

# Utilizing non-*Saccharomyces* yeast as bio-protectants during cold soaking

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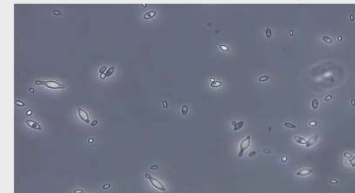
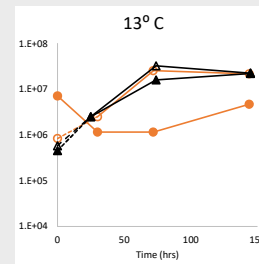
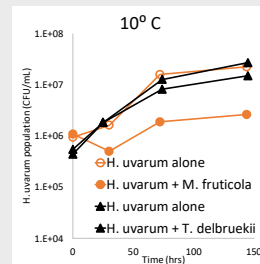
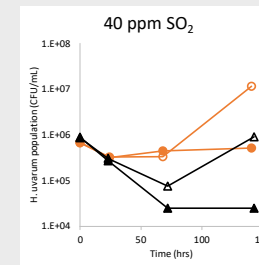
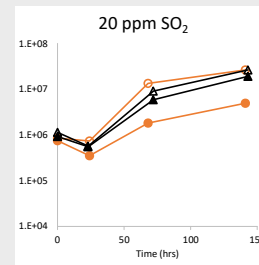
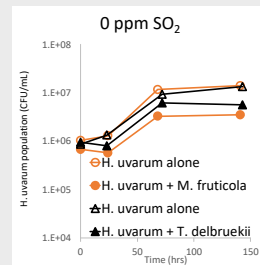
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## Introduction

- Pre-fermentative cold soak is a practice that can alter the phenolic, flavor, and aroma qualities of a wine
- *Hanseniaspora uvarum* can proliferate during cold soak and produce excess ethyl acetate and acetic acid, causing spoilage
- Non-*Saccharomyces* yeast have potential as bio-protectants against *H. uvarum*
- How effective are these bioprotective cultures under varying conditions?

## Methods

- Simulated six day cold soaks in model grape juice
- Different cold soak conditions tested
  - *H. uvarum* starting population
  - SO<sub>2</sub> concentration
  - Temperature
- Commercial cultures of *Metschnikowia fruticola*, *Torulaspota delbrueckii*, and *Lachancea thermotolerans*
- *H. uvarum* populations monitored by plating
- Acetic acid measured by enzymatic analysis



## Conclusions

- Non-*Saccharomyces* more effective against low starting populations of *H. uvarum*, with *M. fruticola* and *T. delbrueckii* being more effective than *L. thermotolerans*.
- *M. fruticola* and *T. delbrueckii* enhanced the effectiveness of SO<sub>2</sub> to reduce *H. uvarum* growth and acetic acid production
- *M. fruticola* more effective than *T. delbrueckii* in preventing growth and acetic acid production of *H. uvarum* at higher cold soak temperatures.
- Synergistic effect of SO<sub>2</sub> with *M. fruticola* and *T. delbrueckii* will be investigated during cold soak of Pinot noir grapes.

Experiment	Treatment	Acetic Acid (g/L)
Starting populations	Low <i>H. uvarum</i>	0.031 ± 0.0001
	Low <i>H. uvarum</i> + <i>L. thermotolerans</i>	0.037 ± 0.003
	Low <i>H. uvarum</i> + <i>T. delbrueckii</i>	0.027 ± 0.013
	Low <i>H. uvarum</i> + <i>M. fruticola</i>	0.032 ± 0.008
	High <i>H. uvarum</i>	0.242 ± 0.004
	High <i>H. uvarum</i> + <i>L. thermotolerans</i>	0.221 ± 0.008
SO <sub>2</sub> addition + <i>T. delbrueckii</i>	High <i>H. uvarum</i> + <i>T. delbrueckii</i>	0.106 ± 0.003
	High <i>H. uvarum</i> + <i>M. fruticola</i>	0.146 ± 0.018
	<i>H. uvarum</i> , No SO <sub>2</sub>	0.186 ± 0.006
	<i>H. uvarum</i> , 20 ppm SO <sub>2</sub>	0.125 ± 0.002
	<i>H. uvarum</i> , 40 ppm SO <sub>2</sub>	0.016 ± 0.001
	<i>H. uvarum</i> + <i>T. delbrueckii</i> , No SO <sub>2</sub>	0.112 ± 0.004
SO <sub>2</sub> addition + <i>M. fruticola</i>	<i>H. uvarum</i> + <i>T. delbrueckii</i> , 40 ppm SO <sub>2</sub>	0.088 ± 0.002
	<i>H. uvarum</i> + <i>T. delbrueckii</i> , 20 ppm SO <sub>2</sub>	0.010 ± 0.001
	<i>H. uvarum</i> , No SO <sub>2</sub>	0.209 ± 0.001
	<i>H. uvarum</i> , 20 ppm SO <sub>2</sub>	0.195 ± 0.006
	<i>H. uvarum</i> , 40 ppm SO <sub>2</sub>	0.052 ± 0.006
	<i>H. uvarum</i> + <i>M. fruticola</i> , No SO <sub>2</sub>	0.115 ± 0.002
Temperature + <i>T. delbrueckii</i>	<i>H. uvarum</i> + <i>M. fruticola</i> , 20 ppm SO <sub>2</sub>	0.082 ± 0.003
	<i>H. uvarum</i> + <i>M. fruticola</i> , 40 ppm SO <sub>2</sub>	0.046 ± 0.001
	<i>H. uvarum</i> , 10 C	0.305 ± 0.017
	<i>H. uvarum</i> + <i>T. delbrueckii</i> , 10 C	0.171 ± 0.018
Temperature + <i>M. fruticola</i>	<i>H. uvarum</i> , 13 C	0.441 ± 0.028
	<i>H. uvarum</i> + <i>T. delbrueckii</i> , 13 C	0.235 ± 0.030
	<i>H. uvarum</i> , 10 C	0.280 ± 0.010
	<i>H. uvarum</i> + <i>M. fruticola</i> , 10 C	0.101 ± 0.002
	<i>H. uvarum</i> , 13 C	0.435 ± 0.026
	<i>H. uvarum</i> + <i>M. fruticola</i> , 13 C	0.165 ± 0.002

## Acknowledgements

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