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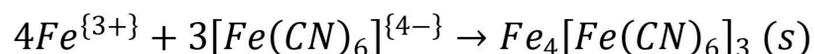
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ABSTRACT

Cyanide is a highly toxic chemical that poses serious health risks to humans by inhibiting cytochrome c oxidase, an essential enzyme in cellular respiration. This inhibition prevents cells from utilizing oxygen to generate energy, leading to histotoxic hypoxia, which can result in fatality within a short period. Therefore, the detection and analysis of cyanide are crucial, particularly in preliminary screening processes that require rapid and convenient methods. One of the commonly used approaches is the Prussian Blue Test, which detects cyanide ions through a chemical reaction with ferric and ferrocyanide ions, forming an insoluble Prussian Blue complex that exhibits a distinct blue color. This study aims to evaluate the sensitivity of the Prussian Blue Test for cyanide detection by comparing its sensitivity in different matrices, including distilled water, gastric contents, and centrifuged gastric contents. Potassium cyanide was used as the standard cyanide. The results indicated that the lowest concentration of cyanide that could be visually detected in all tested matrices was 150 µg/mL. This finding suggests that the Prussian Blue test is a simple, rapid, and cost-effective method for preliminary cyanide screening. However, further studies on several factors that influence the test's performance, such as sample composition and reaction conditions, could enhance its accuracy and reliability for forensic and analytical applications.

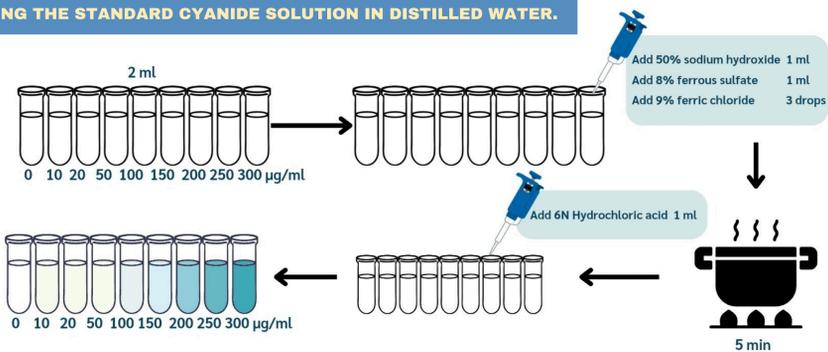
INTRODUCTION

The Prussian Blue Test is a chemical method used to detect cyanide ions by relying on a reaction with ferric ions (Fe^{3+}) and ferrocyanide ($Fe(CN)_6^{4-}$) to form an insoluble compound known as Prussian Blue (Ferric Ferrocyanide, $Fe_4[Fe(CN)_6]_3$), which appears as a blue or deep blue-colored substance.

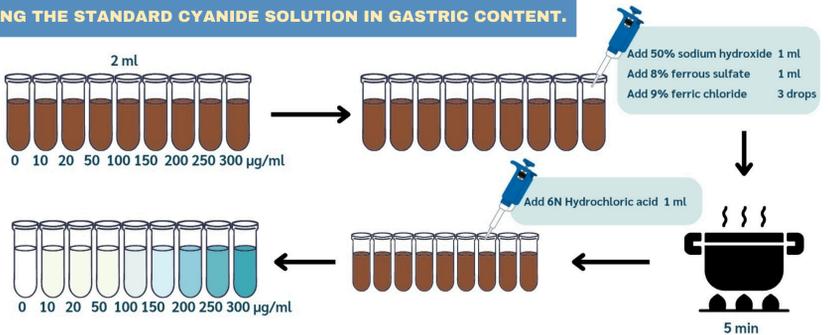


METHODOLOGY

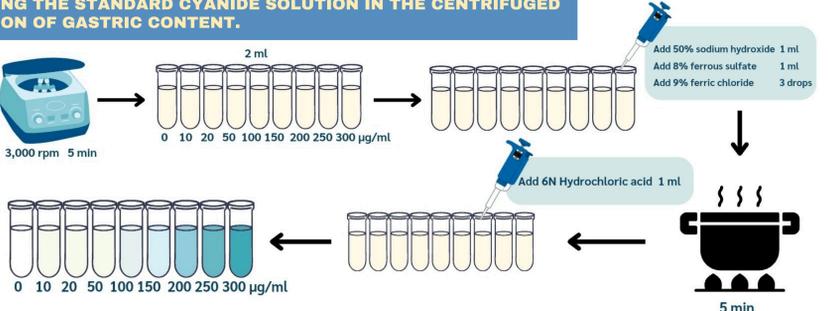
TESTING THE STANDARD CYANIDE SOLUTION IN DISTILLED WATER.



TESTING THE STANDARD CYANIDE SOLUTION IN GASTRIC CONTENT.



TESTING THE STANDARD CYANIDE SOLUTION IN THE CENTRIFUGED FRACTION OF GASTRIC CONTENT.



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RESULTS & DISCUSSION

TESTING THE STANDARD CYANIDE SOLUTION IN DISTILLED WATER.

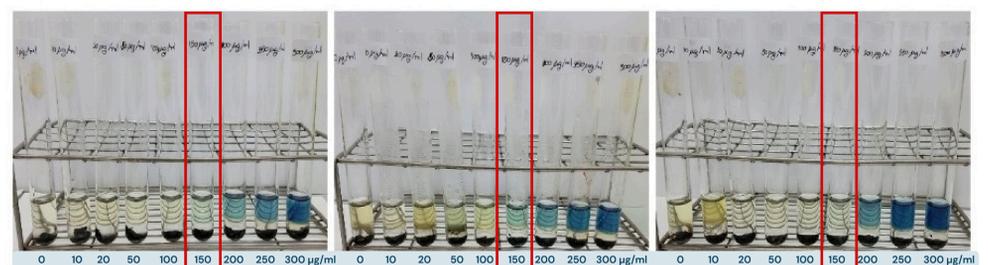


Figure 1. Results of Experiment 1

Figure 2. Results of Experiment 2

Figure 3. Results of Experiment 3

In Figures 1, 2, and 3 the results of three experiments using the standard cyanide solution in distilled water showed a sensitivity of 150 µg/mL.

TESTING THE STANDARD CYANIDE SOLUTION IN GASTRIC CONTENT.

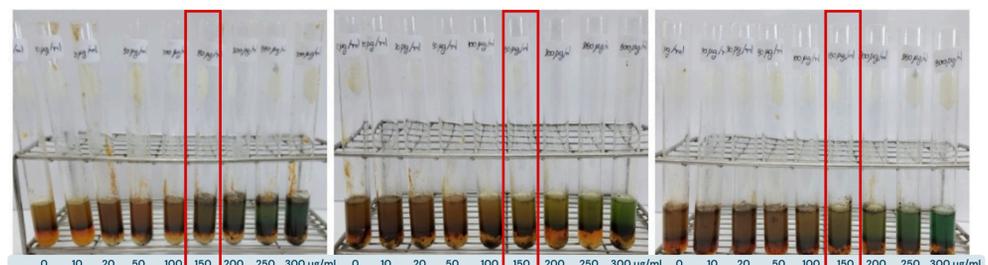


Figure 4. Results of Experiment 1

Figure 5. Results of Experiment 2

Figure 6. Results of Experiment 3

In Figures 4, 5, and 6 the results of three experiments using the standard cyanide solution in gastric content showed a sensitivity of 150 µg/mL.

TESTING THE STANDARD CYANIDE SOLUTION IN THE CENTRIFUGED FRACTION OF GASTRIC CONTENT.

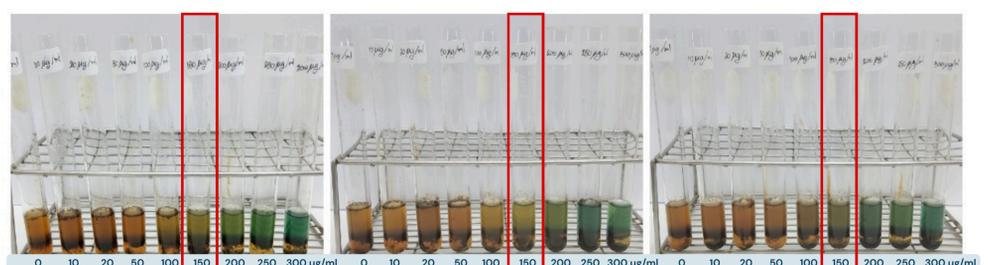


Figure 7. Results of Experiment 1

Figure 8. Results of Experiment 2

Figure 9. Results of Experiment 3

In Figures 7, 8 and 9 the results of three experiments using the standard cyanide solution in the supernatant fraction of gastric content obtained by centrifugation showed a sensitivity of 150 µg/mL.

CONCLUSIONS

- The sensitivity of the preliminary cyanide detection process using the Prussian Blue Test was 150 µg/mL, which remained consistent in distilled water, gastric content, and the centrifuged fraction of gastric content.
- The findings of this study can serve as fundamental data for developing cyanide detection methods in forensic analysis and toxicological examinations. Furthermore, future studies can explore factors affecting the efficiency of the detection process, such as the composition of test samples and potential interfering substances, to enhance the accuracy of cyanide analysis in more complex conditions.