

CHEM 101 Laboratory Exercise #6 Laboratory Notebook

Extraction of caffeine from Tea¹

Using Microsoft Word, students are to write their in-lab notes below while completing the Laboratory exercise. The Laboratory notebook must be uploaded to the CHEM 101 lab Brightspace site as a readable .pdf by the end of the lab period. Please see page 7 of the 202309 CHEM 101 lab manual for all the information required in the in-lab notes. The documentation below must reflect the student's work without assistance from others.

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In-lab Notes:

Procedure:

A tea bag² was cut open, and the contents were weighed on a balance. The tea was quantitatively transferred into a 125 mL Erlenmeyer flask, and 50 mL of distilled water were added before bringing the mixture to a boil using a hot plate. Approximately 5 g of NaCl was weighed and dissolved in 20 mL of distilled water by bringing the solution to a gentle boil. A Buchner flask was prepared with a Buchner funnel and vacuum pump, placing a dampened filter paper with about 1.5 g of Celite on top. The hot tea solution was decanted into a 150 mL beaker, leaving the tea leaves behind, and approximately 10 g of NaCl and 0.1 g of Ca(OH)₂ were added, with gentle heating to dissolve completely. The mixture was poured through the Buchner funnel with the pump turned on, followed by 20 mL of hot salty water to rinse the Celite cake. The filtrate was transferred to a clean, dry 100 mL beaker and kept warm. Next, 8 mL of isopropanol (CH₃CH(OH)CH₃) were added to the filtrate, stirred for at least one minute, and the top layer was removed using a Pasteur pipette. This process was repeated with another 8 mL of isopropanol, and the combined top layers were transferred to a beaker. An equal volume of 100% ethanol (CH₃CH₂OH) was slowly added with gentle mixing, and the solution was cooled in an ice bath if necessary to aid crystallization. After 10 minutes, the caffeine crystals were vacuum filtered using a Hirsch funnel with a polyethylene disc, air-dried for a minute, collected in a weigh boat, and the weight was recorded. The product was disposed of as directed, and the plastic Hirsch funnel was returned to the appropriate container with the polyethylene disc removed.

Tea Bag Contents Weighed Amount: 3.012g

Caffeine Extracted: 0.052g

Reference:

1. Reimer, M. et al, Laboratory Manual, Chemistry 101, pp. 19-24. (University of Victoria: Victoria, B.C.) **Summer 2024**
2. Red Rose® Tea. Unilever Canada Inc, Toronto, ON, Canada, Drug Identification Number: 6840044376.