

CHR HANSEN

Improving food & health

non-*Saccharomyces* wine yeast

Annicka Bunte 16 June 2009

History of yeast starters

- ▼ First starter culture: Müller-Thurgau 1890
- ▼ First commercial wine yeast starter: California 1964-65
- ▼ Today: 90% starter fermentations in California
[Mortimer(2000) *Genome Res.* 10 (4): 403-409]
- ▼ Process consistency gained
at the expense of some positive wine qualities



Lost qualities associated with “wild” yeast

FRUIT.

COMPLEXITY.

MOUTHFEEL.



Reintroducing the good “wild” characters

- ▼ Aiming to reintroduce fruit, complexity and mouthfeel like spontaneous fermentations
- ▼ Keeping process control
- ▼ Screening of non-*Saccharomyces* isolates
- ▼ Laboratory and field trials ensuring good vinification
- ▼ Safety aspects tested (low urea/ethyl carbamate)
- ▼ Sensoric impact evaluated in field trials

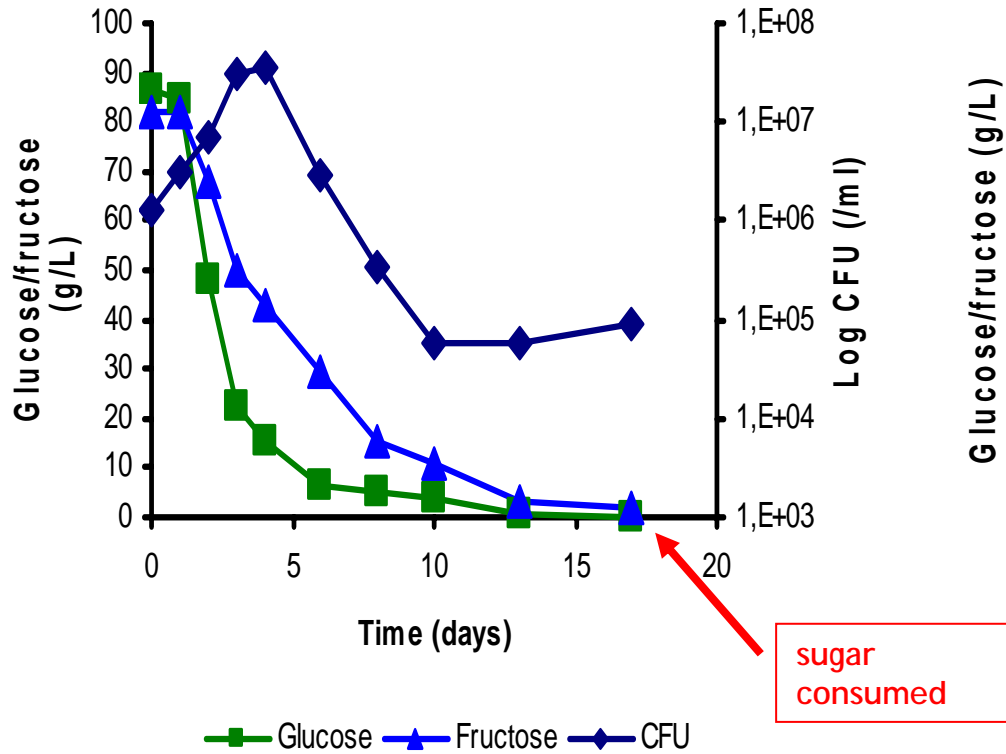


Chr Hansen screening of wine related “wild” yeasts started in the 1990’s

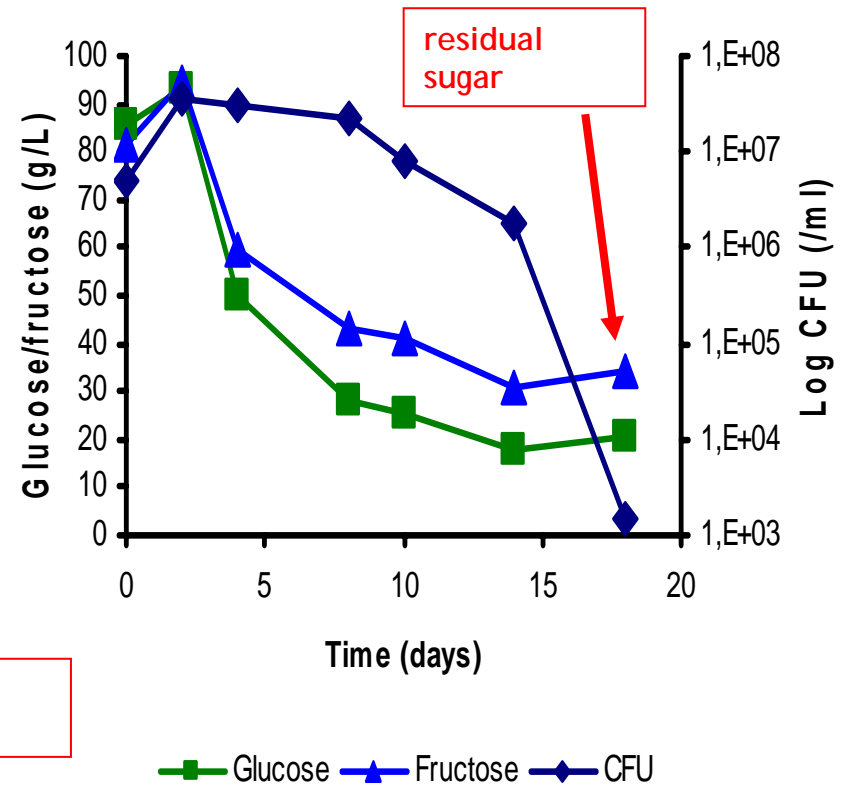
- ▶ *Brettanomyces* / Anamorph *Dekkera*
- ▶ *Candida*
- ▶ *Cryptococcus*
- ▶ *Debaromyces*
- ▶ *Hanseniaspora* / Anamorph *Kloeckera*
- ▶ *Hansenula*
- ▶ *Kluyveromyces*
- ▶ *Torulaspora*
- ▶ *Metschnikowia*
- ▶ *Pichia*
- ▶ *Rhodotorula*
- ▶ *Saccharomyces*
- ▶ *Saccharomycodes*
- ▶ *Schizosaccharomyces*
- ▶ *Zygosaccharomyces*

Saccharomyces drives the alcoholic fermentation

S. cerevisiae



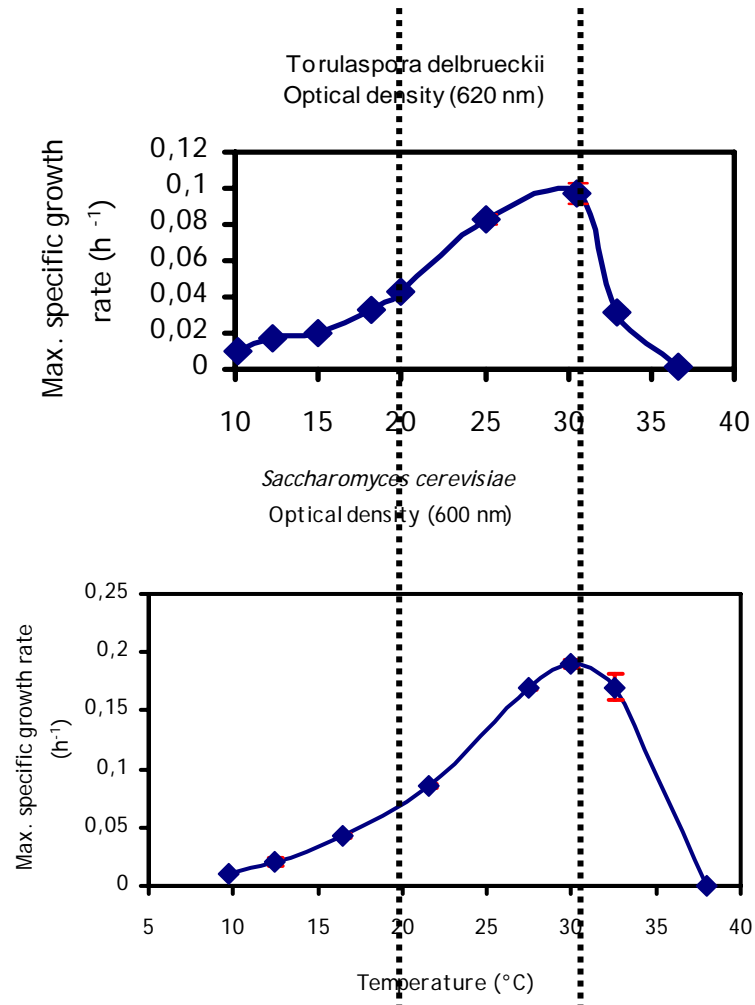
T. delbrueckii



non-*Saccharomyces mixed* starters

- ▼ *Saccharomyces* yeast needed to finish fermentation
- ▼ non-*Saccharomyces* yeasts and *Saccharomyces* yeast should ferment under similar conditions
- ▼ 2003 big scale field trials
- ▼ 2004 first non-*Saccharomyces* containing starter cultures introduced by Chr Hansen

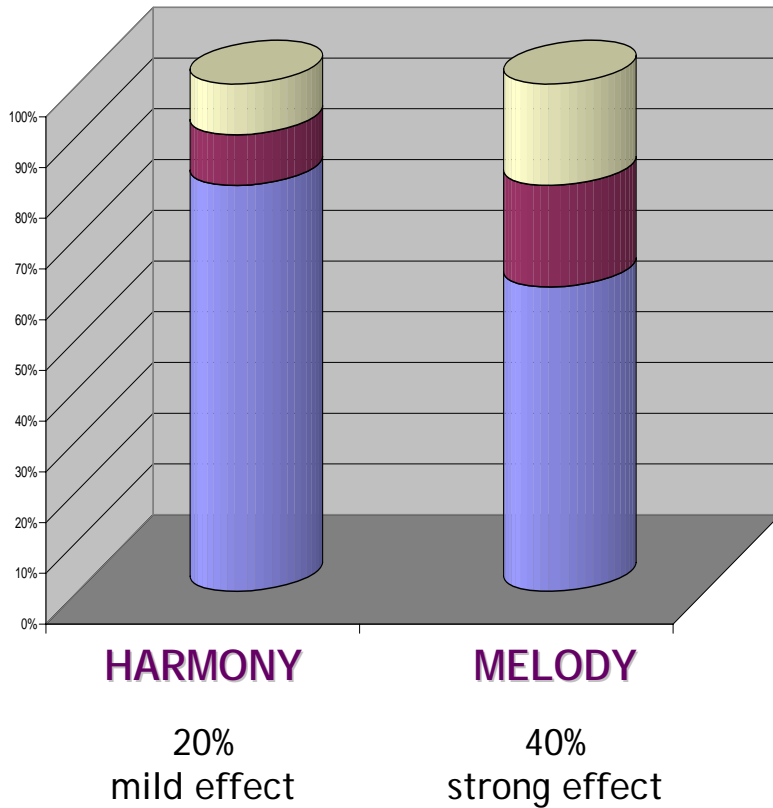
Temperature optimum similar, temperature tolerance differs slightly.



HARMONY.nsac & MELODY.nsac

▼ 2 Blends of:

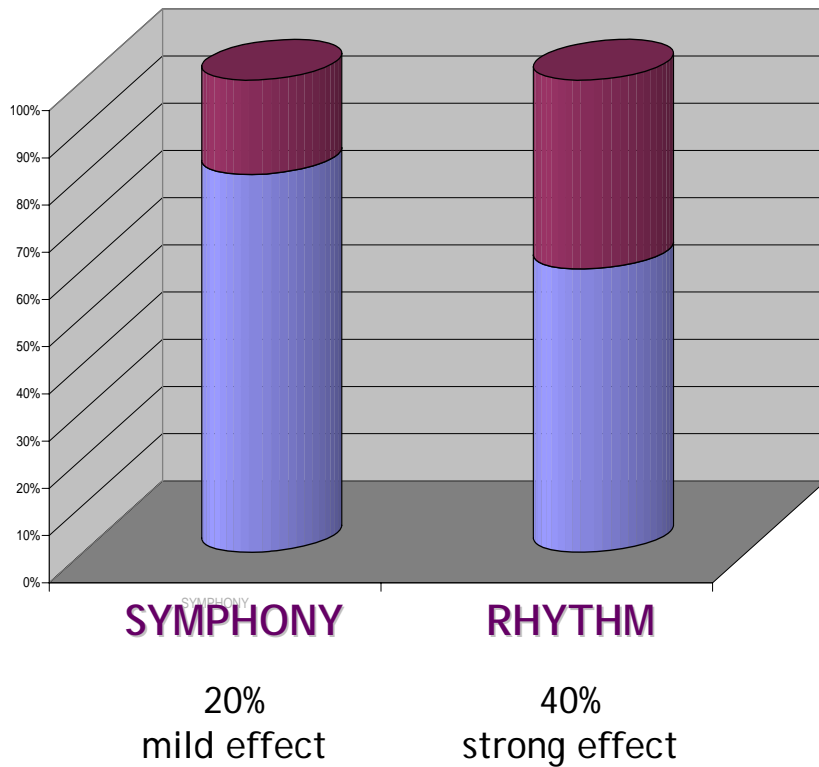
- ▶ *Torulasporea delbrueckii* (Td)
- ▶ *Kluyveromyces thermotolerans* (Kt)
- ▶ *Saccharomyces cerevisiae* (Sc)



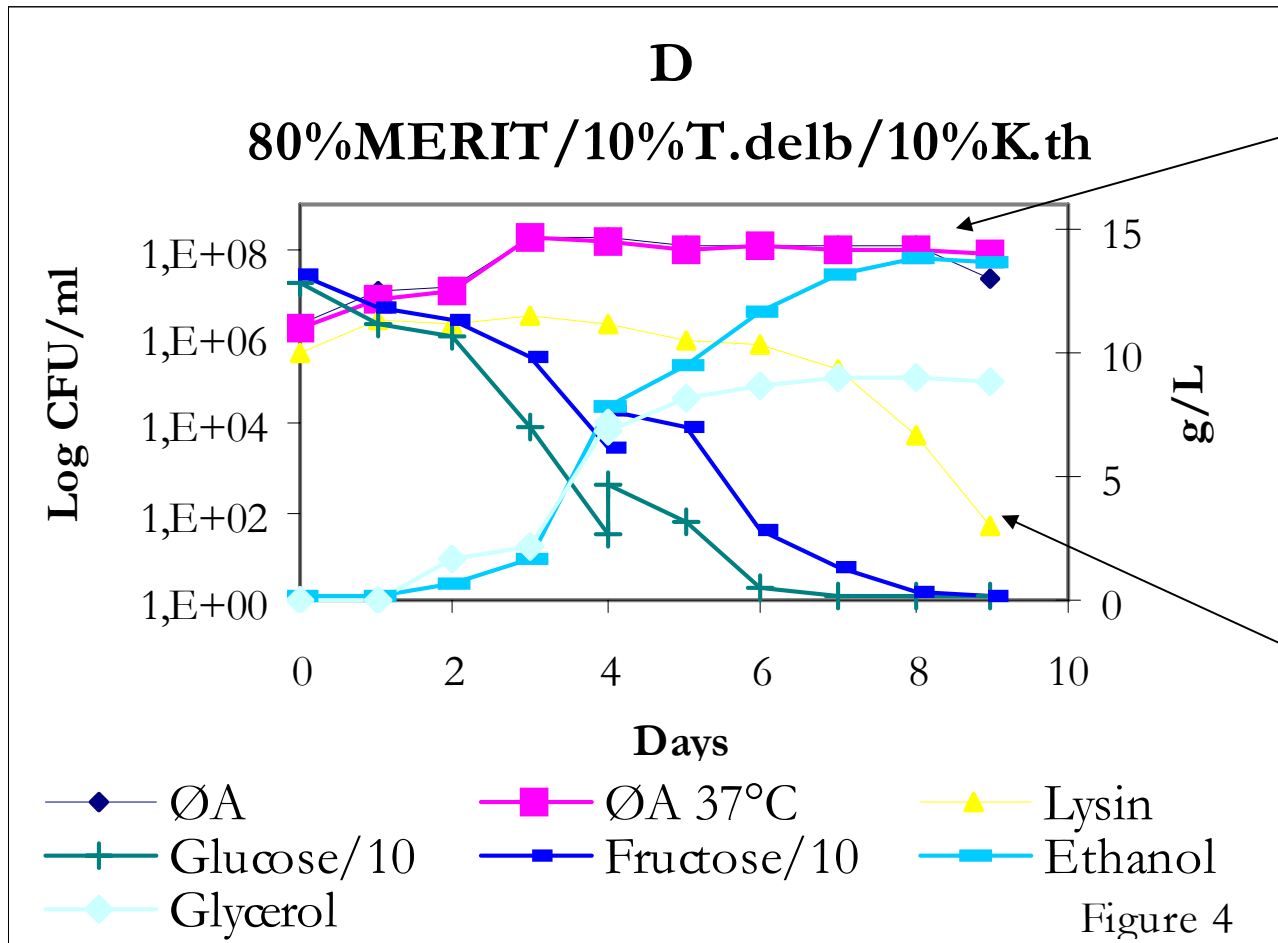
SYMPHONY.nsac & RHYTHM.nsac

▼ 2 Blends of:

- ► *Kluyveromyces thermotolerans* (Kt)
- ► *Saccharomyces cerevisiae* (Sc)



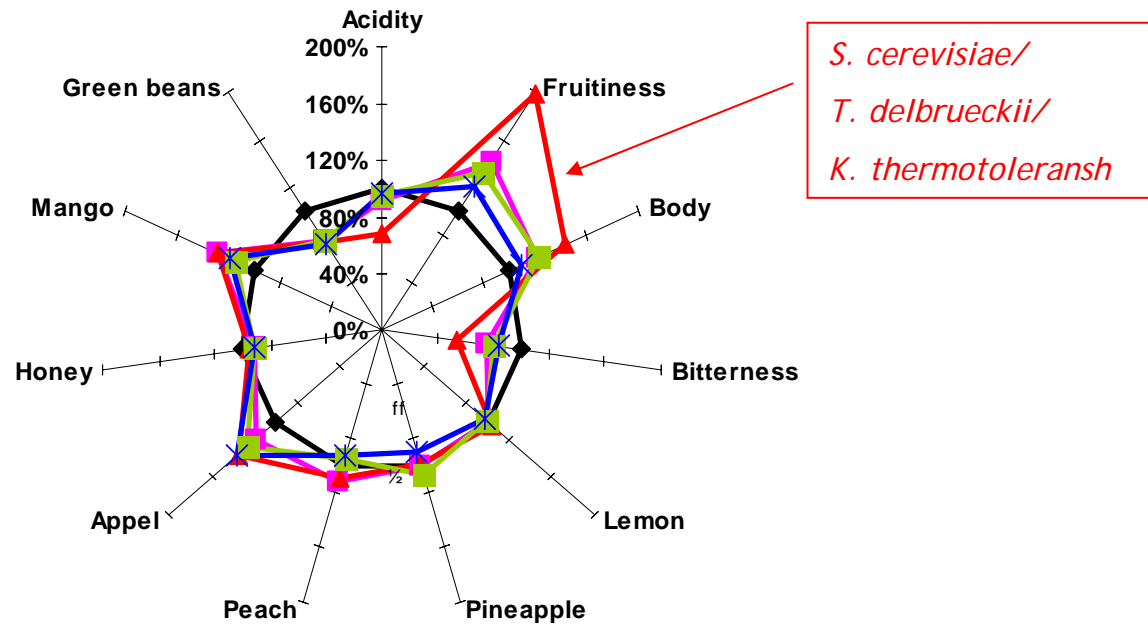
Example fermentation Cabernet sauvignon, HARMONY.nsac



Saccharomyces drives the fermentation

non-*Saccharomyces* numbers decline over time, like in spontaneous fermentation

Mixed starters vs pure *Saccharomyces* cultures



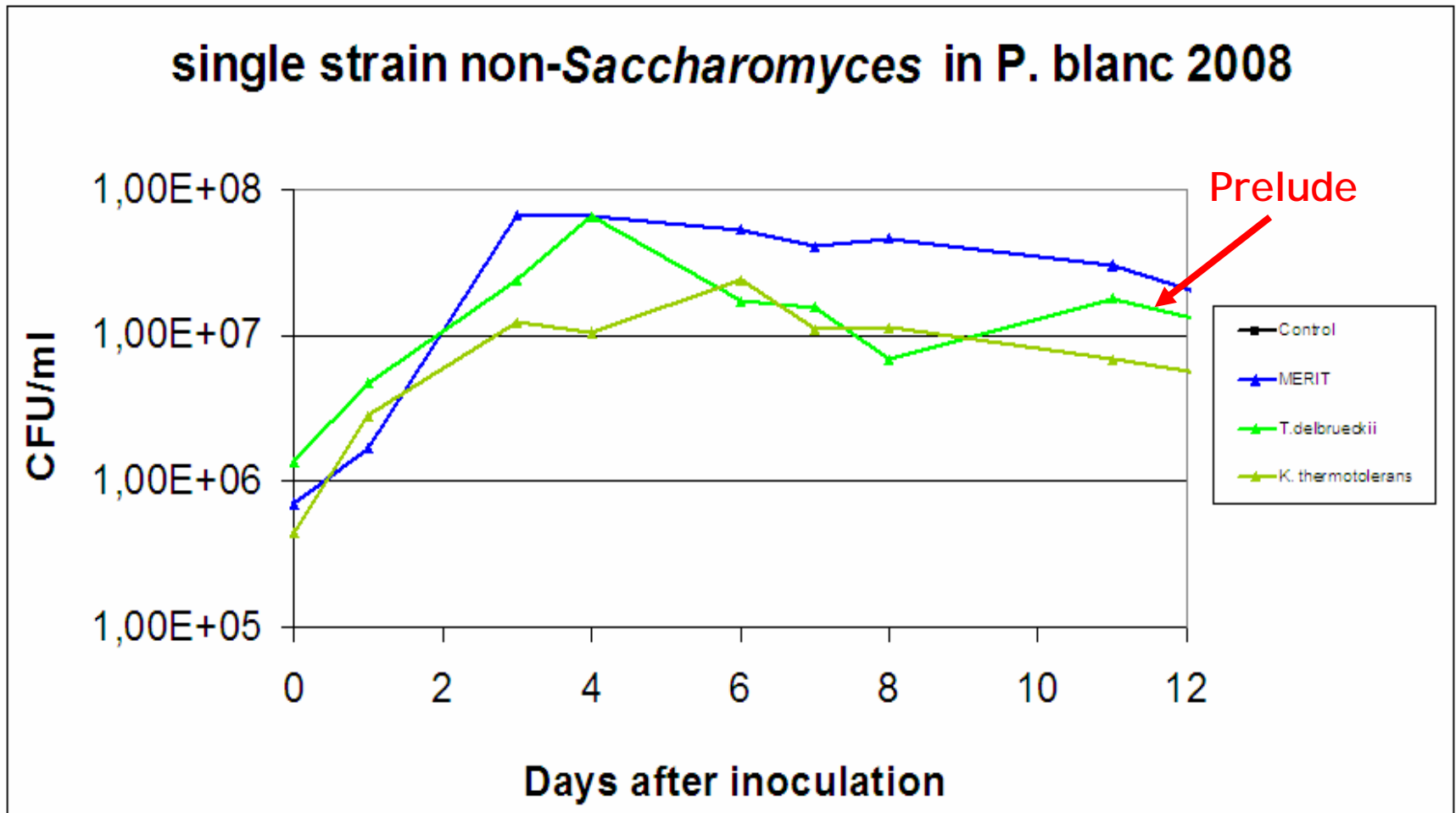
3001
 3004
 3005
 3006
 3007

Data kindly provided by University of Neustadt, Germany and E: Begerow GmbH & Co, Germany

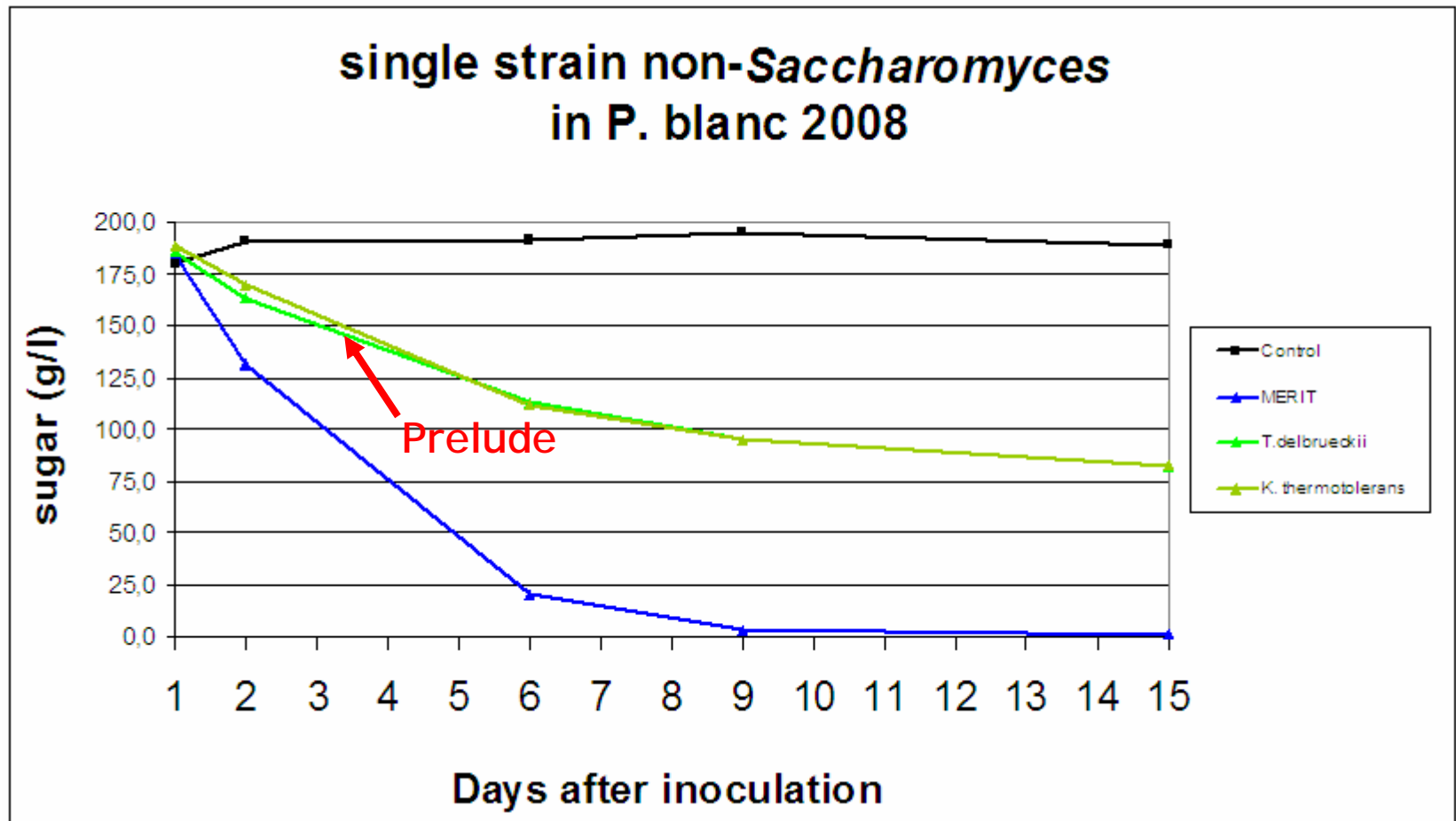
Experience with starters

- ▼ Improves mouthfeel and smoothness / roundness of wines
- ▼ Increases longevity of flavours and aromas
- ▼ Wineries interested in experimenting with own ratios, inoculation schemes and favourite *Saccharomyces cerevisiae* commercial strains
- ▼ PRELUDE.nsic single strain *Torulasporea delbrueckii*

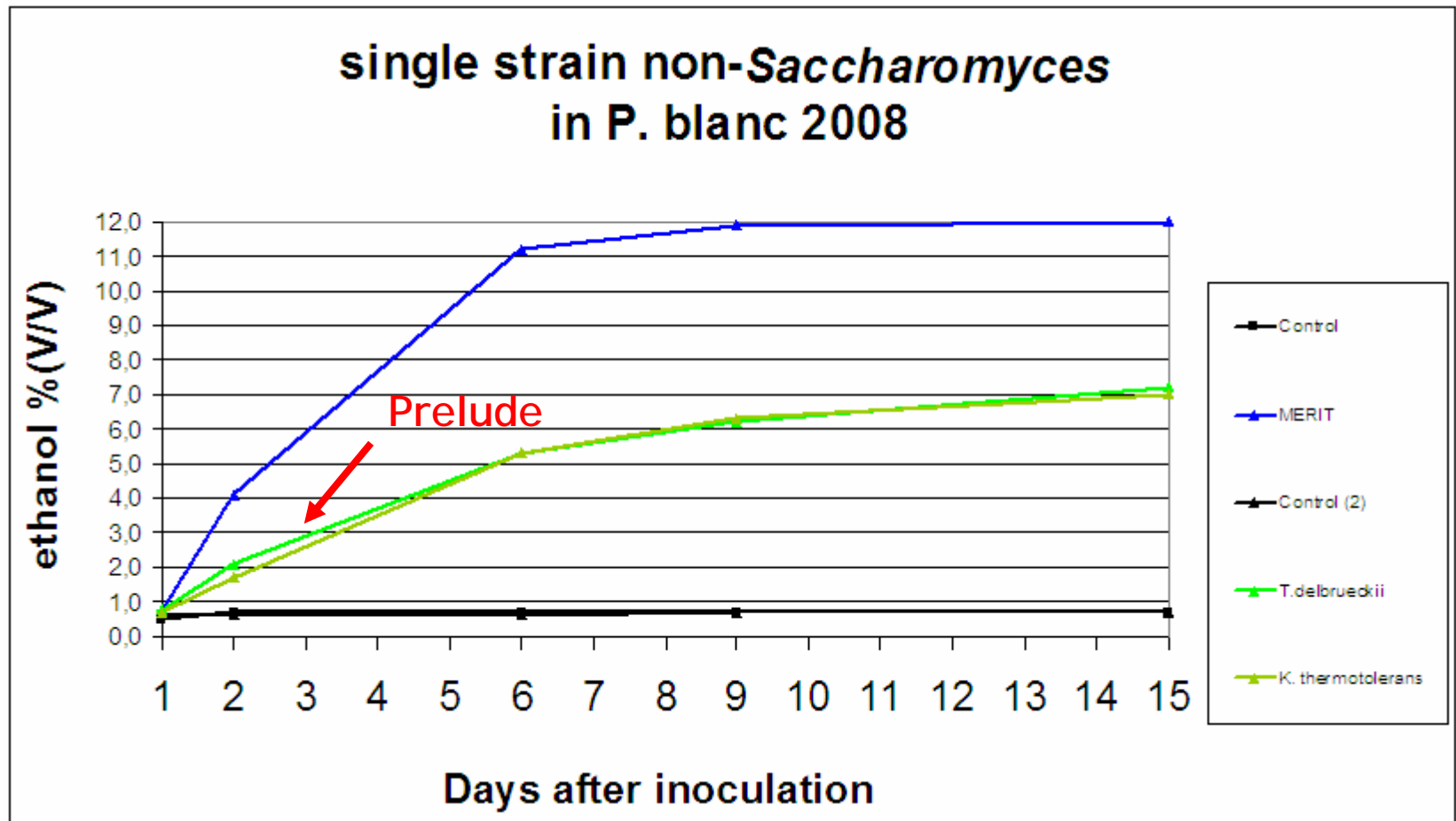
Saccharomyces drives alcoholic fermentation: growth



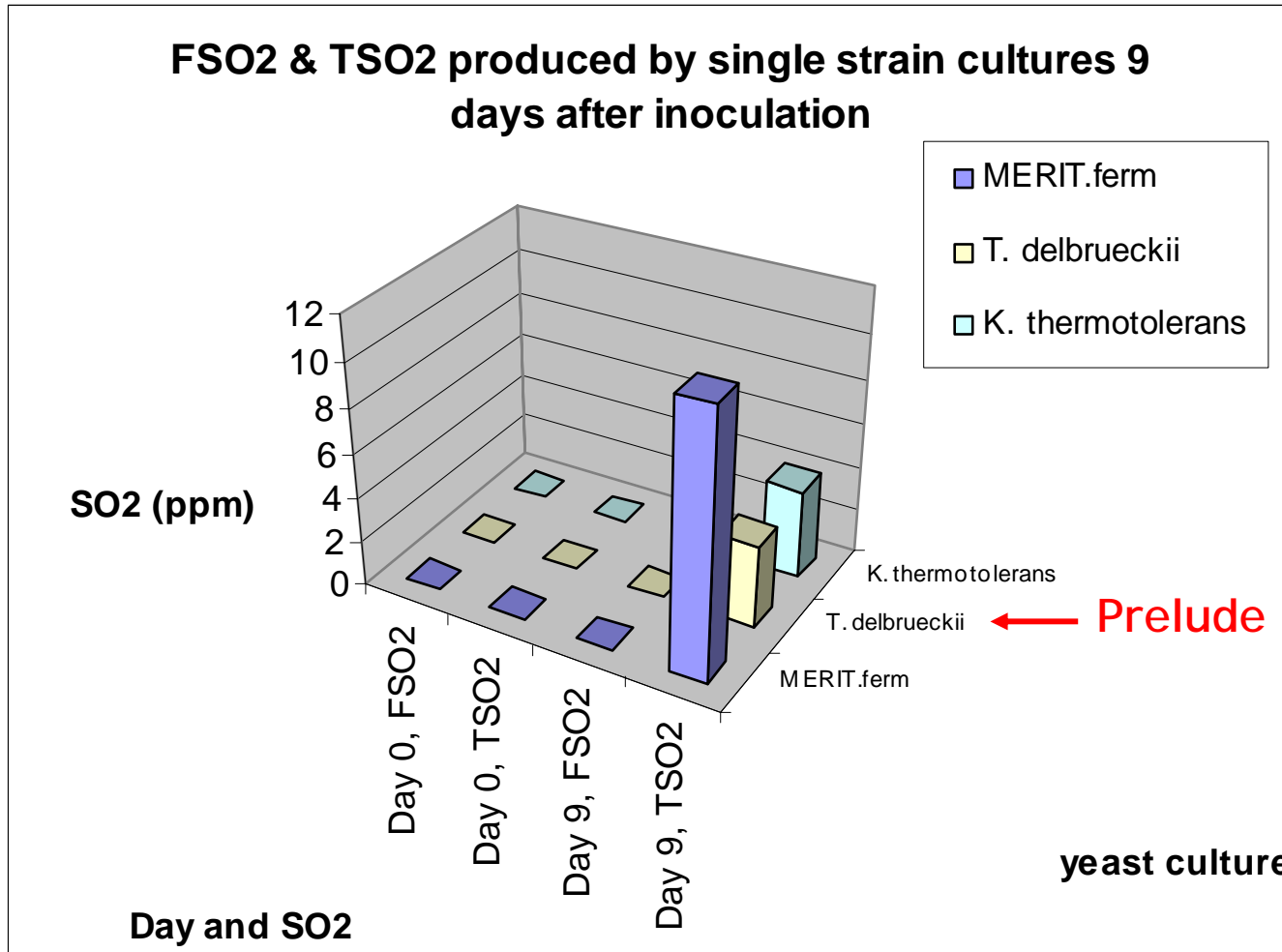
Saccharomyces drives alcoholic fermentation: sugar



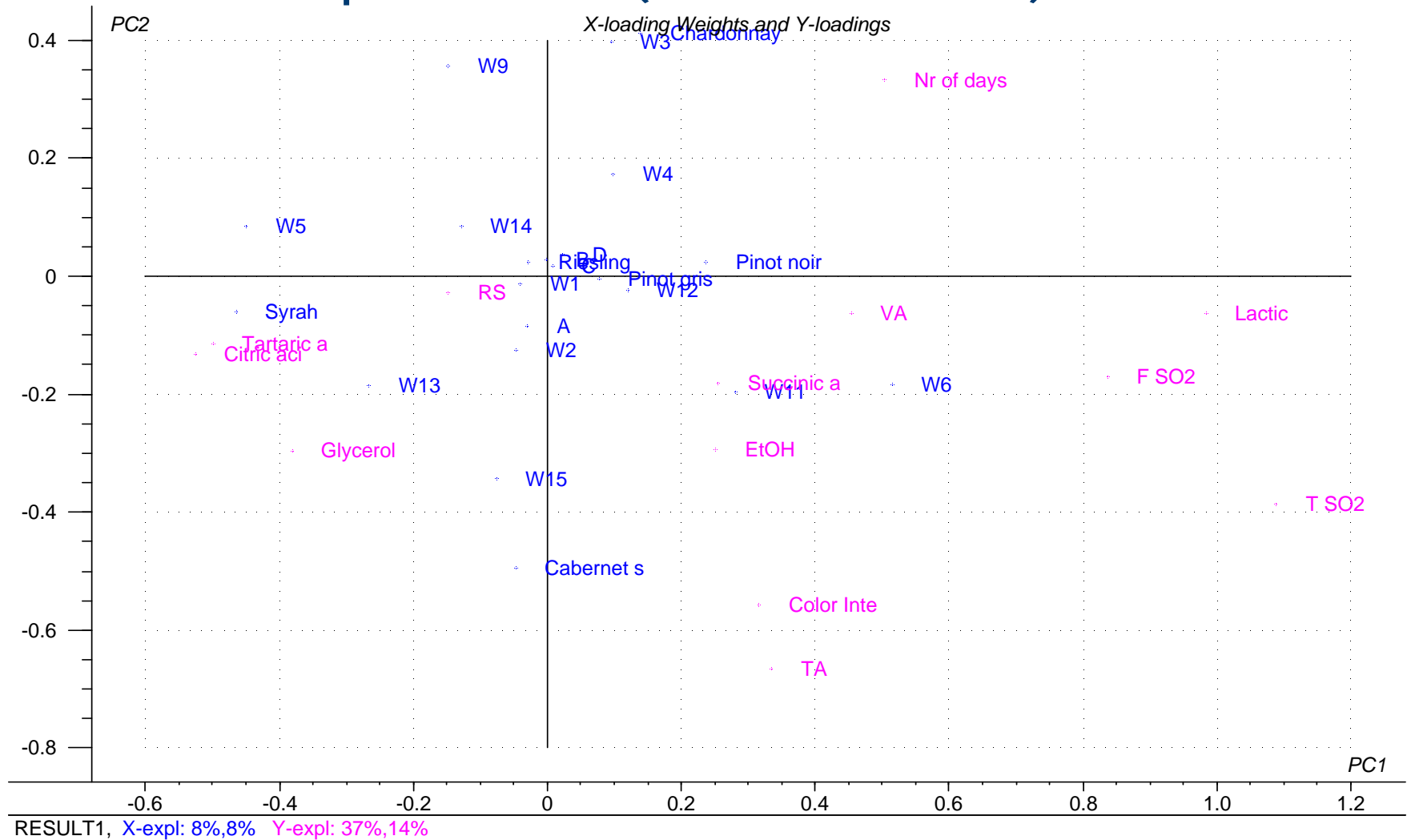
Saccharomyces drives alcoholic fermentation: ethanol



non-*Saccharomyces* contribute little to SO₂



non-*Saccharomyces* made little difference on standard fermentation parameters (field trials 2003)

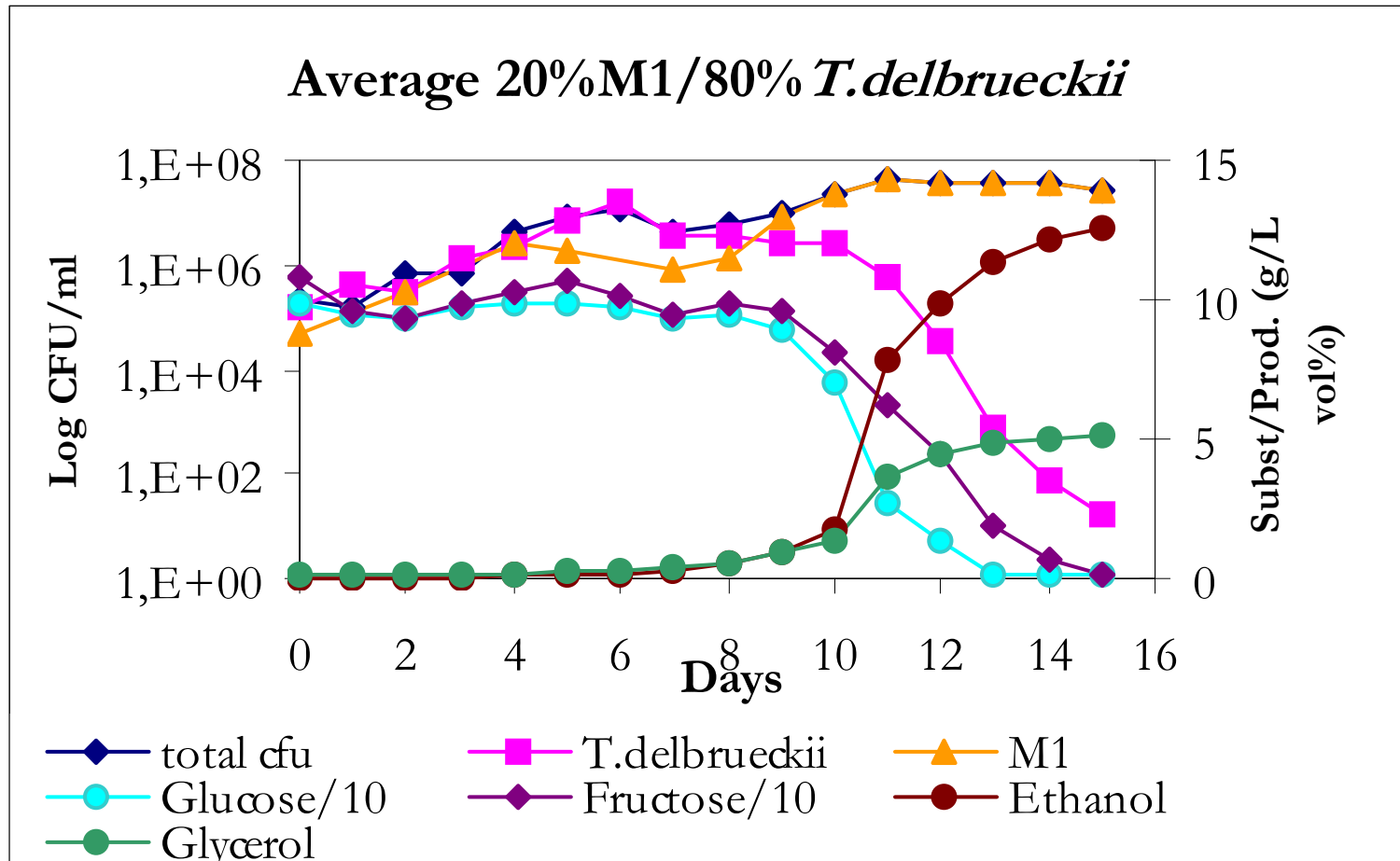


S. cerevisiae drives the alcoholic fermentation: field trials 2003

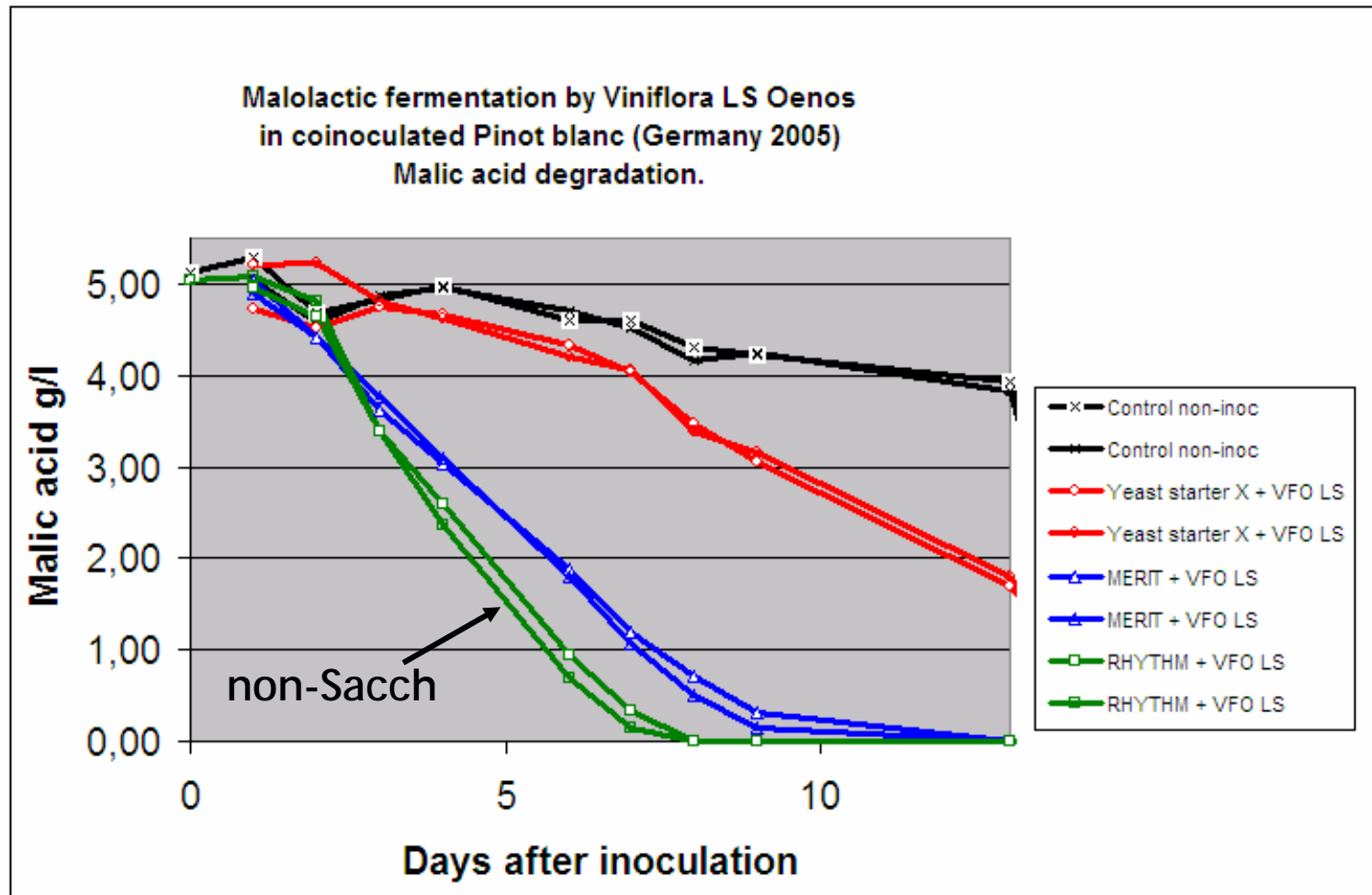
	Finished first	Finished last	Total No. reported trials
<i>S. cerevisiae</i>	4	1	16
80% NS	0	6	16
"PRELUDE"	0	1	15
"SYMPHONY"	3	1	14

Always use single strain *Torulaspora delbrueckii* (PRELUDE) with a commercial *Saccharomyces cerevisiae*!

Torulaspora delbrueckii (PRELUDE) in Pinot blanc



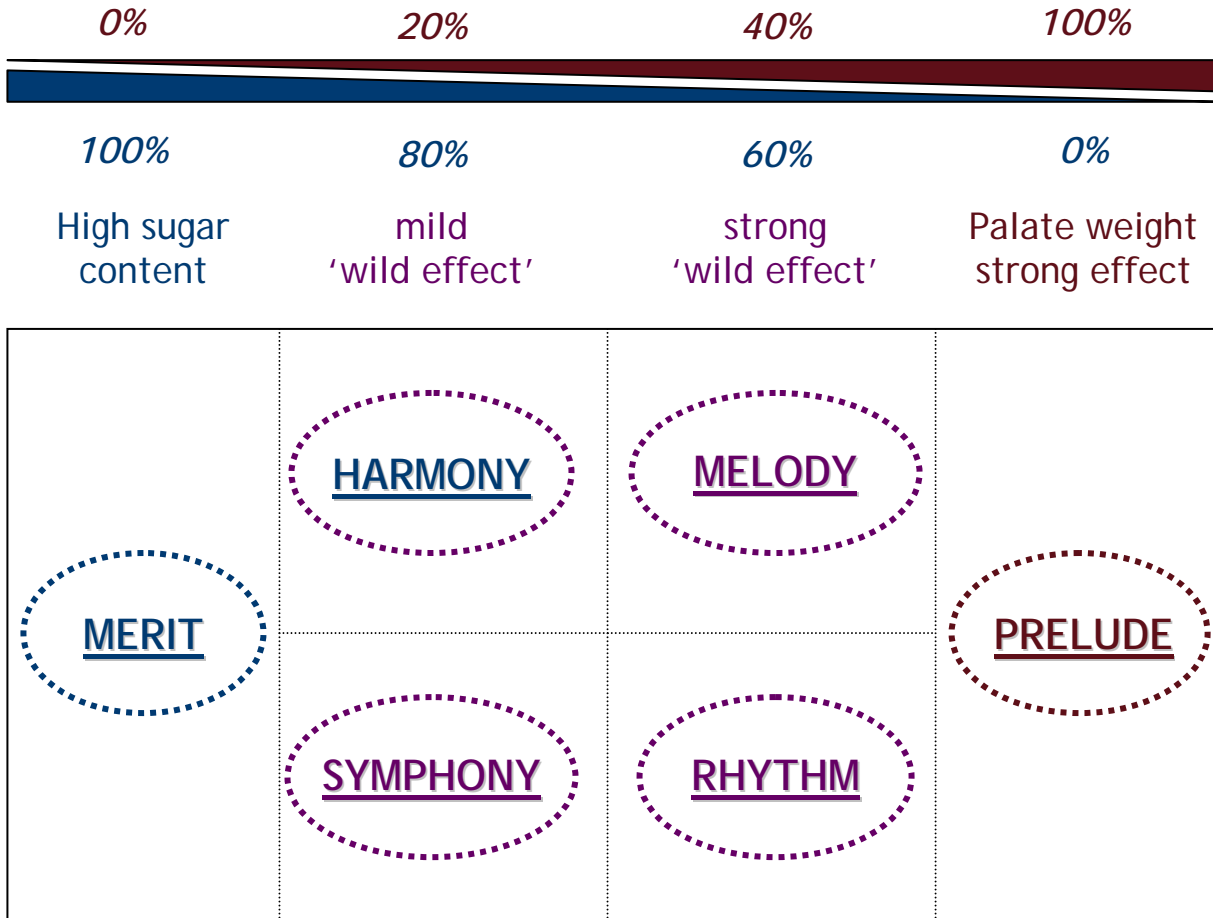
Fast MLF with non-*Saccharomyces*



Select your yeast product

Saccharomyces cerevisiae

Non-Saccharomyces species



NEW!

PRELUDE.nsac

- ▼ 100% *Torulasporea delbrueckii*
- ▼ To be used with your favorite *Saccharomyces cerevisiae*
- ▼ Gives rounder, smoother mouthfeel
- ▼ Extend palate weight and flavors
- ▼ Used in white/ rosé and premium red wines to get additional complexity
- ▼ ALWAYS use your favorite *Saccharomyces cerevisiae* in addition to PRELUDE.nsac

Yeast strain:
Torulasporea delbrueckii

Oenological use:
SEE PRODUCT INFORMATION BEFORE USE
Inoculate simultaneously with your *Saccharomyces cerevisiae* of choice or 1-2 days before for an enhanced effect.

Oenological characterization:
Increase mouthfeel and palate weight. Longer palate flavour and aroma. Low production of volatile acid and acetaldehyde. Very low production of SO₂ and sulfur ester compounds. Compatible with your favorite *Saccharomyces cerevisiae*.

Ethanol tolerance:
9% vol.; always use with a *Saccharomyces cerevisiae*

Temperature spectrum:
10-25°C / 50-77°F

The contents of this package is for use in:
25-35 hl / 660-920 US gallons

Packaging:
500 g yeast in vacuum packed aluminium pouches.

687487
(+353) 02-44

Viniflora®.nsac

PRELUDE.nsac
Pure Torulasporea delbrueckii

A pure strain of *Torulasporea delbrueckii* to be used in combination with *Saccharomyces cerevisiae* strains of choice, assisting in a rounder, smoother mouthfeel, increased palate weight and extended palate flavour, ensuring the longevity of aromas produced from the grape by the *Saccharomyces cerevisiae*.

Recommended for improving the mouthfeel and palate of white, rosé and premium red wines, without interfering with the fermentation kinetics and flavour characteristics of the *Saccharomyces cerevisiae* used.

Chr Hansen AS
DK-2870 Hørsholm
Denmark
Tel: +45 45 74 74 74
Fax: +45 45 74 88 18
www.chrhansen.com

Directions for use:
The 3 major steps for optimal results using dried yeast:

- 1. Rehydration:**
Add yeast to unchlorinated tap water in a ratio of 1:10 (20-30°C/68-86°F). Let the yeast absorb water for at least 10 minutes and stir again to a homogeneous suspension.
- 2. Activation:**
Add unfiltered must to the yeast suspension in a ratio of 1:3. Leave the suspension for approx. 20 minutes.
- 3. Acclimatization:**
Add the suspension to the must/mash and pump over to make sure that the yeast is well suspended. If the must/mash has a low temperature (10-15°C/50-59°F), adjust the temperature of the yeast suspension slowly to approx. 20°C/68°F before adding to the must/mash.

Expiry date: see back of pouch
Material No.: 692118
Batch no.: see back of pouch

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Experience with PRELUDE.nsac

South African field trials 2009

- ▼ Chardonnay: Inoculation of PRELUDE.nsac 5 days prior to *Saccharomyces cerevisiae* (commercial strain)
 - ▶ “Remarkable” increased mouthfeel, palate weight and creaminess.
 - ▶ Impact on red wines predicted to be very beneficial
 - ▶ Effect similar to addition of mannoproteins
- ▼ Sauvignon blanc: Inoculation of PRELUDE.nsac 2 days prior to *Saccharomyces cerevisiae* (commercial strain)
 - ▶ Preferred the PRELUDE.nsac treatment
 - ▶ Improved mouthfeel and length of flavours in the palate
 - ▶ Reduced VA notes
 - ▶ Maintain Sauvignon blanc aromas produced by *Saccharomyces*

Experience with PRELUDE.nsac

South African field trials 2009

- ▼ Chardonnay and Sauvignon blanc: PRELUDE.nsac pre- and co-inoculated with *S. cerevisiae* (commercial strain)
 - ▶ PRELUDE.nsac wines increased mouthfeel and roundness
 - ▶ Allows *Saccharomyces cerevisiae* to express flavour and fermentation characteristics
 - ▶ Co-inoculation preferred by most
- ▼ Shiraz trials with non-*Saccharomyces* single strain
 - ▶ Enhanced varietal character, enhanced colour and great mouthfeel, full bodied
 - ▶ Effect similar to addition of mannoproteins