



# KENDRIYA VIDYALAYA NO.1 GOLCONDA



2015 -2016

CHEMISTRY



INVESTIGATORY PROJECT

INK OUT OF TEA BAGS

MADE BY:-

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# ACKNOWLEDGEMENT

**In the accomplishment of this project successfully, many people have best owned upon me their blessings and heart pledged support, this I am utilizing to thank all the people who have been concerned with project.**

**Primarily I would like to thank god for being able to complete the project with success. Then I would like to thank my principal Mrs. P. V. V. Prasanna and chemistry teacher Mr. P. Anjaneyulu, whose valuable guidance has been the ones that helped me patch this project and make it full proof success his suggestions and his instructions has served as the major contributor towards the completion towards the completion of the project.**

**Then I would like to thank my parents and friends who have helped me with their valuable suggestions and guidance has been helpful in various phases of the completion of the project.**

**Last but not the least I would like to thank my classmates who have helped me a lot.**



KENDRIYA VIDYALAYA NO.1  
GOLCONDA, HYDERABAD  
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CERTIFICATE

This is to certify that P. N. S. SOWMYA BHARADWAJ, a student of class XII-A has successfully completed the research on the below mentioned project under the guidance of Mr. P. Anjaneyulu ( Subject Teacher ) during the year 2015-16 in partial fulfillment of chemistry practical examination conducted by AISSCE, New Delhi.

Signature of external examiner

Signature of chemistry teacher

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# **SIGNIFICANCE OF THE STUDY**

**This investigatory project will benefit us by producing an alternative for other inks. These other manufactured inks nowadays come quite expensive prices, but since the materials to be used in our project are common and easy to find, you will be spending less money. Also, no harmful chemicals will be used in making our ink. Therefore, it is non-toxic compared to commercially sold inks which have the tendencies of causing harm to one's health and to the environment.**

# INTRODUCTION

**Tea is created by using the leaves of a plant known as *Camellia sinensis*. This plant is a native to China, South Asia and Southeast Asia but is now found**

**Tea-drinking can be traced back to the 10<sup>th</sup> century BC in China before it was spread to Korea and Japan.**

**Basically, this drink is made by brewing tea leaves to create an extract. Due to the chlorophylls and other pigments in the leaves, the extract commonly appears with a brown color.**



**It was mentioned that theaflavin is the reddish brown pigment found in tea. It is an example of a flavonoid which acts to create color.**



# OBJECTIVES

This research is being done to find out the potency of the extract of the leaves from the the plant Camellia sinensis as an ink. Nowadays, ink is a pigment in a liquid or paste form used as colorants and dyes. Also, they are becoming more and more expensive because of their increasing purposes.

The background features a light blue gradient with several overlapping circular patterns in various shades of blue, ranging from light to dark. There are also numerous small, dark blue splatters scattered across the background, particularly concentrated on the right side.

**Our research aims to produce this ink as a cheaper alternative to those commercial ones. Compared to the ink we are aiming to create, commercially produced inks are toxic and can be hazardous to a person's health once there is inappropriate contact with it.**



**To match with the color and consistency of other inks, we will be adding other substances, specifically vinegar and cornstarch, which are common and easy to find.**

# STATEMENT OF THE PROBLEM

Generally, this investigatory project aims to find out if tea bags can be used to create an ink.

Specifically, it aims to answer the following questions:

a. Can vinegar strengthen the color of the product, ink?

b. Can cornstarch contribute to achieving the right consistency of the ink?

c. Are the processes boiling and straining efficient in taking the extract out of the tea bags?

# HYPOTHESES

- **Extracts taken from tea bags have the potential to be made into an ink.**
- **If vinegar and cornstarch are added to the mixture, then the product would have a stronger color and a thicker consistency than**

# SCOPE AND LIMITATIONS

**Our research and experiments are only limited to making a simple ink as a colorant. It does not include inks that are used in machines such as printers, copiers, etc. Also, our study includes the effects of vinegar and cornstarch on the product. To have accurate observations, we will be creating two set-ups: an ink without vinegar and cornstarch and one with vinegar and cornstarch.**

# **REVIEW OF RELATED LITERATURE**

**The history of Chinese inks can be traced back to the 18th century BC, with the utilization of natural plant dyes, animal, and mineral inks based on such materials as graphite that were ground with water and applied with ink brushes.**

**The India ink used in ancient India since at least the 4th century BC was called masi, and was made of burnt bones, tar, pitch, and other substances applied with sharp pointed needle .**

**Saffron is well known as the source of a truly brilliant if rather fugitive yellow and there is evidence of its use, both as a colorant and medicine, in the Greek and Persian civilizations of the same period.**

**Indian skill in vegetable dyeing and painting reached a high point in the two centuries from 1600 to 1800 AD, when the painting and resist dyeing of cotton cloth known to us as Chintz became the basis of the largest trade in textiles that the world had ever seen.**



**The Strasbourg manuscript, of an earlier period, also describes the use of a whole range of plants used in the manufacture of inks and water-colours. Later we see developments in vegetable block-printing inks in 17th and 18th century Japan where it is interesting to note that some colours were actually leached from previously dyed cloth.**



Early historical accounts of tea are unclear, for the Chinese character for tea had not been standardized, and several other Chinese characters appear in books referring very likely to the same plant, ***Camellia Sinensis***, what we now call **tea**.

**Tea dyeing** is an easy way to mute fabrics or give them an older, antiqued look. Tea stains the fibers and gives a semi-permanent dull brown "dirty" tone to the whole piece. It is used when you want to "antique" a craft textile such as a doll dress or small quilt.

**Griffiths** uses the medium of tea and ink (sometimes graphite, vodka, whiskey, and others) to create these pieces.



**Tea and ink as a medium has become a trademark for Griffiths in the art world.**

# METHODOLOGY

The background features a light blue gradient. On the right side, there are several overlapping, curved bands in shades of blue and teal, resembling a stylized globe or a series of concentric arcs. These bands are surrounded by numerous small, dark blue and teal splatters and dots, creating a dynamic, artistic effect.

# SET-UP A

Experimental Set-up



# MATERIALS

- **7 teabags**
  - **1 1/2 cups of water**
  - **1 tablespoon of vinegar**
  - **Cornstarch**
  - **Strainer and fork**
  - **Bottle**
- 

# PROCEDURE

- Place the 7 teabags in 1 ½ cups of boiling water.





- **Create the tea for 6-8 minutes.**



- **Remove the teabags from the boiling water. Use a strainer and a fork to remove all of the extracts.**



- **While stirring the tea, add a tablespoon of vinegar.**



- **Continue to stir it. Add as much dissolved cornstarch as you need to have your desired consistency.**



- **Remove it from the heat and let it cool. When done, store in a bottle.**



# SET-UP B

Controlled Set-up



# MATERIALS

- **7 teabags**
  - **1 1/2 cups of water**
  - **Strainer and fork**
  - **Bottle**
- 

# PROCEDURES

- Place the 7 teabags in 1 ½ cups of boiling water.





- **Create the tea for 6-8 minutes.**



- **Remove the teabags from the boiling water. Use a strainer and a fork to remove all of the extracts.**



- **Remove it from the heat and let it cool. When done, store in a bottle.**



# FINDINGS

**During the procedure itself, we have observed that boiling is an effective process of extraction. Right after we have placed the teabags in the boiling water, the change of color is very noticeable. During this step the mixture had a very strong smell from the tea. While following the procedures for set-up A which included the placing of vinegar, there was no immediate change in color as we expected. Instead, the vinegar's effect was seen when we tried to paint the two inks on paper. While applying the ink on paper, it was harder to use ink B because it's consistency was very watery. Thus it became runny and**

After letting them dry, it was seen that ink A had a darker color while ink B's writings faded.



# DISCUSSION OF RESULTS

Our hypothesis which states that tea bags have the potential to be made into an ink if vinegar and cornstarch is added is proven correct. We had two setups which were Setup A that has vinegar and Setup B that has no vinegar. Vinegar is mainly a dilute aqueous solution of acetic acid which is an important reagent and industrial chemical, mainly used in the production of cellulose acetate.

**A cellulose acetate is used as film base in photography and a film base is a transparent substance which acts as a support medium for the photosensitive emulsion that lies atop it, its base generally accounts for the vast majority of the thickness of any given film stock.**

**The addition of vinegar and cornstarch in making an ink can result to a thicker consistency and consistent color which is better for the usage of the ink. Our observations prove that adding vinegar to the mixture can be made into an ink because without the vinegar there would be no consistency on the mixture and it will be less seen.**



# CONCLUSION

- **Tea bags can be used to create an ink.**
- **Vinegar can strengthen the color of the product, ink.**
- **Cornstarch effectively contributes to achieving to the right consistency of the ink.**
- **The processes boiling and straining are efficient in taking the extract out of the tea bags.**

# RECOMMENDATION

Based on the conducted experiment, we recommend the following for further improvements. To have better results of extraction, suggest that there would be longer minutes of boiling. We also recommend that one should make use of a large amount of corn starch, a thickening agent, so the application of ink would be done easier.

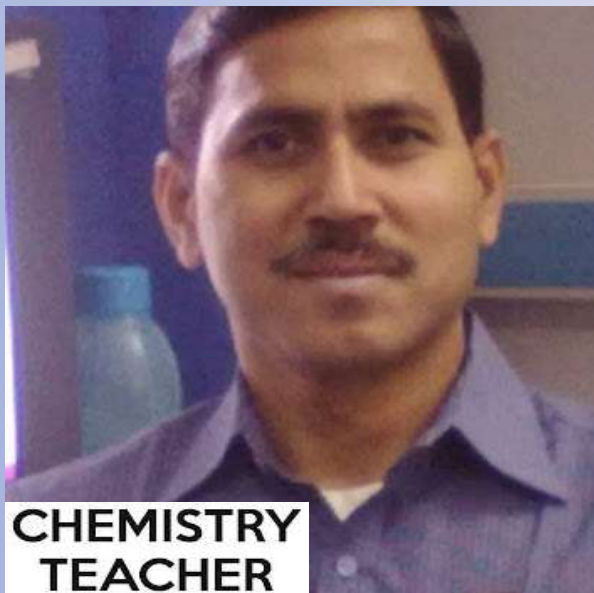
**Instead of directly placing your desired amount of cornstarch in the mixture above low fire, it would be better to dissolve it first in cold or warm water to avoid forming lumps. We still recommend the usage of vinegar because of the results we have observed. Depending on the availability, one can also use processed soybean oil as a drying oil. This is used as a base for printing inks and oil paints.**

# BIBLOGRAPHY

1.



2.



**CHEMISTRY  
TEACHER**

3.

