

# Cadmium Removal from Water with a Corn Biosorbent

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# Importance of clean water

- ▶ Mine spills effecting rural commutes
  - ▶ Chenzhou mine spill (China)
  - ▶ Tar Creek superfund site
  - ▶ Kings mine spill
    - ▶ Cd 36.1  $\mu\text{g/L}$  to 138  $\mu\text{g/L}$
  - ▶ Cadmium health effects
  - ▶ Short term exposure:
    - ▶ nausea, vomiting, diarrhea, muscle cramps, sensory disturbances, liver injury and renal failure
  - ▶ Long term exposure:
    - ▶ kidney, liver, bone and blood damage



# Bio-sorbents?

- ▶ Biosorbents- tiny particles of any biological component that remove metals or nonmetals from a solution .
- ▶ United States produces 120 million tons of biomass residue per year
- ▶ Corn is a possible economically way to remove heavy metals from water.

***Question: Do corn cobs work as a viable biosorbent to remove Cadmium from contaminated waters?***



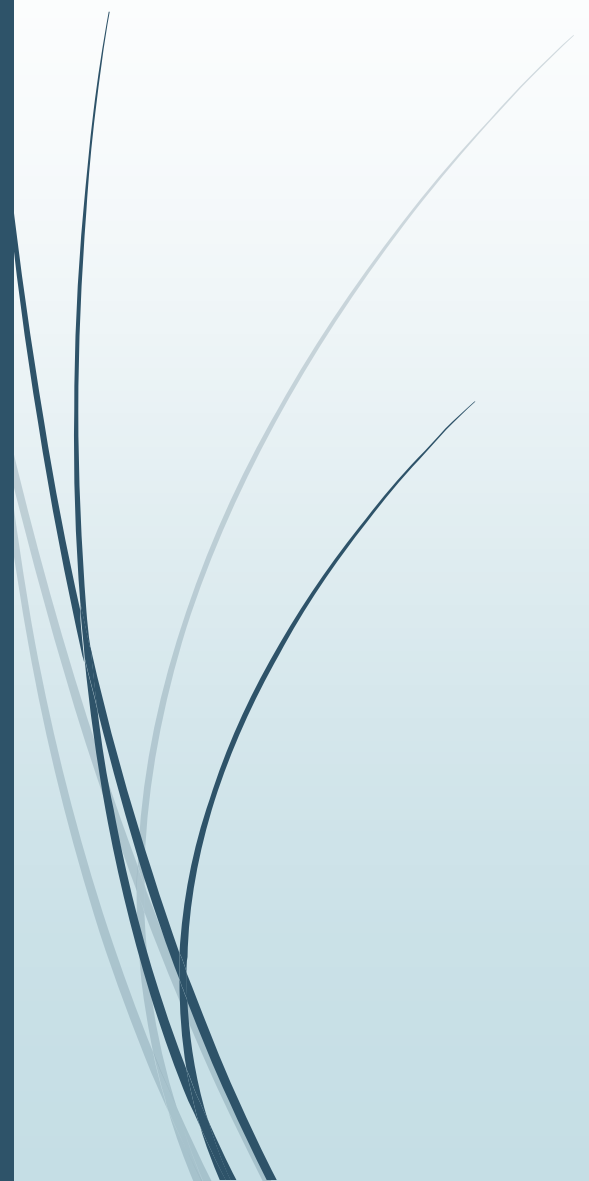


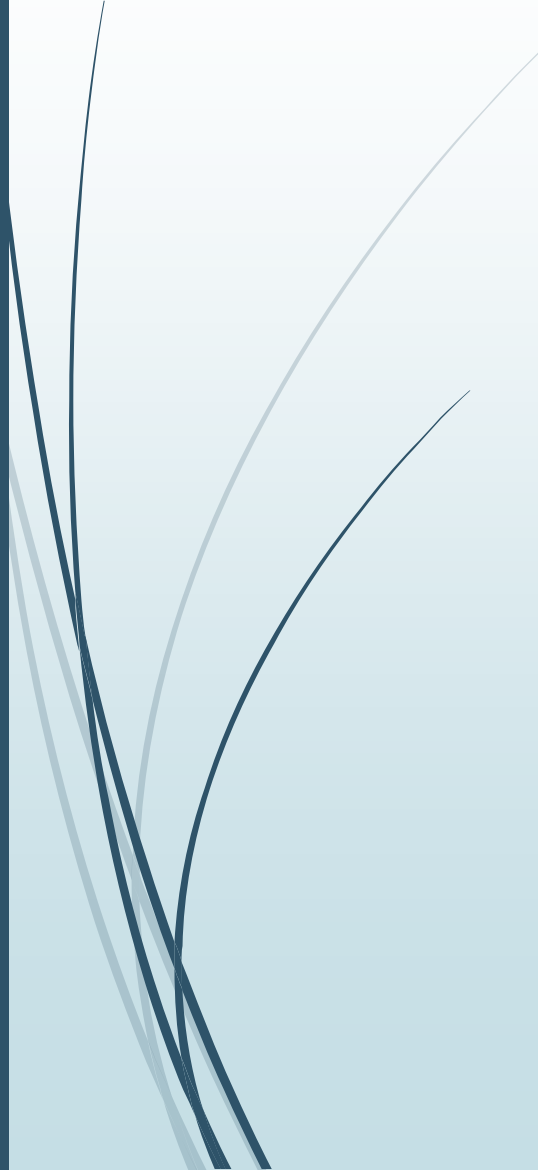
# Data collection



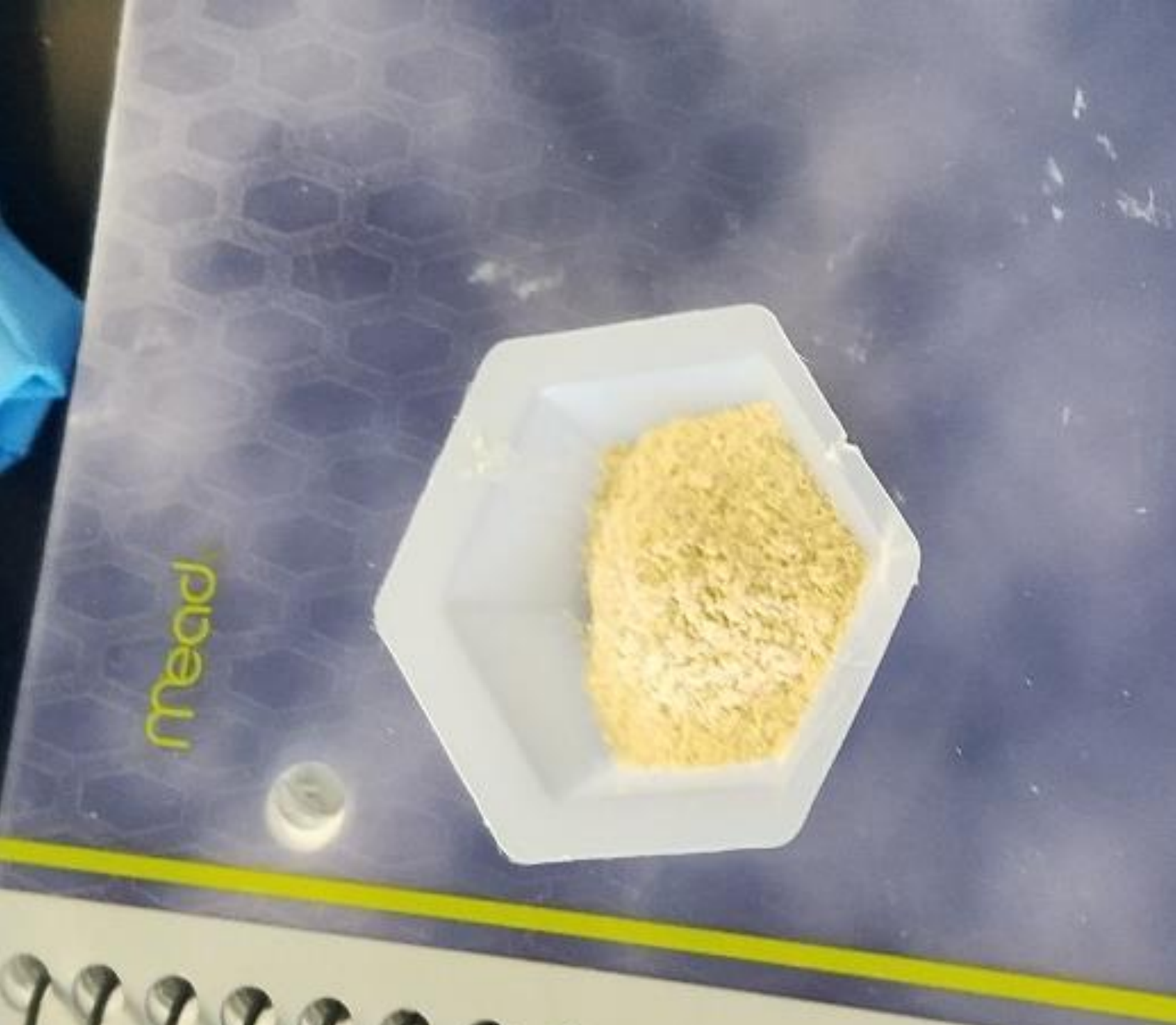
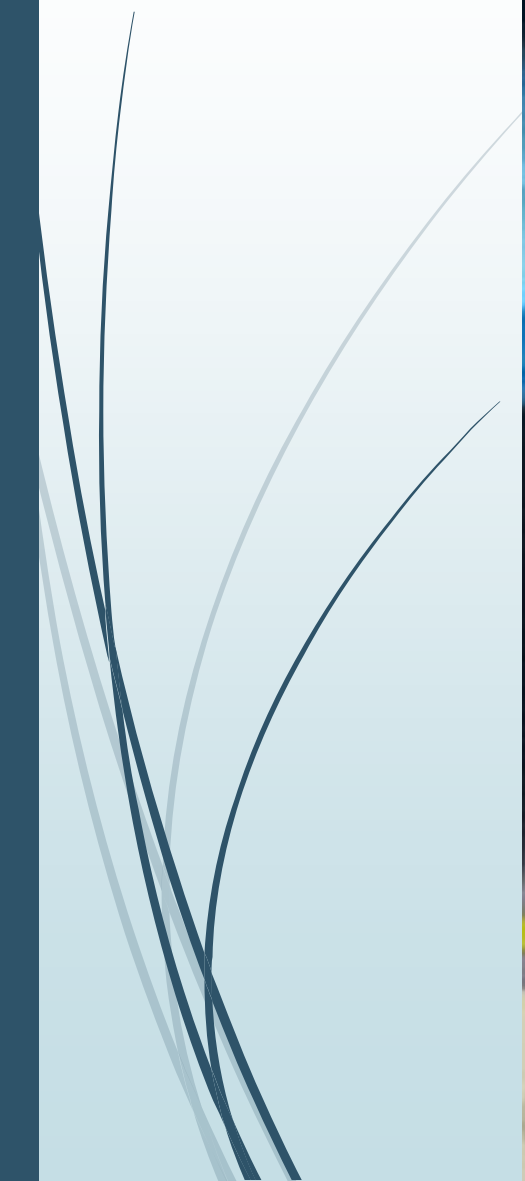








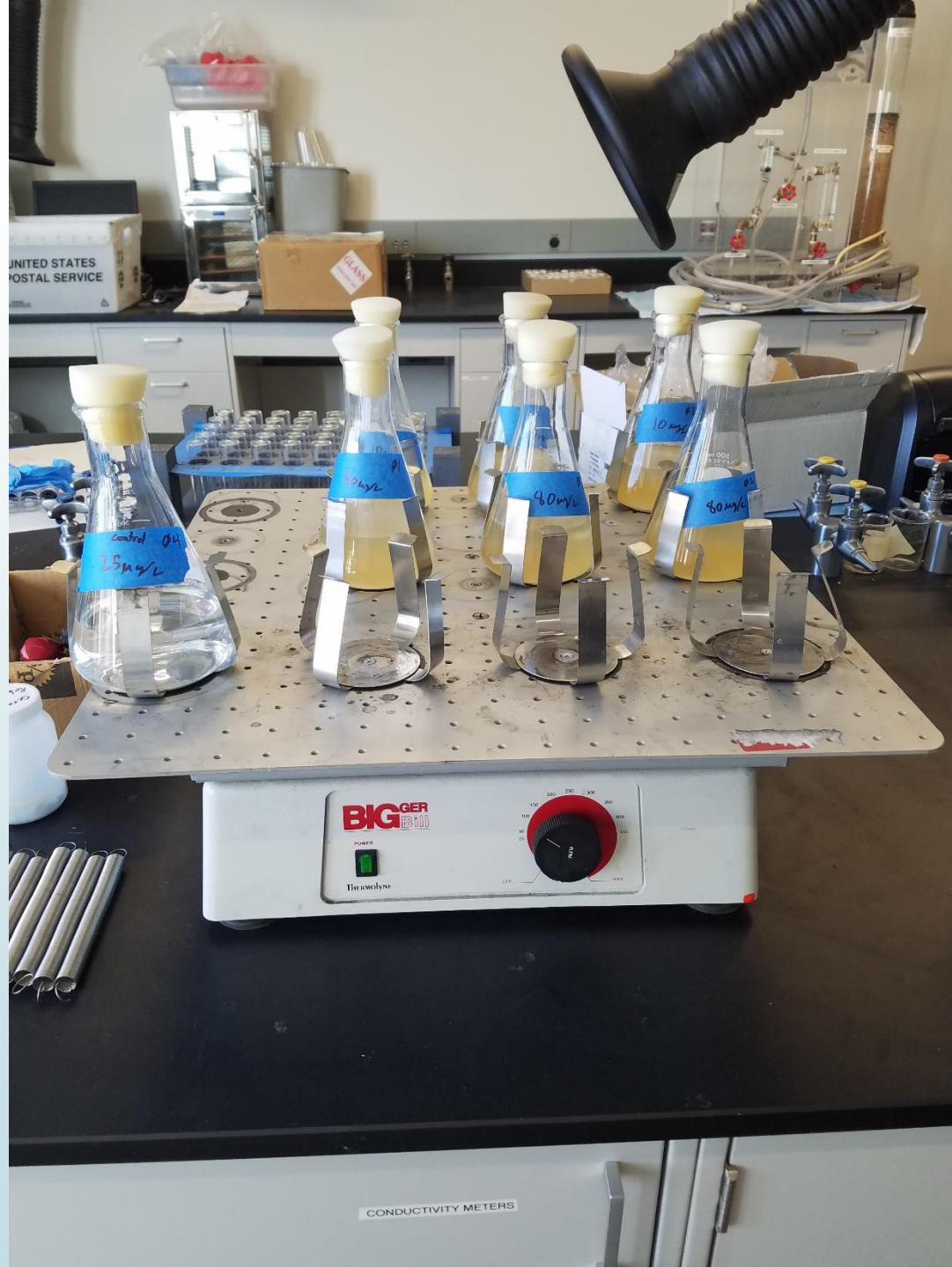
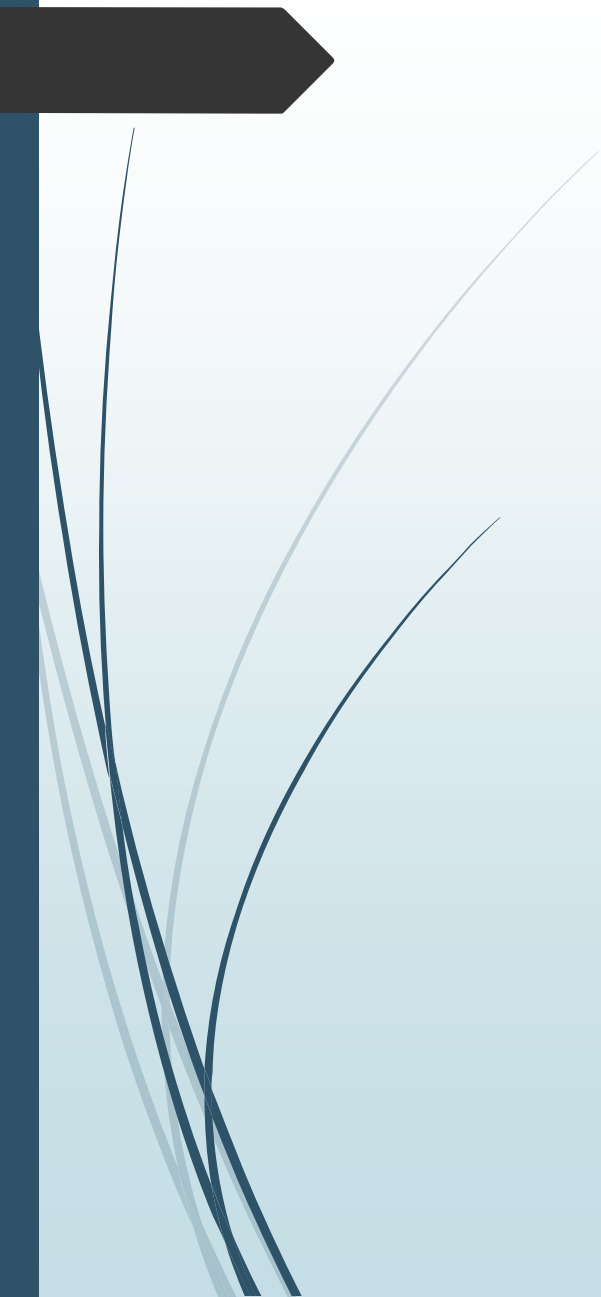




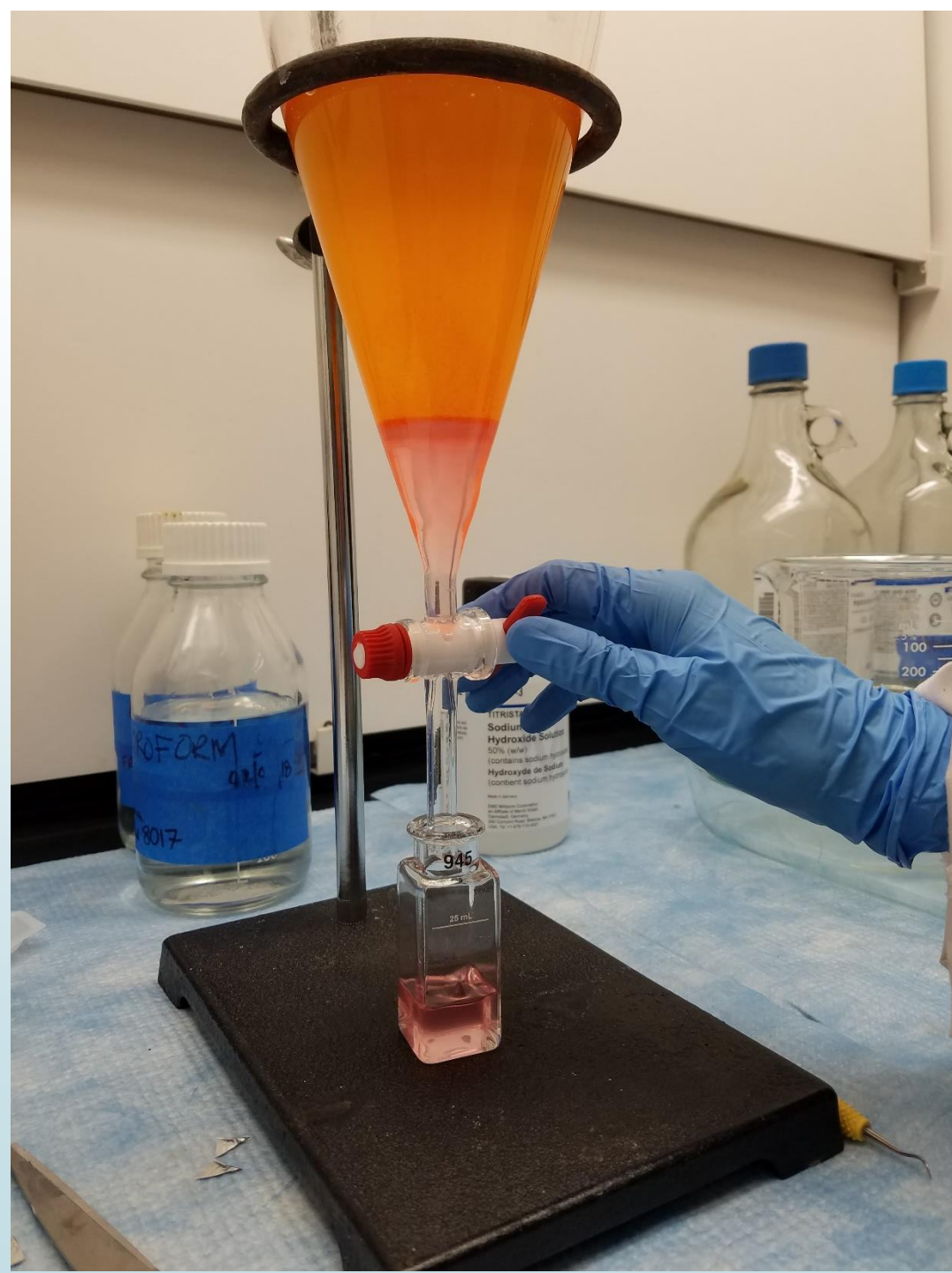
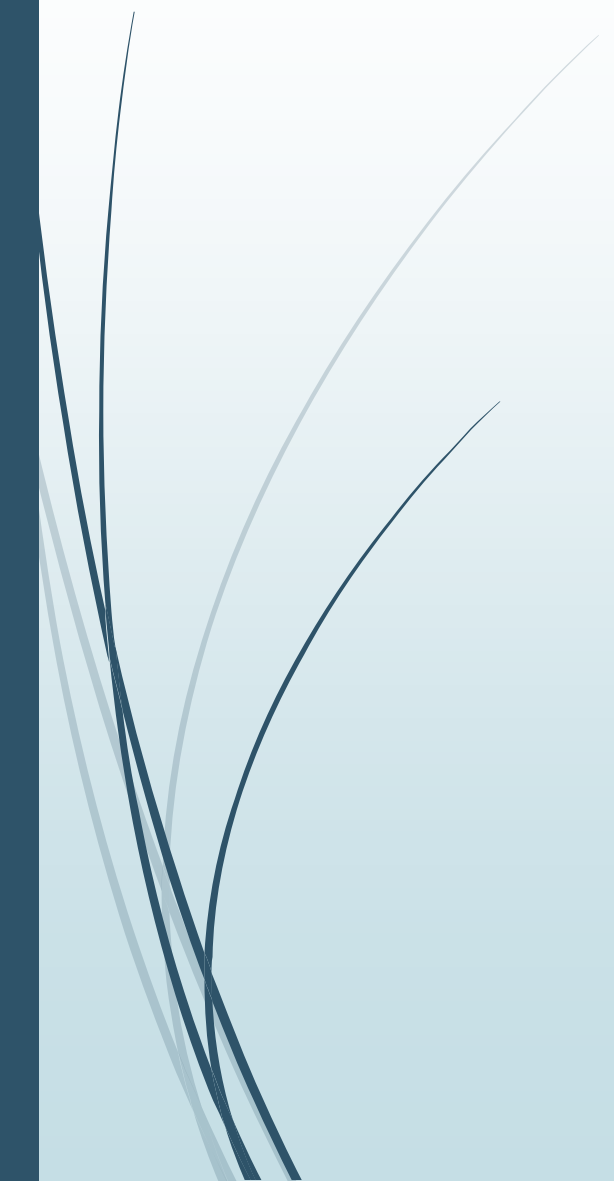


10  $\mu\text{g}/\text{l}$   
25  $\mu\text{g}/\text{l}$   
80  $\mu\text{g}/\text{l}$

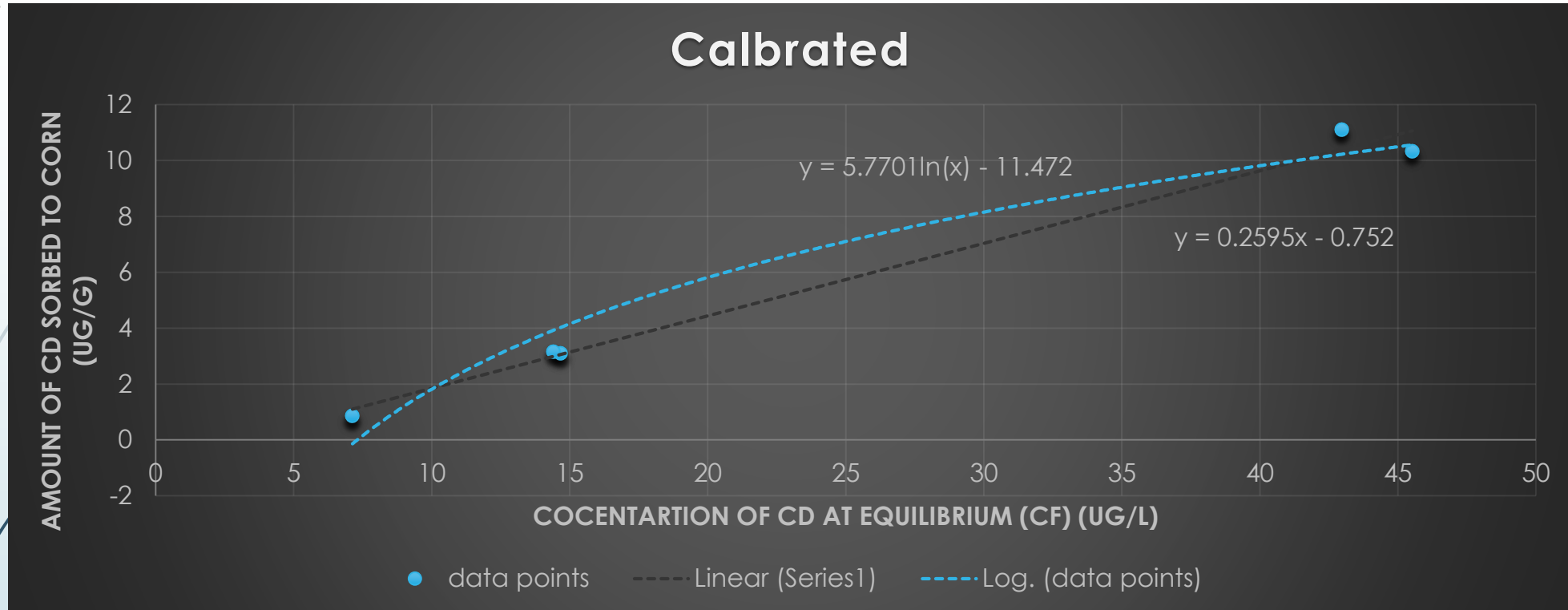








# Analysis



Calibrated data points			
	Test 1	Test 2	Test 3
$C_i$ (ug/L)	$C_f$ (ug/L)	$C_f$ (ug/L)	$C_f$ (ug/L)
10	11.08	7.13	14.41
25	14.67	33.41	14.41
80	42.95	28.84	45.52



# Conclusion

- For higher concentrations corn is a viable biosorbent
- Lower concentration did not see large sorption rates.

*Is a viable bio sorbent for Cd but further research could be done on different parts of the corn and other heavy metals.*

Initial concentration (ug/L)	Removal/Absorption Efficiency
10	9.0 %
25	41.8 %
80	51.1 %



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**Any Questions?**