# Hand sanitizer & detergent

## How do E.coli react to ethanol and SDS shock?

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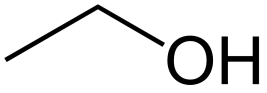
# Ethanol and SDS are found everywhere

Ethanol

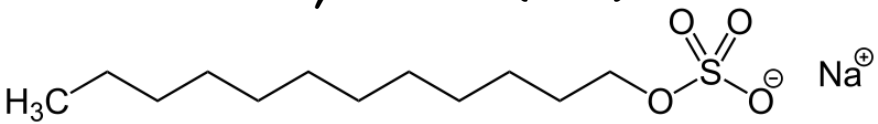






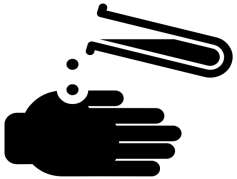


Sodium dodecyl sulfate (SDS)




# Why are they not used in the same products?

**Different chemical structures and therefore different characteristics**



SDS
corrosive

Ethanol found naturally in nature (in alcohol we drink!)

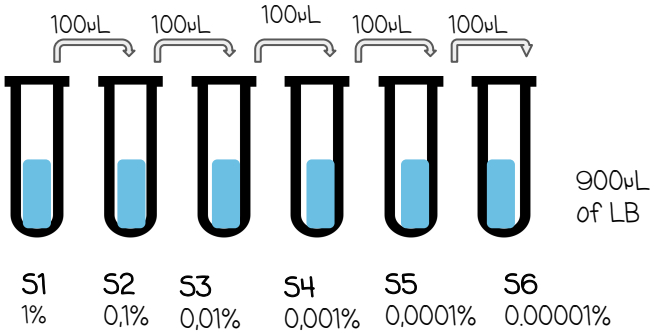
Practical concerns (cost, manipulation, synthesis)

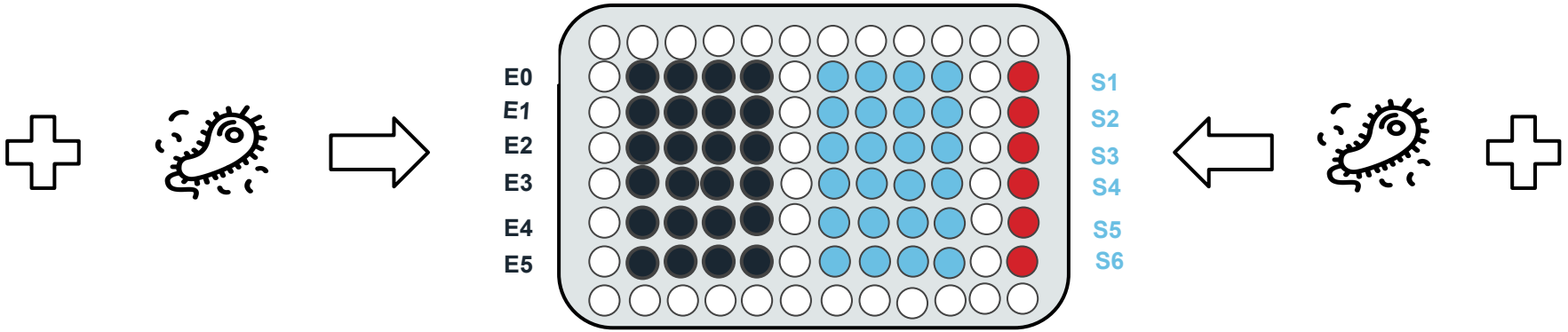
**Maybe not the same anti-bacterial properties?**

# Determining detergent concentration needed

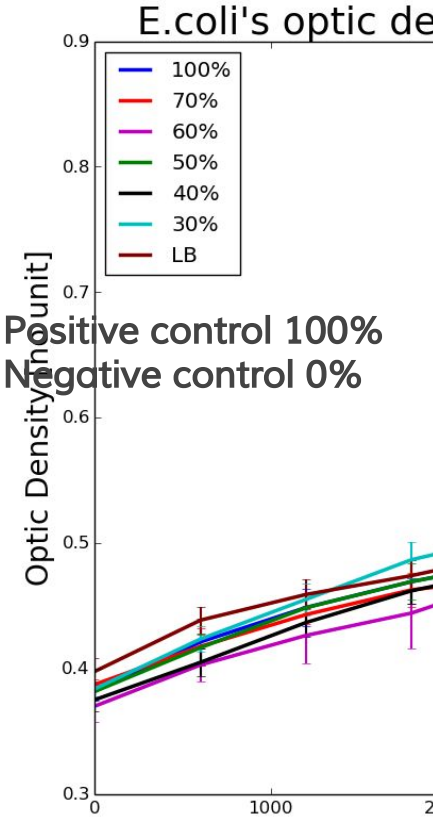
## Ethanol concentration


## SDS concentration

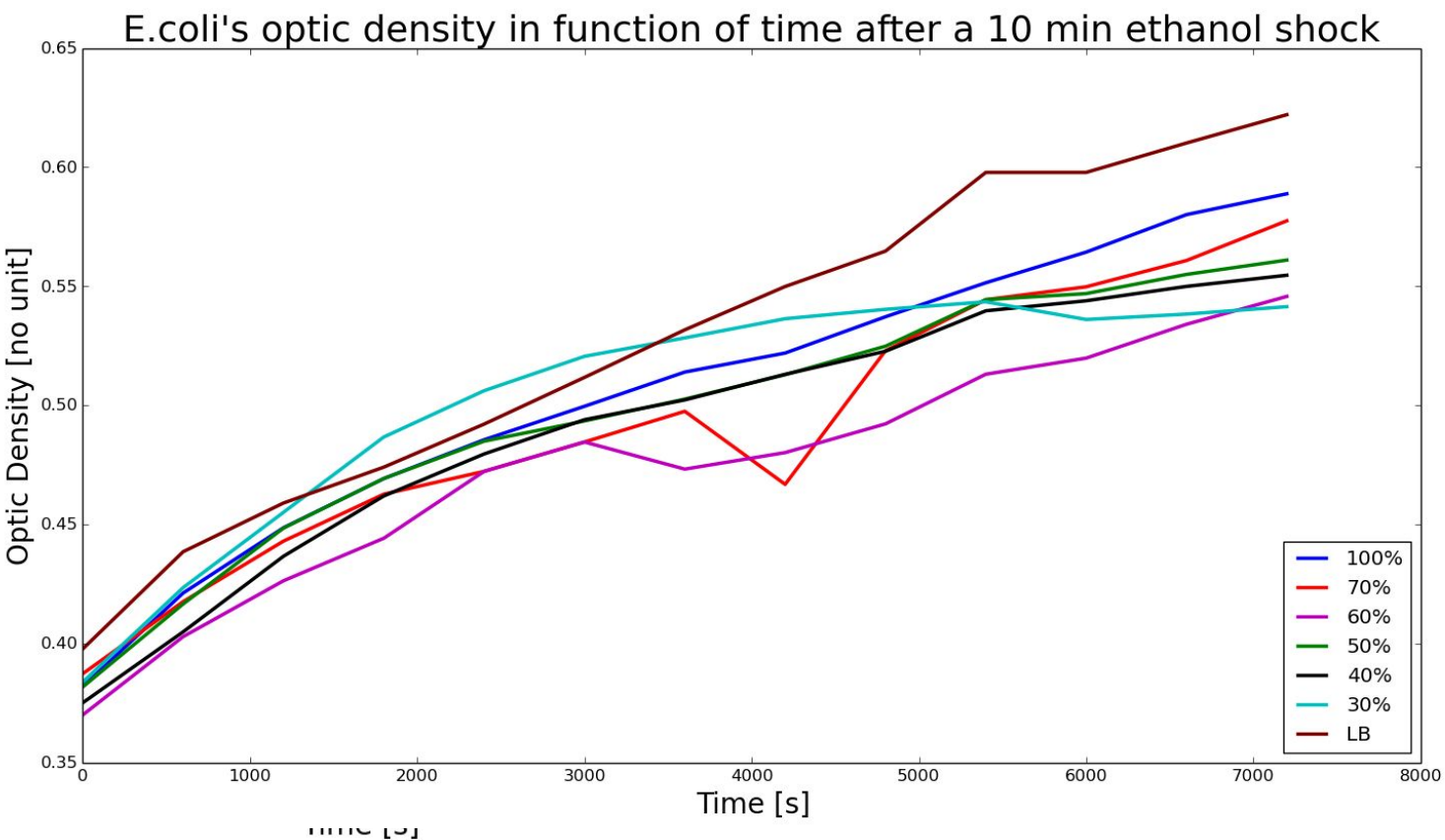


# No reaction to shock by ethanol or SDS




Positive control 100%
Negative control 0%



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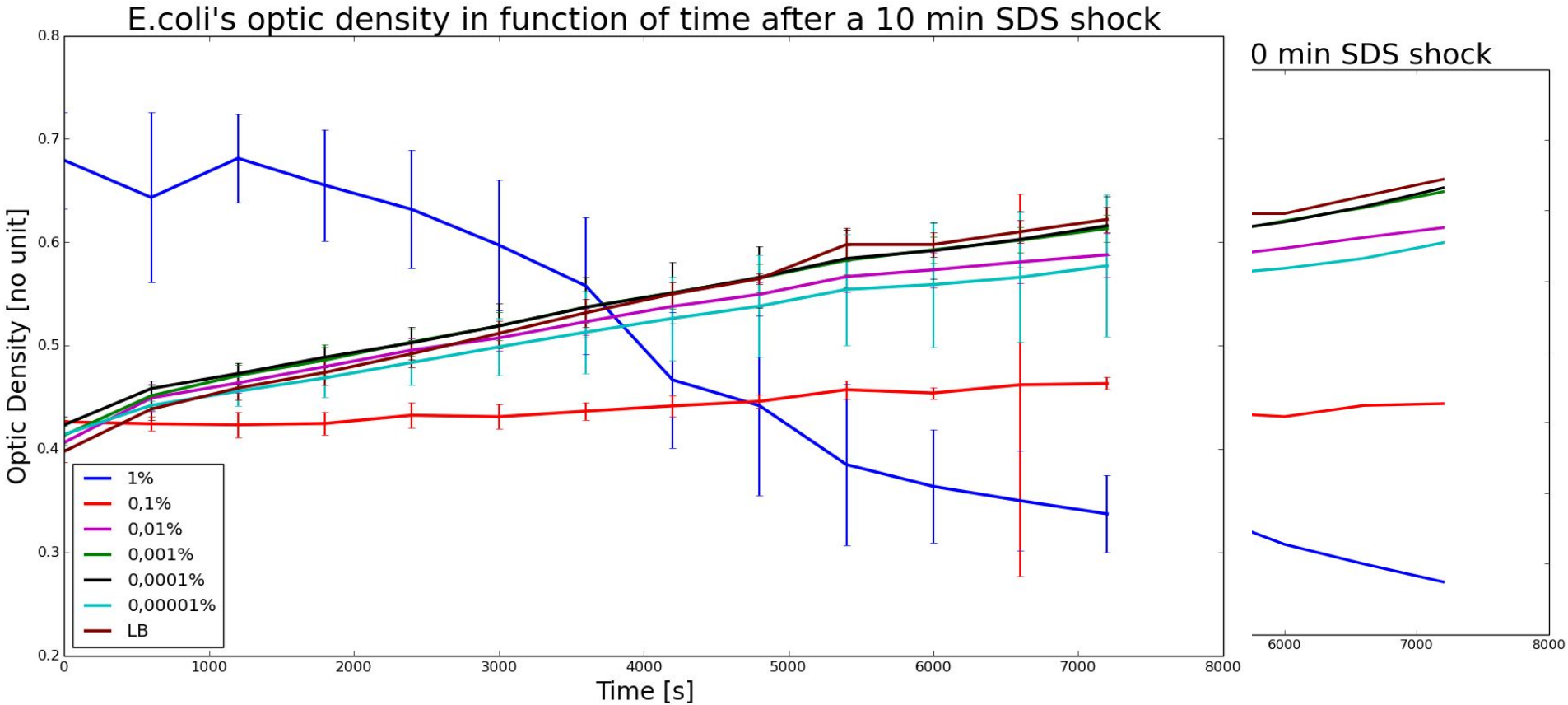
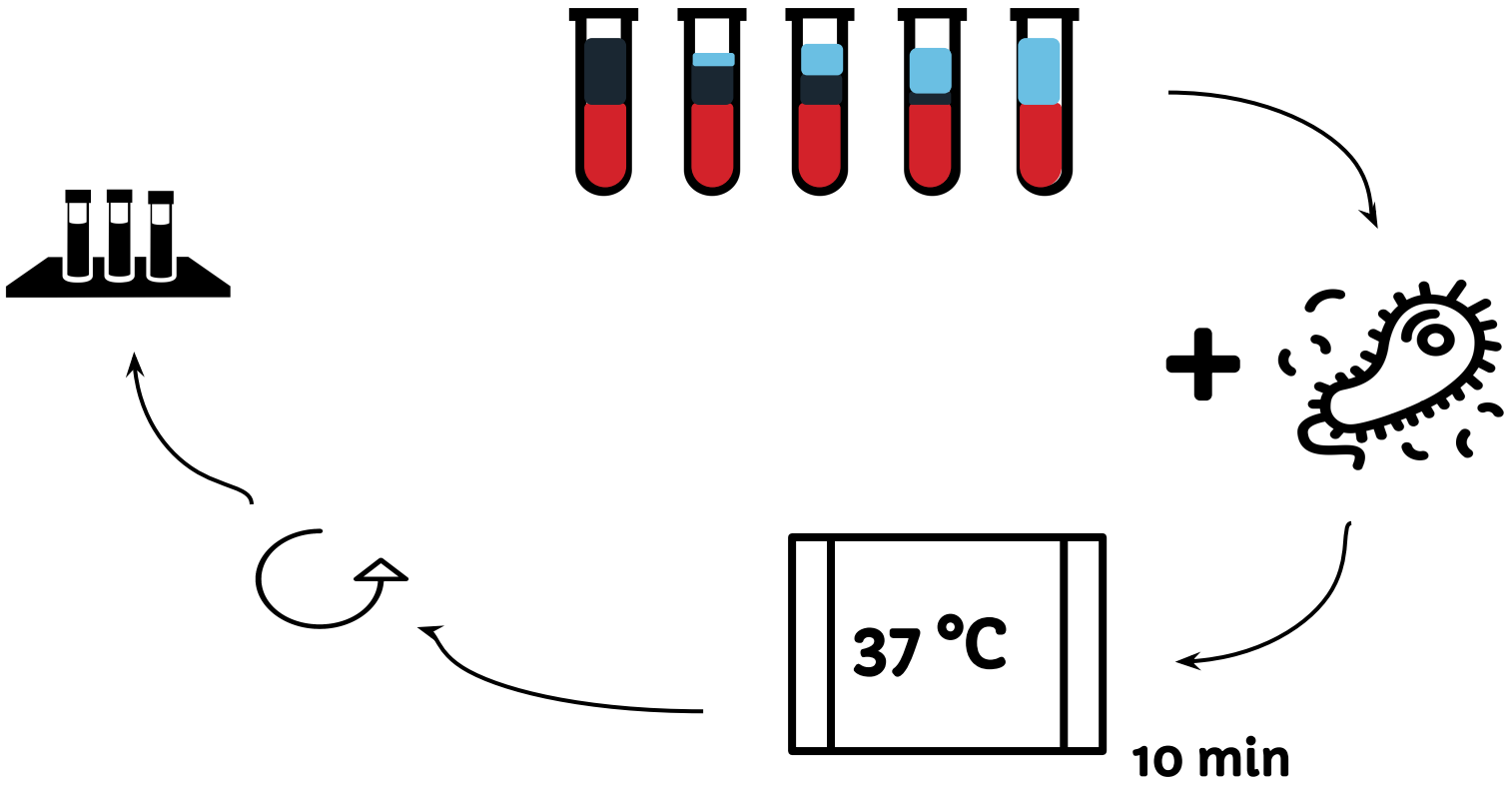
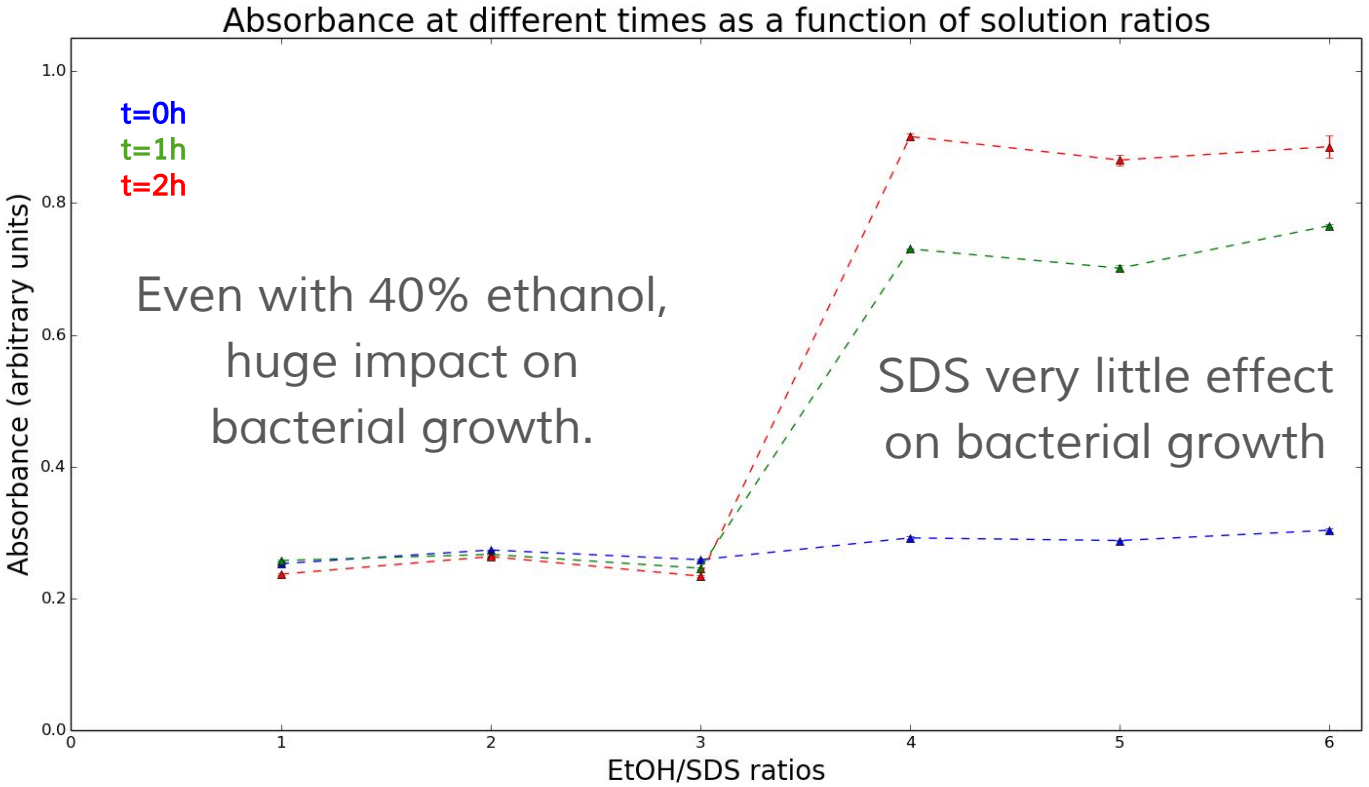


# Reactions to different detergent ratios



# Ethanol more effective than SDS




EtOH:SDS 100:0 75:25 50:50 25:75 0:100 only LB

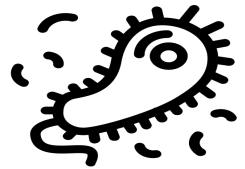
Positive controls: 100% of SDS and 100% EtOH

Negative control: only LB

# 50:50 EtOH and SDS mix most efficient.

A mixed solution of **SDS and EtOH** with a **50:50 ratio** is **more efficient** than 100:0 or 0:100.

**Ethanol** is **more effective** than SDS at slowing down **bacterial growth** after 10 minutes of exposition.



# Biases and sources of error

- Manipulation done by different people
- No biological replicate
- Few technical replicates
- No exponential phase (might be due to the moment we took the cells)
- Final concentration choice (influenced by experimental mistakes)

# What to remember

**Ethanol** is much more effective than **SDS** at **stopping bacterial growth.**

A **50:50 ratio** might be **optimal** in experimental conditions but perhaps not applicable.

We are right to **sterilize our hands** in the lab with ethanol!

# Acknowledgement


- Tamara
- Ivan & Aïmen
- Nicolas for the help with the sensors, the code and GitHub
- Hortense for the methylene blue coloration
- Our mentor Nicholas Garcia (Microchem laboratory in Texas)


**Biosensors Week 4**

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# Resources

Aiello, A. E., E. L. Larson, and S. B. Levy. "Consumer Antibacterial Soaps: Effective Or Just Risky?". *Clinical Infectious Diseases* 45.Supplement 2 (2007): S137-S147. Web. 12 Feb. 2016.

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