

OBJECTIVE

Develop an evaporator that reduces the water content in the mustard seed extract slurry by at least half

BACKGROUND

- I Mustard plants produce many useful chemical products
 - Oils that can be processed into biodiesel and glucosinolates
- I Glucosinolates show promise on being used as biopesticides, which help in organic farming
- I Currently, freeze drying is being used and takes about three days to dry a 10-gallon batch

VALUE PROPOSITION

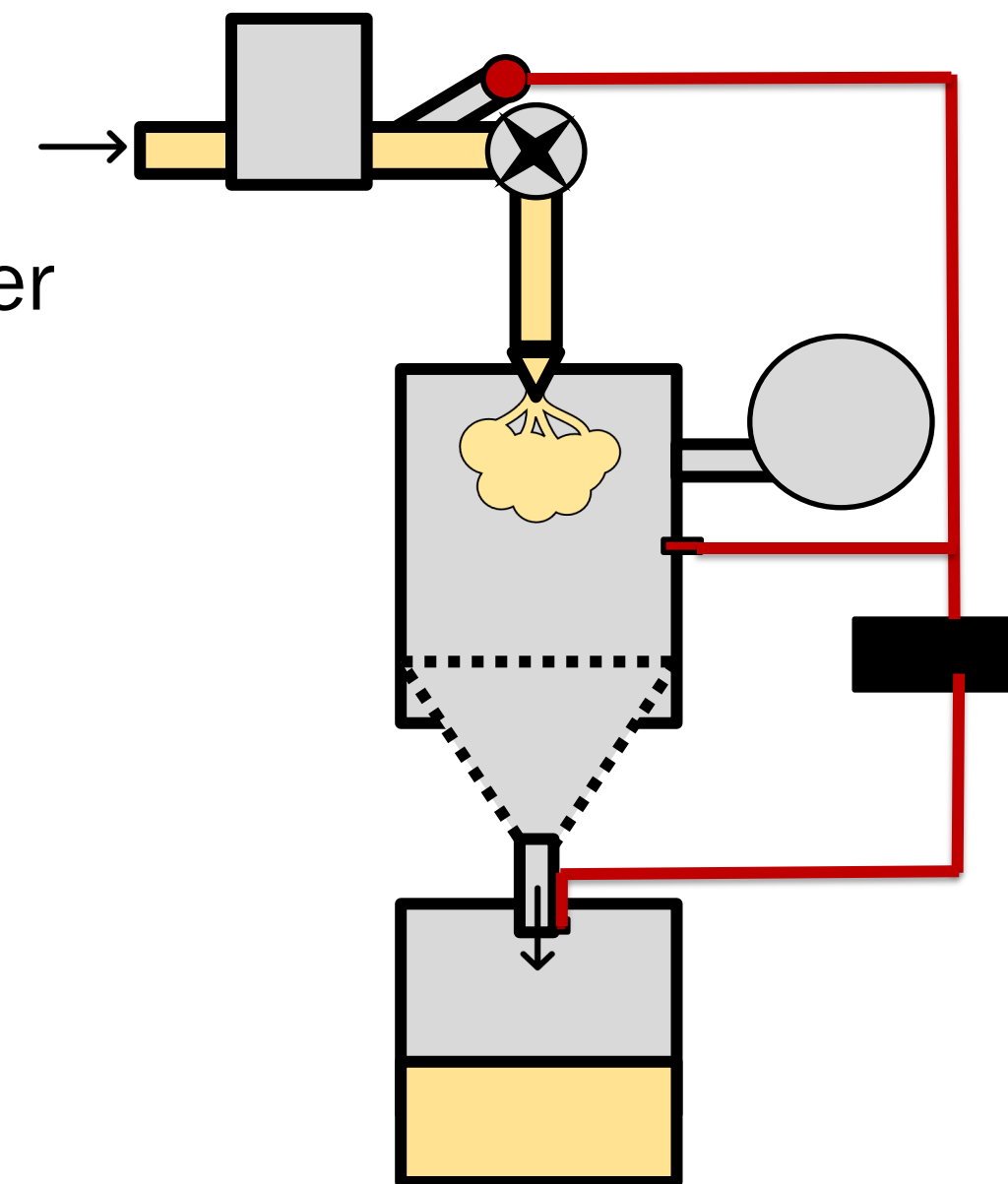
The current freeze-drying method takes 3 days and has created a bottleneck in the system. To reduce this, we have created a flash evaporator and it should reduce the water content by half.

KEY REQUIREMENTS

- I Get extract 50% dry
- I Reduce drying time by half
- I No large drop in glucosinolates yield
- I No use of chemicals
- I System can handle up to 10 gallons of product a day

CONCEPT DEVELOPMENT

- I Initial Design
 - Pump to pressure sprayer
 - Cost effective
- I Available pumps created higher pressure than necessary, so design was altered.



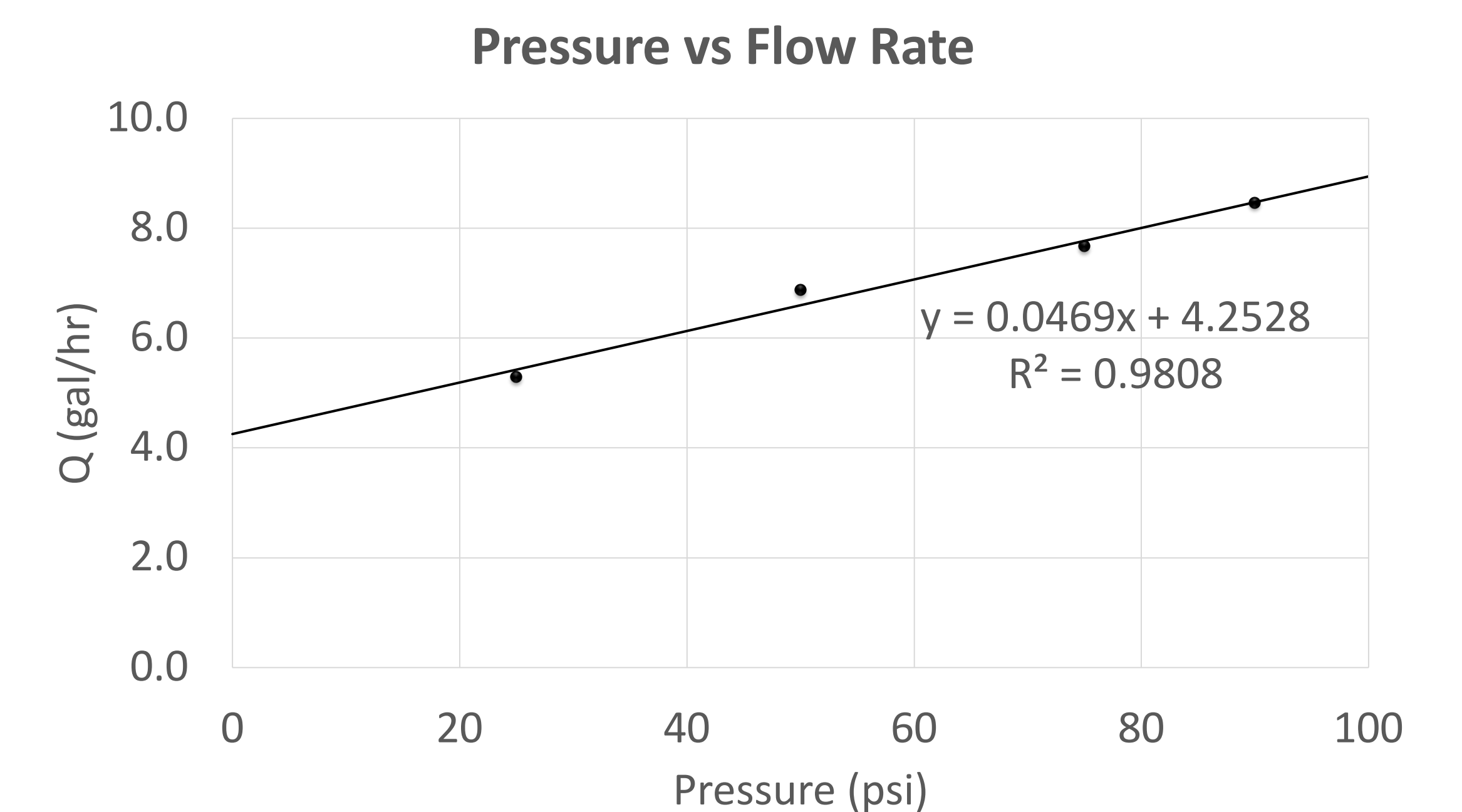
FINAL DESIGN



- I Used a pressurized sprayer instead of a pump
 - Easier to manage and control the low pressures needed
- I 55-gallon metal drum and iron funnel

VALIDATION

- I Used cold water in the sprayer to get a range of pressures
 - Quicker testing once we got our evaporator assembled



CONCLUSION & FUTURE

- I The evaporation system dries the extract X amount
- I Future of Project:
 - Look into different heating elements
 - Look into insulation types that will not pose a safety hazard in combination with the heat guns

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