Measuring heat and oxidative stress resistance of yeast cells

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This protocol describes the method used by Slavov *et al* (2014, 2012) for measuring the stress resistance of yeast cells. It is based on a widely used method that have been described and used extensively for decades.

To measure the stress resistance of an yeast culture, take a $1\ ml$ sterile sample of the culture and split it into three tubes, each containing $250\ \mu l$. The first tube (control) should be kept at 30^oC and the remaining two tubes, each tube corresponding to either heat-shock or oxidative-shock, should be either dropped in water bath at 48^oC or mixed with H_2O_2 to a final H_2O_2 concentration of $5\ mM$. After $10\ min$, the samples subjected to heat and H_2O_2 should be removed from the stress environment and all samples washed several times with liquid YPD (YPD; 10 g of Bacto-Yeast extract, 20 g of Bacto-peptone, and 20 g of glucose in 1000 ml of water).

Each sample should be serially diluted $1:10$ with liquid YPD into 9 dilutions spanning 9 orders of magnitude. The dilutions should be spread on YPD (YPD; 10 g of Bacto-Yeast extract, 20 g of Bacto-peptone, 20 g of Bacto-agar, and 20 g of glucose in 1000 ml of water) plates to measure viability. Colonies should be counted after $36\ h$ incubation at $30\ ^oC$. For each sample, a minimum of 100 colonies should be counted. The fraction of viable cells in a sample is quantified as the fraction of cells surviving the heat or the H_2O_2 exposure relative to the corresponding control, the cells that were not exposed to stress.

References

Slavov N, Airoldi EM, van Oudenaarden A, Botstein D (2012) A conserved cell growth cycle can account for the environmental stress responses of divergent eukaryotes. *Molecular Biology of the Cell* **23**: 1986–1997

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