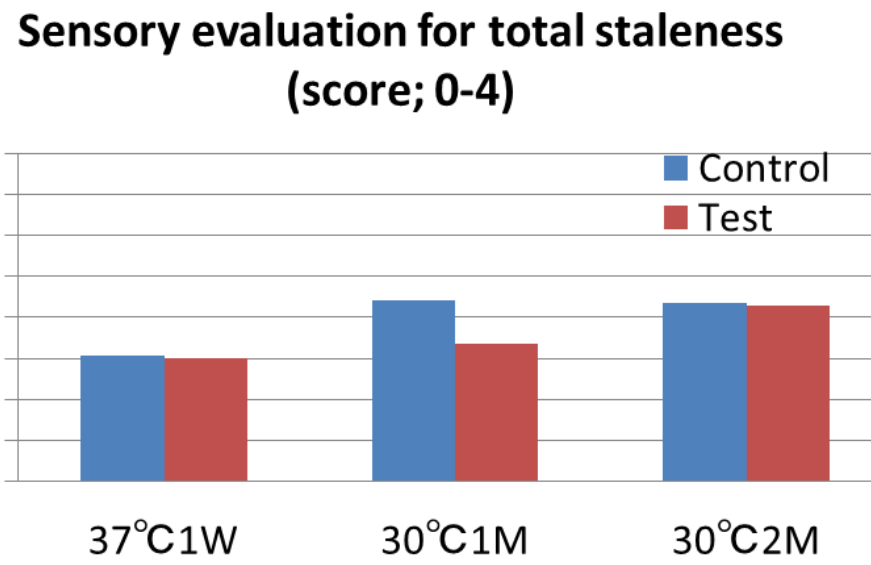
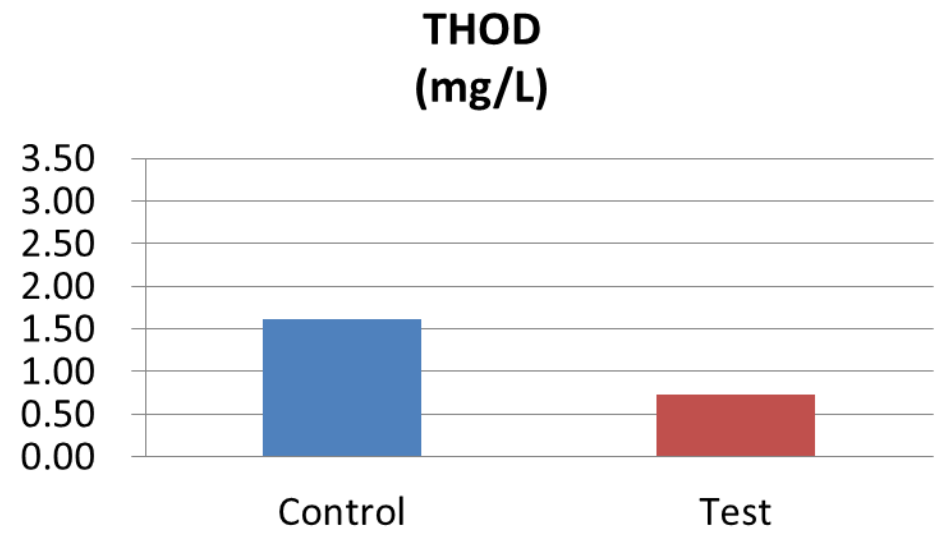
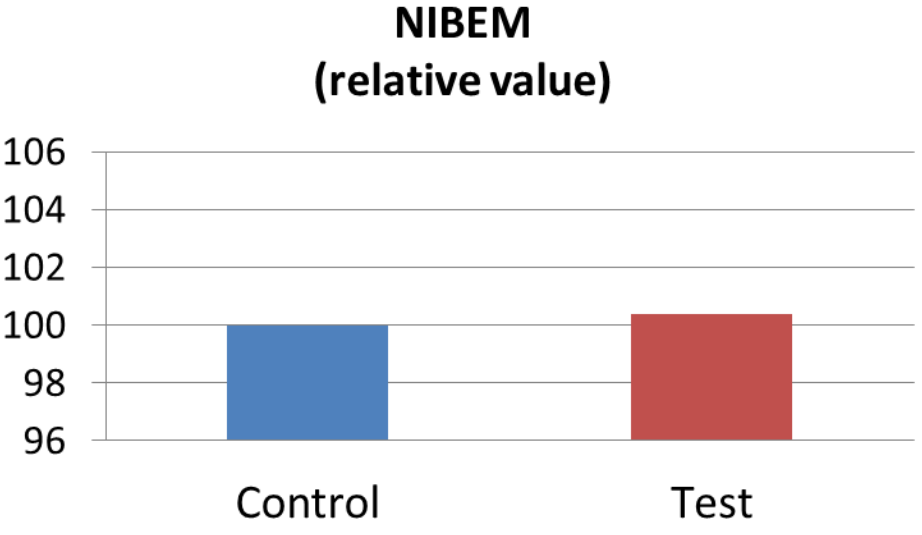
3. B) Result of a Brewing trial at Coopers

Result of a Plant scale brewing trial by Coopers









Both Commander and SouthernStar were malted by Cargill Malt Asia Pacific.

Summary
-Coopers's brewing trial-

- **T2N contents of test beers were lower than those of control beers, and sensory evaluation for total staleness of test beers was better than those of control beers.**

- **THOD content of test beer was lower than that of control beer, and foam stability of test beer tended to be higher than that of control beer.**

- **The positive effects of SouthernStar and LOX-less traits were also verified in the brewing trial at the different brewery using different facilities and yeast strains other than Sapporo.**

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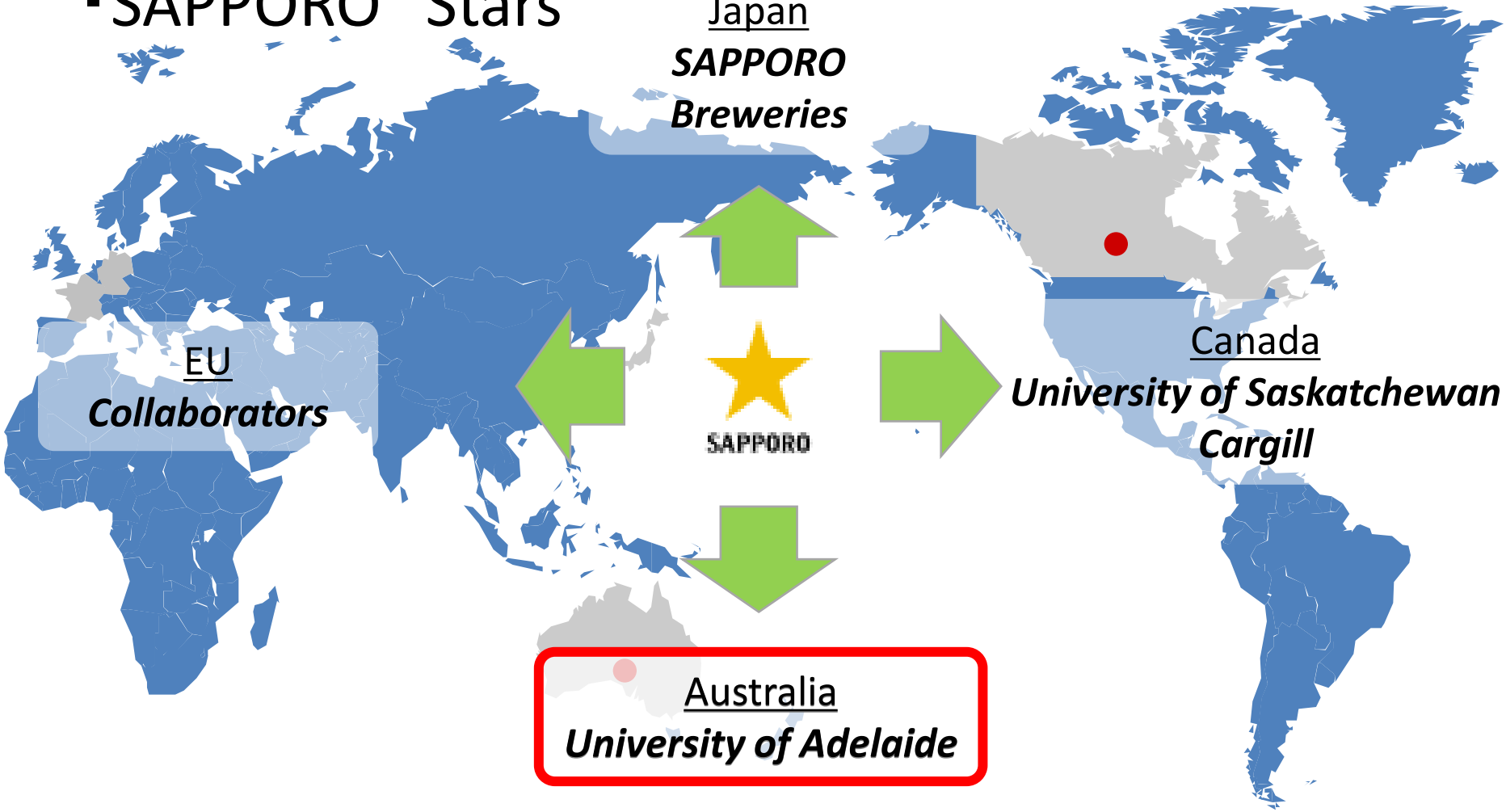
Summary

- **‘SouthernStar’ in Australia was jointly developed by University of Adelaide and Sapporo Breweries.**
- **‘SouthernStar’ has advantages especially on improvement of flavor stability.**
- **Flavor stability could be further improved by application of higher ratio of LOX-less malt.**
- **It is suggested that LOX-less traits are adequately and universally functional under different brewing conditions.**

R&D Marketing strategy of LOX-less malt

- SAPPORO “Stars”



R&D Marketing strategy of LOX-less malt

- SAPPORO “Stars”

Japan
Satsuiku 2

EU
New LOX-less varieties

Canada
CDC PolarStar
CDC PlatinumStar

Australia
SouthernStar

Now on sale!

Sapporo's barley varieties to the world for customers' better toast !!

CCFS

Growers

Maltsters

Brewers

SAPPORO

Cheers

Breeders

SAPPORO THE UNIVERSITY of ADELAIDE Cargill Coopers

Acknowledgement

We appreciate the joint research with Okayama University, Japan for their scientific advice and collaboration.

Any questions?