



Dehydrating Mustard Seed Extract

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Objective

This project aims to create a flash evaporation system to dehydrate mustard seed extract, which can be used as a biopesticide.

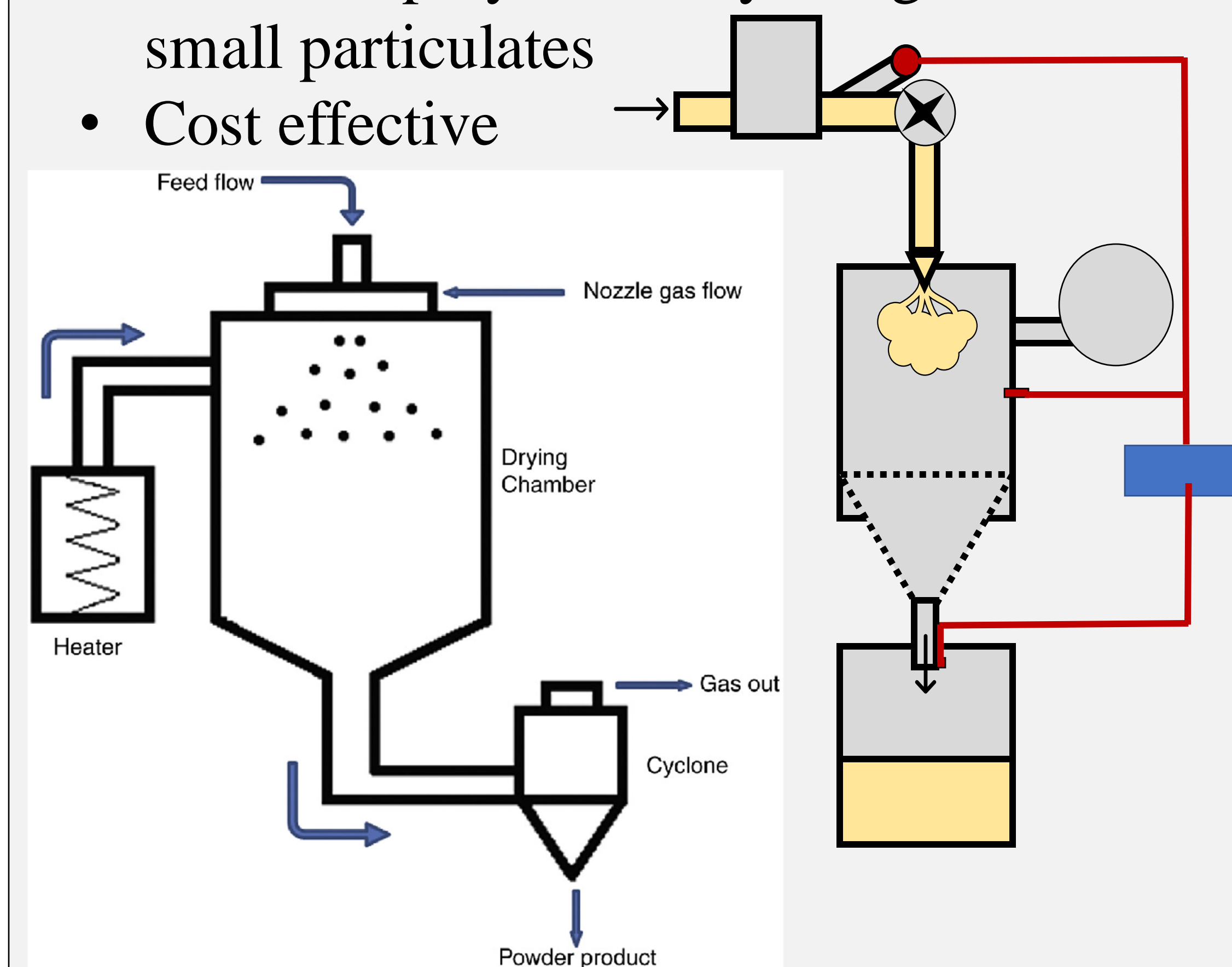
Background

- Mustard plants produce many useful chemical products
 - Oils that can be processed into biodiesel and glucosinolates
- Drying methods available
 - Drum dry, freeze dry, and spray dry
 - Freeze drying currently takes three days for a 10-gallon batch

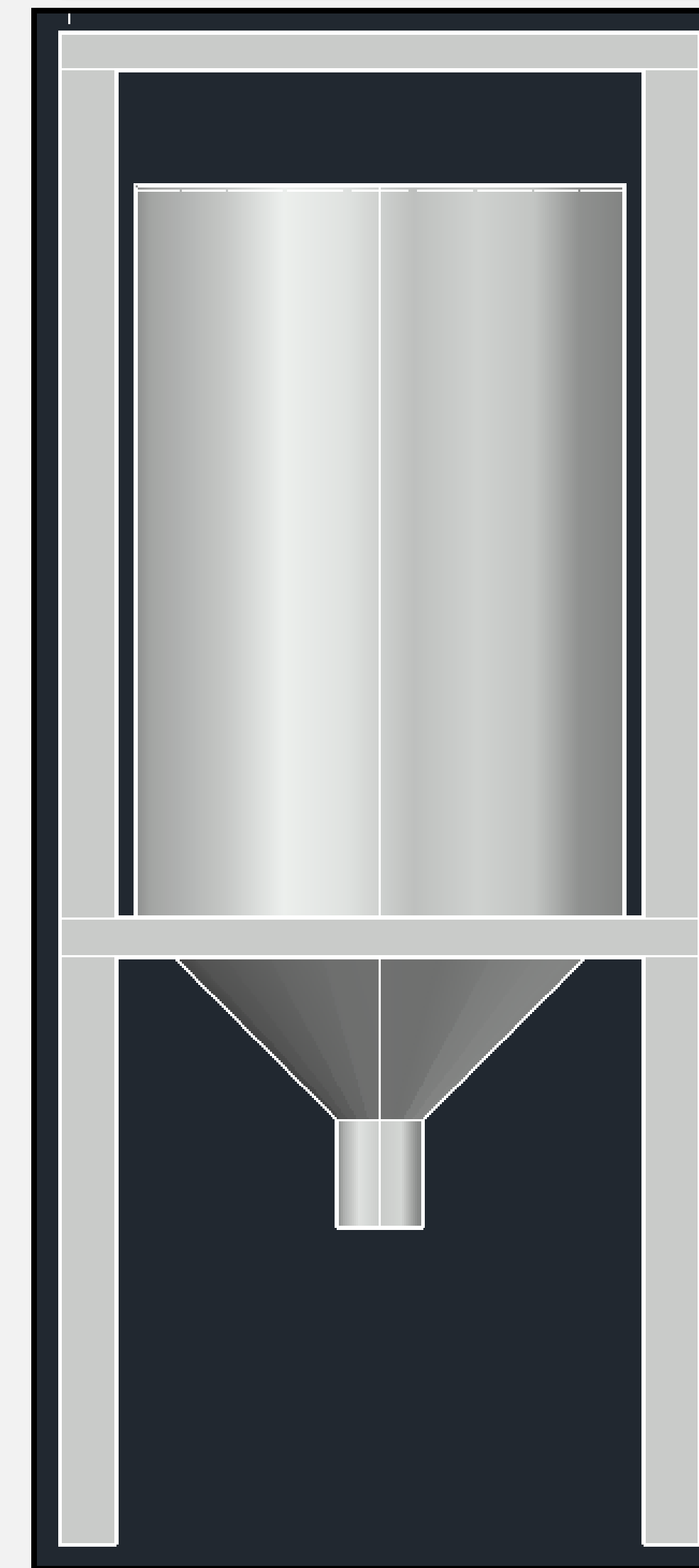
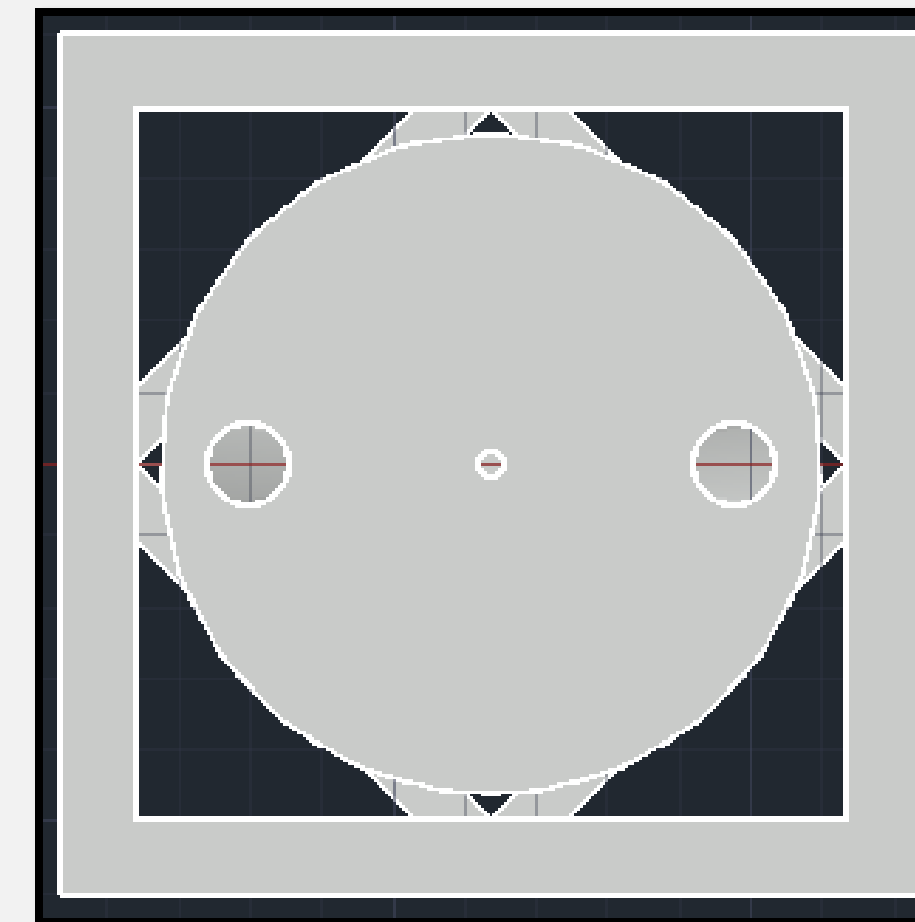
Concept Development

The idea was presented by Dr. Popova from a method of drying tomato sauce

- Pump to Pressure Sprayer
- Pressure sprayer already designed for small particulates
- Cost effective



The Current Design



Validation

- Testing the System in Parts
 - Sprayer time to empty
 - Nozzle setting
 - Heat gun temperature settings
- Water first, then mustard seed extract
- EHS wants to test the fumes for potential hazards to the operator



Value Proposition

Mustard seeds contain glucosinolates, a compound which contributes to plants' defense against pests. Extractions of this compound would provide an organic alternative to pesticides. A shelf stable powder can be extracted as a byproduct of mustard seed-based biodiesel production.

Summary & Conclusions

- Started testing with sprayer and water
- Selecting necessary materials and associated costs
- Building our design and making sure everything is what Dr. Popova had in mind

Acknowledgements

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Key Requirements

- Product should be at least 50% dry
- Reduce drying time by at least half
- No large drop in glucosinolate yields due to thermal degradation
- No chemicals due to organic farming use
- Handle up to 10 gallons of product a day