Maltose and maltotriose metabolism in brewing-related Saccharomyces yeasts

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Propositions accompanying the thesis:
"Maltose and maltotriose metabolism in brewing-related *Saccharomyces* yeasts"

by Anja Brickwedde

1. A rapidly growing misbalance between the pace of scientific progress and the collective acquisition of wisdom is the single largest risk facing mankind.

2. Construction of new interspecies *S. cerevisiae* x *S. eubayanus* hybrids, followed by their laboratory evolution under brewing-related conditions, is the best available approach to gain insight into the evolutionary history of current lager brewing yeast strains.
   Chapter 3 of this thesis

3. Despite their industrial relevance, the mechanisms that underlie an apparent trade-off between fermentation kinetics of *Saccharomyces pastorianus* on maltose and maltotriose remain to be identified.
   Chapter 4 of this thesis

4. Strain S288C, which is still an important benchmark in yeast genome research, poorly reflects the genetic and physiological diversity of the species *Saccharomyces cerevisiae*.
   Engel SR, et al: **The Reference Genome Sequence of Saccharomyces cerevisiae: Then and Now.** *G3: Genes|Genomes|Genetics* 2014, 4:389-398.

5. Rather than humans having domesticated *Saccharomyces cerevisiae*, this yeast has domesticated mankind.
   Dawson G: **Beer Domesticated Men**. 2013 [http://nautil.us/issue/8/home/beer-domesticated-man].

6. At the cell densities and culture volumes that are applied in routine laboratory cultivation of heterotrophic microorganisms, the concept of a genetically pure culture is an abstraction.
   Salazar AN, et al: **Nanopore sequencing enables near-complete de novo assembly of Saccharomyces cerevisiae reference strain CEN.PK113-7D.** *FEMS Yeast Research* 2017, 17:fox074-fox074.

7. CRISPR based genome editing can save cocoa plants from their impending extinction and thus ensure our supply of chocolate.

8. Avoiding procrastination is not about managing time but rather about managing emotions.
   Schlüter C, et al: **The Structural and Functional Signature of Action Control**. Psychological Science, 0:0956797618779380.

9. The recent decision by the Court of Justice of the European Union (EU), which states that all crops engineered by means of CRISPR-Cas9 or similar techniques are subject to the 2011 EU directive, not only poses a drawback for agricultural economics in the EU but will also discourage investments in European research on genome editing of crops.
   European Parliament CotEU: **Directive 2001/18/EC of the European Parliament**. 2001.

10. Rather than scientific curiosity, patriotism provided the main inspiration for Pasteur's famous research on brewing yeasts.
    Pasteur L: **Etudes sur la bière: ses maladies, causes qui les provoquent, procédé pour la rendre inaltérable, avec une théorie nouvelle de la fermentation**. Gauthier-Villars, Paris, 1876.

These propositions are regarded as opposable and defendable and have been approved as such by the promoters Jack T. Pronk and Jean-Marc G. Daran.