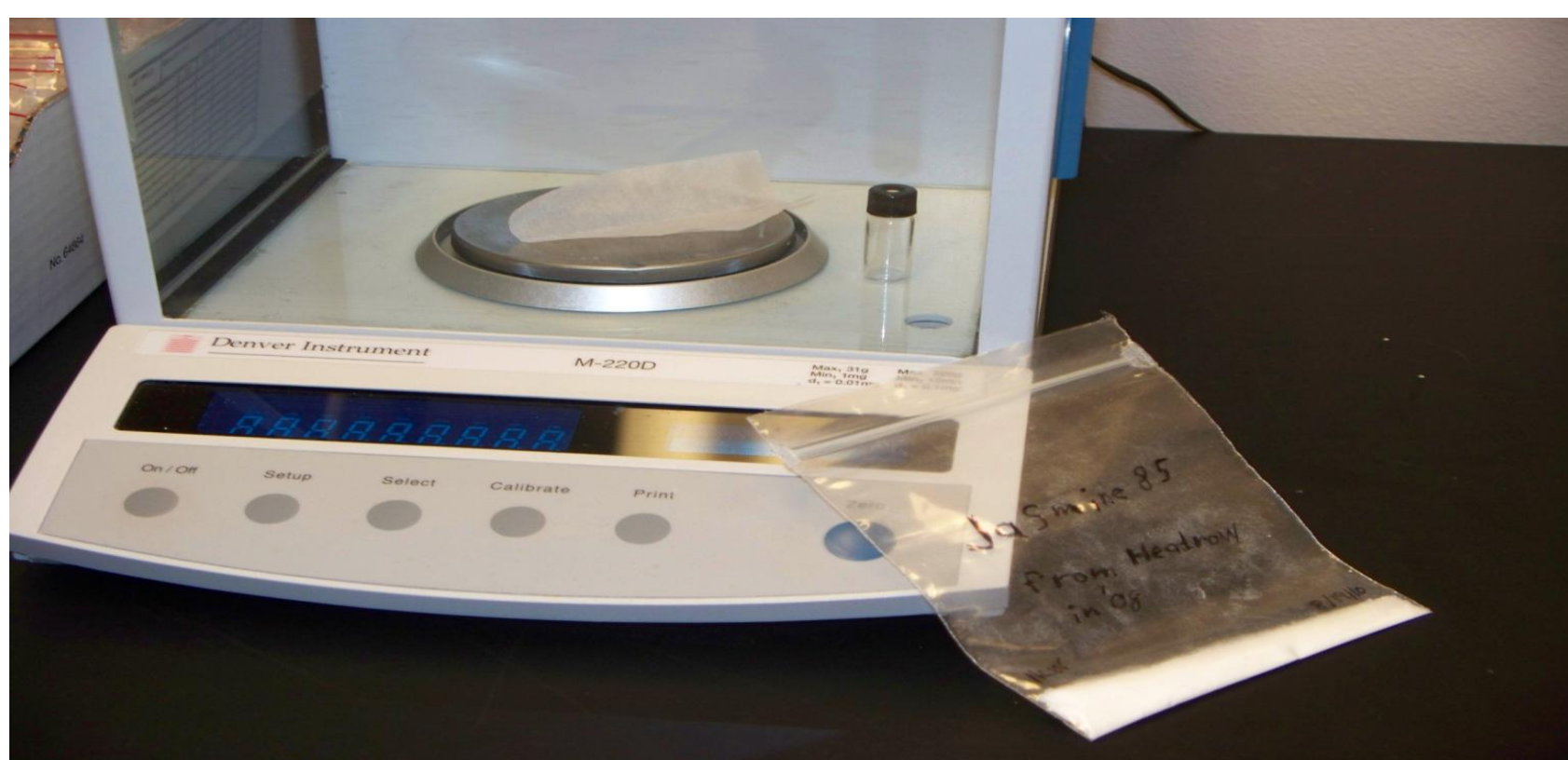




## Introduction:

There are volatiles (chemical components that tend to vaporize) in almost everything. The most noticeable type of volatiles are the chemical compounds that we can smell and give various fruits, amongst other items, a scent. For instance, when you are baking a cake you can always tell the kind of cake that is being baked. For my summer research we took the idea of volatiles and attempted to quantify the amount of the volatiles in rice using liquid extraction so as to tell the quality and shelf life of various types of rice—Jasmine, Basmati, or Bengal--.



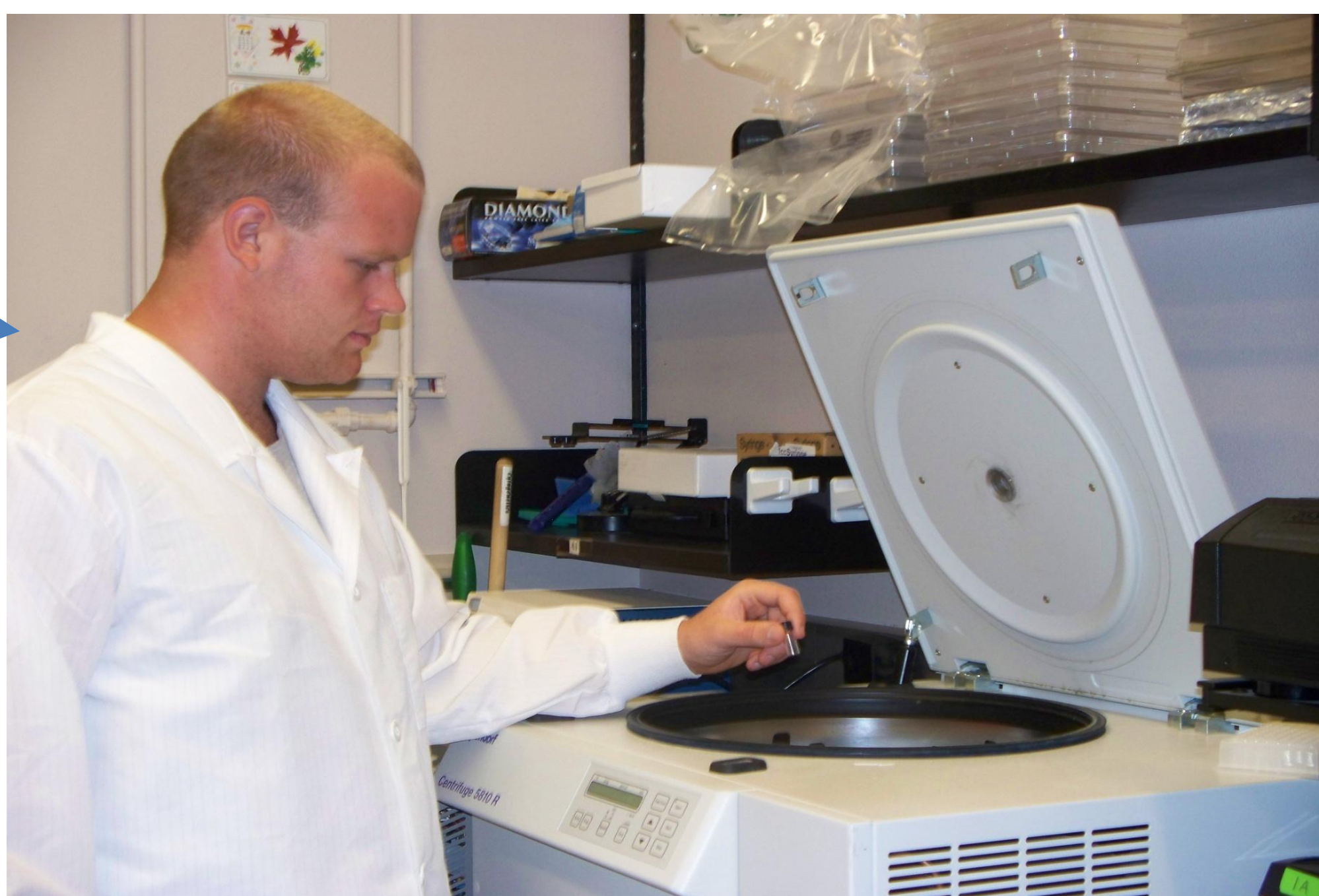
weigh out .3 grams of rice flour into a two mL glass vial



add .5 mL of a 1 microgram 2,4,6 trimethyl pyridine (TMP) / 1 mL methylene chloride solution (called stock solution #2) and seal



mix the sample and put into an isotemp oven for 1 hour at 85 degrees Celsius



centrifuge at 17 degrees celsius and 4,000 rpm for ten minutes.



Extract 1 microliter using a 2 microliter syringe



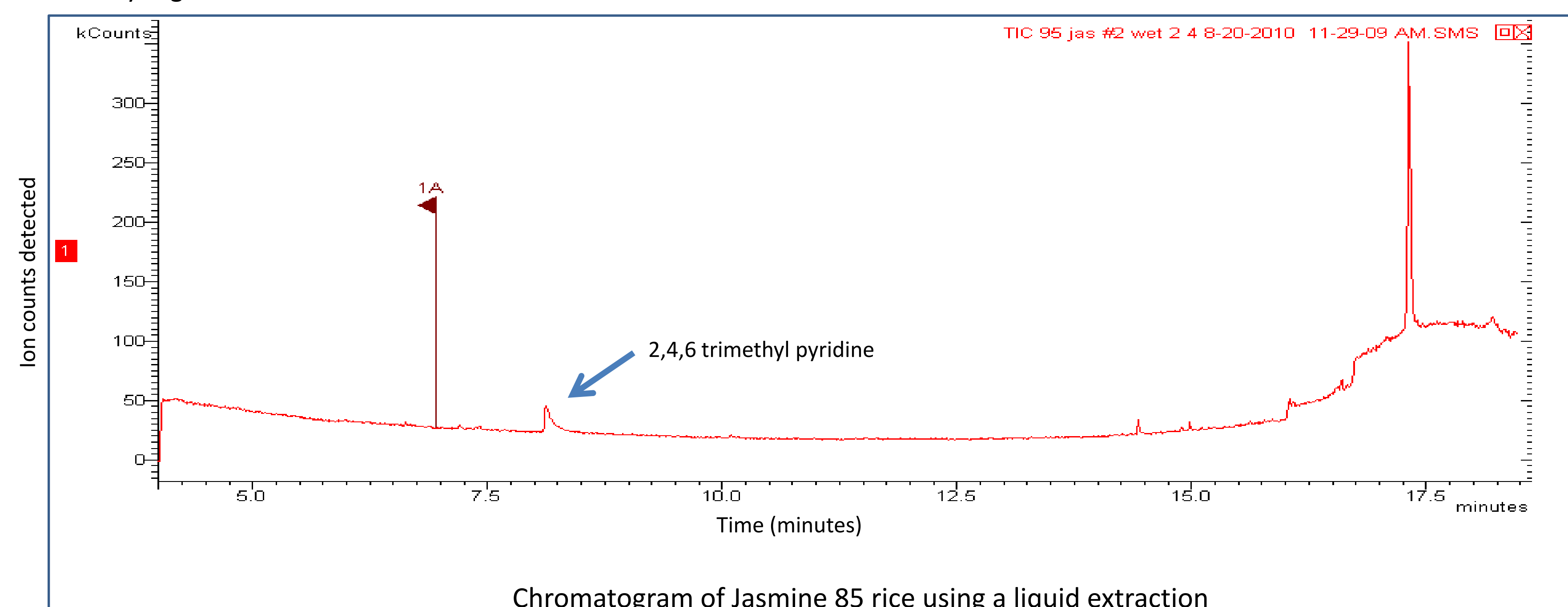
shoot a 1 microliter sample into a Gas Chromatography/ Mass Spectrometer (GC/MS)

## Results:

After testing several samples, it was found that the stock #2 solution was not enabling a significant enough extraction to allow the GC/MS to detect lesser volatiles, such as the scent compound in rice which is known as 2-acetyl pyrroline (2-AP). This lead Dr. Rolfe and I to conclude that the concentration was a major issue in the extraction. To alleviate this problem, we substituted a 10 mL vial with a screw top that didn't have a septum for the 2 mL glass vial. We also used 10 grams of rice flour and added 7 mL of stock #2 solution to the rice flour instead of the amounts in the previous method. This still did not yield any significant improvement in results in terms of an detecting more volatiles. Thus, we returned to the 2 mL glass vials and .3 grams of rice flour and .5 mL of stock #2 solution. We then turned to increasing the temperature to 95 degrees Celsius and increasing the cooking time to 3 hours. These changes did increase the volatile detection, but the scent compound 2-AP was still not detected. Also the internal TMP standard ,which had been fluctuating until we made the increase in temperature and cooking time, stabilized and stayed within an acceptable deviation. Thus, I was able to establish a constant internal standard within rice samples and begin work on perfecting the liquid extraction of volatiles from ground rice flour.

## Future work:

Future work that is necessary to be done on this project includes work to increase the extraction of all volatiles , such as determining different solvents to extract the volatiles from rice, effects of and possibility of increasing temperature and extraction time, and the effects of using a different detector.



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