

Detection of false positive results for Kastle-Meyer test from food samples.

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Abstract

Blood is essential evidence at the crime scene. Generally, dried blood can be seen as a reddish stain which causes stiffness on fabric. The bloodstain appears hard on non-porous surfaces and it can easily be scraped off. In the crime scene, the suspect may try to dispose of evidence. For example, the suspect may throw the cloth that contains some blood into the dustbin. The phenolphthalein test is a relatively specific presumptive test for blood. However, certain food samples can cause false positive reactions. The purpose of this project is to detect which food samples may cause a false positive reactions for blood. The reagents used are deionized water, phenolphthalein and hydrogen peroxide. A positive result is indicated by the formation of pink color within 1 to 20 seconds. Formation of other colors will be considered as negative results. Since these test are not human specific, any food containing blood will cause positive reactions. Forty-three samples of foods were tested, in the categories of fruits, vegetables, meats and condiments and only the meats were positive for blood. However, broccoli and horseradish caused a pink color changes after 45 seconds, but since this took longer than the test conditions this would not lead to a false positive in a properly run test. Thus, the phenolphthalein test is a very specific presumptive test for the blood

Introduction

Objective

- In order to determine the validity of forensic samples taken from the trash, the objective is to determine which, if any, food samples will cause a positive reaction in the phenolphthalein test for blood.
- To analyze the effects of phenolphthalein test on rotten food samples.



Figure 1 : Negative control (left) and Positive Control (right)

Hypothesis

- Phenolphthalein test reacts with hemoglobin in the blood to produce bright pink color within 5 to 20 seconds.
- Certain foods might cause false positive reactions.

Methods

- Cut a small piece of the food sample
 - Place the food sample onto a filter paper
 - Add a drop of deionized water to the food sample
 - Add a drop of phenolphthalein and observe for color change
 - Add a drop of hydrogen peroxide and Observe for color change
- Positive result is indicated by formation of bright pink color within 5 to 20 seconds
- Negative result is indicated by the absence of pink color formations

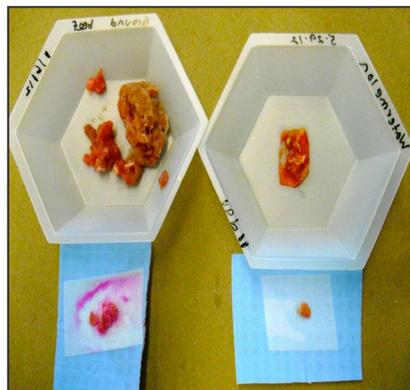


Figure 2: Positive result (left) and negative result (right)

Results

Items	Positive	Negative	Comments
Fruit : Watermelon, strawberry, blueberry, cantaloupe, grape, almond, banana, lime, raspberry, plum, peach, grapefruit, true lemon, nectarine		✓	
Vegetables: Celery, tomato, red pepper, potato, cauliflower, rhubarb, Chinese cabbage, garlic, mushroom, red onion, green garlic, spinach		✓	Rhubarb: Pink color formation due to the pink color of rhubarb itself
Meat: Cooked Hamburger, ham, pepperoni, beef frank, raw salmon, turkey frank, raw ground beef	✓		Raw ground beef: Positive reaction with luminol Pepperoni: Pink color changes not really obvious due to preservatives Raw salmon: Only shows positive result until 2 nd day Ham: Only shows positive result until the 6 th day
Condiments: Chinese mustard, tartar sauce, soy sauce, ketchup, egg		✓	
Drink: Raspberry Tea Herb Tea, coffee		✓	
Broccoli		✓	Positive reaction with luminol
Horseradish		✓	Positive reaction with luminol
Cauliflower		✓	Positive reaction with luminol

Conclusion

- ✓All food samples that contain blood will give positive result with phenolphthalein test.
- ✓The phenolphthalein is rapidly oxidized through the catalytic peroxidase activity of hemoglobin causing pink color formation.
- ✓After 45 seconds the materials naturally turn pink.
- ✓Ring precipitin test is used to differentiate animal and human bloods.

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