AUTOMATED DISTILLING

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OTAGO POLYTECHNIC
Te Kura Matatini ki Otago

Engineering problem

Home distilling involves several monotomous tasks that can be automated to create a safer and easier enviroment for the distiller. A system was devised to automate these processes which include: warm up, cool down, reflux temperature control and data collection

Warm Up

The still takes a long time to warm up as in needs to heat a large amount of liquid up to boiling point. This normaly means the distiller has to watch the still the entire time. This system can monitor the warm up process, notifying the distiller once it is at temperature. If the distiller does not interact with the still soon enough than it will automaticaly enter into cool down as a safety feature.

Cool down

After completing a distilling run the still needs to be cooled down. It helps to continue running water through the still to cool it down faster. The cool down process simply turns off the still element and keeps the water running for 20 minutes before shutting down.

Reflux

The reflux still requires the top of the column to be kept at a constant temperature. This is achieved by controling how much water is flowing through the column. The water flow is controled by a servo that is attached to a ball valve. A temperature probe in the water allows the arduino to use a PID system to control the reflux.

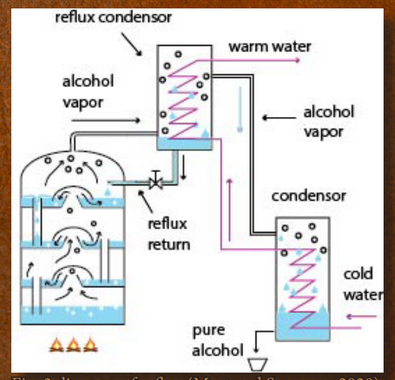

Fig. 2 diagram of reflux (Meat and Sausages, 2020)

Data collection

The system is constantly recording column temperature, boiler temperature, time and how much has been distilled. This data can be analyzed in Excel after wards to help the distiller with improving their product and process.

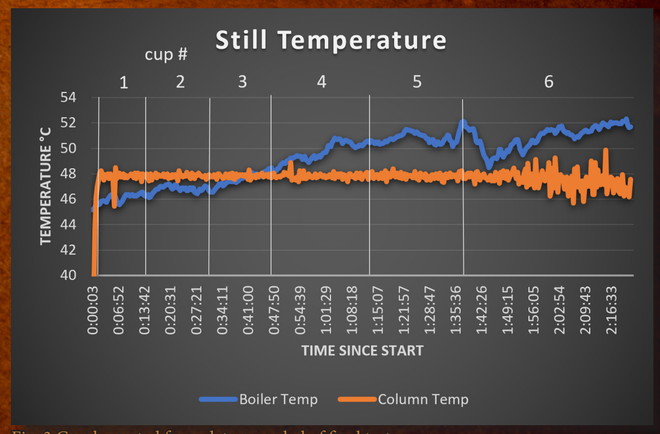

Fig. 3 Graph created from data recorded of final test

Fig. 1 A still with automation system. This still was purchased from copperhead stills (Copperhead stills, 2020) but the automation system will work with any reflux still.

Conclusion

This project was a resounding success. The warm up process has given the user more freedom from the still while remaining safe and simple. The reflux temperature control kept the still within optimal temperature without any human interaction and the cool down process simplified the end of the distilling. The data collection worked excellently and was easily analyzed to help create an even better spirit next time.

BIBLIOGRAPHY

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