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DIOSCOREA HISPIDA DENNST (KOROT) EXTRACT AS A POTENTIAL RUST STAIN REMOVER

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ABSTRACT

The study aimed to determine the capacity of fresh Dioscorea Hispida Dennst (Korot) tuber extract as rust stain remover. Physical and chemical properties of Korot were also assessed.

Korot extract has a percentage yield of 74.4%. It is yellow in color, has an unpleasant odor, has a pH of 5.42, miscible in water and ethanol, immiscible in benzene, has a density of 1.08 g/mL, and a boiling point of 98.7°C. Korot tuber extract is found positive for the presence of oxalic acid and tartaric acid and negative for borate, sodium carbonate and citric acid based on qualitative analysis of the extract.

From the several tests conducted, fresh Korot extract with water can effectively remove rust stain that has been left in cotton fabric for 12hrs. Rust stain in fabric dried for 24hrs can only be partially removed by the extract. Further study on how to improve the rust stain removing capacity of korot is recommended.

Introduction

Rust is a product created by particular phenomena of chemical reaction that describes a destructive metal corrosion. This occur mostly when moisture adhere to metal surface and at certain condition react with oxygen undergoing oxidation or reduction reaction. In cases rust commonly effect vital roles in strengthening infructures and by this reason the country spent more money in order to restore those damaged machine structures and delicate metal parts by this destructives effect. Similarly, Rust destructive nature not only influences metal from its effect but also those that are called non-metallic as well. In terms of cleaning, rust could be classified as one of the most difficult stains to deal with in the fabric during washing process. Rust may decolorize the fabric and alter its good quality.

In removing the rust stain on fabric, it is important to know about the nature of fabric stains specifically iron rust stain. The researchers tried to use (Korot) Dioscorea hispida Dennst as a stain remover of rust on the fabric and to determine the chemical and physical properties of the extract.

Objectives of the Study

This study aimed to use Dioscorea hispida Dennst (korot) extract as a rust stain remover. Specifically, this study tried to determine the percent yield of the extract, the physical properties of korot extract in terms of color, odor, pH, solubility, density and boiling point, the chemical properties of korot extract in terms of content of borate compound, oxalic acid, sodium carbonate, tartaric acid and citric acid and the rust stain removing capacity of the extract on cotton fabric.

Procedure

The korot tubers were washed thoroughly to remove any adhering dirt. The weight of the sample was obtained using triple beam balance. Six hundred (600) grams of korot tuber was cut into small pieces and blended. This was followed by manual extraction process. The extract was filtered and placed in a clean and covered container. Percent yield was calculated.

The different physical properties of korot tuber extract like color, odor, pH, solubility, density and boiling point were determined. Qualitative analysis was used to test the presence of borate compound, oxalic acid, sodium carbonate, tartaric and citric acid. All procedures were done in three trials.

Test for Borate Compound

To 2mL of liquid sample in an evaporating dish, 10 drops of concentrated sulfuric acid was added and mixed thoroughly. Then 2mL of methyl alcohol was added and gently heated. The solution was heated avoiding vaporization of all methyl borate and alcohol. The remaining mixture was ignited. A green flame appearing immediately proves the presence of borate compound.

Test for Oxalic Acid

Five (5mL) of liquid extract was placed in a test tube and 10 drops of 1.5 formal sulfuric acid was added. The extract was heated in a water bath for 1 minute with stirring. Two (2) drops of 0.01 potassium permanganate solution was added and observed for immediate change. The disappearance of pink color indicates the presence of oxalic acid.

Test for Sodium Carbonate

In 2mL of Korot extract in a test tube, 10 drops of dilute hydrochloric acid was added. A rapid effervescence indicates carbonate compounds.

Test for Tartaric and Citric Acid

Two (2) mL of sample extract was placed in a test tube. It was rendered alkaline using dilute sodium hydroxide solution. A few drops 0.1M potassium permanganate solution was added until a permanent purple color is produced and heated to boiling. The color change was observed. A brown color precipitate indicates the presence of tartaric acid while a green color observed in the solution of permanganate indicates the presence of Citric acid.

Determination of Rust Removing Capacity

The rust stain was obtained from rusted nail. The rust was applied to the damp cotton cloth (4 cm x 4 cm) with a uniform size of about 2cm in diameter. This uniform size of rust stain was maintained for all test fabrics. Then the clothes were stored to dry for 12hrs and 24 hours (1day) before the treatment.

Three different treatments were considered in this study. First treatment is water only (negative control), second treatment is korot extract and water, and third treatment is soap and water. Different treatments were applied to the dried rust stain in the fabric. Then, this was scrubbed for about 1 min. The appearance of stain in the cloth was observed by five evaluators. They rated the appearance of stain as: completely removed, partially removed and not removed. Similar procedure was done in removing stains that has been dried for 12 and 24 hours.

Results

The korot extract has a percentages yield of 77.4%. The physical properties are: yellow color, unpleasant odor, pH of 5.42, miscible in water and ethanol and immiscible in benzene, has a boiling point of 98.7^{o}C and a density of 1.08g/mL. The Korot is found

positive for the presence of oxalic acid and tartaric acid and negative for borate, sodium carbonate and citric acid based on qualitative analysis of its extract.

The korot extract can completely remove rust stain from cotton fabric that has been dried for 12 hours and can partially remove rust dried in 24 hours. Detailed result of the analysis of the different treatments is shown in Table 1.

Table 1. Rust Removing Capacity of Different Treatments

Sample	Trial 1	Trial 2	Trial 3
DRIED FOR 12 HOURS			
Water	Partially Removed	Partially Removed	Partially Removed
(Korot) /water	Completely Removed	Completely Removed	Completely Removed
Soap Solution	Completely Removed	Completely Removed	Completely Removed
DRIED FOR 24 HOURS (1 DAY)			
Water	Partially Removed	Partially Removed	Partially Removed
(Korot) /water	Partially Removed	Partially Removed	Partially Removed
Soap Solution	Completely Removed	Completely Removed	Completely Removed

As seen from Table 1, the (Korot) extract can completely remove rust stain that has been dried for 12 hours but can only partially remove rust stain dried for 24 hours. Korot extract is better as compared to the negative control (water) but soap solution is still better for removal of rust stain until 24 hours drying time. The assessment was based on the ratings of five evaluators.

Conclusion

Based on findings and results of this study, the researcher found out the following:
1. The (Korot) extract has a percentage yield of 74.4%
2. The (Korot) tuber extract has a light yellow color, unpleasant odor, weakly acidic, miscible in water and ethanol, immiscible in benzene, has a density of 1.08 g/mL and a boiling point of 98.7^{o}C.
3. Korot extract contains oxalic acid and tartaric acid.
4. Fresh (Korot) extract with water can effectively remove rust stain that has been left in cotton fabric for 12hrs. Rust stain in fabric dried for 24hrs can only be partially removed by the extract.

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