

Cleaning Pennies

Big Question

Which substance will
clean the penny
best?

Hypothesis

I think the vinegar and salt will clean the penny the best because when you put the vinegar and salt together it acts as a acid that can clean what is called copper oxide which in other words is the rust on the penny.

Research

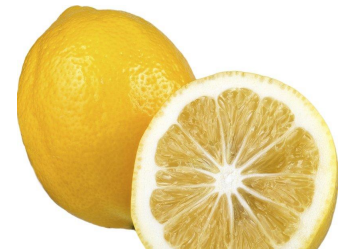
Pennies are made of zinc coated with copper, according to google, the vinegar and salt would clean it the best because it acts like a natural acid. This type of acid removes patina, patina is the brown gross look on pennies.

Pennies turn dull green due to oxidation. Overtime, pennies form a layer of copper oxide on the surface of the penny, it actually protects it from further corruption. After some time, or after exposure to an acid, pennies will form copper sulfate carbonate and chloride salts, which gives pennies a green color.

Tarnish, in order for the tarnish to be removed from the penny there must be an acid that can dissolve the oxide very effectively.

Materials

- Small clear cups
- 6 dirty pennies
- lemon juice
- Ketchup
- Soy Sauce
- Salt
- The Pink Stuff
- Vinegar



Procedures

- 1. Label each cup with each solution*
- 2. Add $\frac{1}{4}$ cup of solution to each cup*
- 3. Add a penny to each cup*
- 4. Let the pennies set for 10 minutes in each of the solution cups.*
- 5. Take each penny out and wipe it with a paper towel.*
- 6. Take a after solution picture.*
- 7. Which solution cleaned the penny best??...*

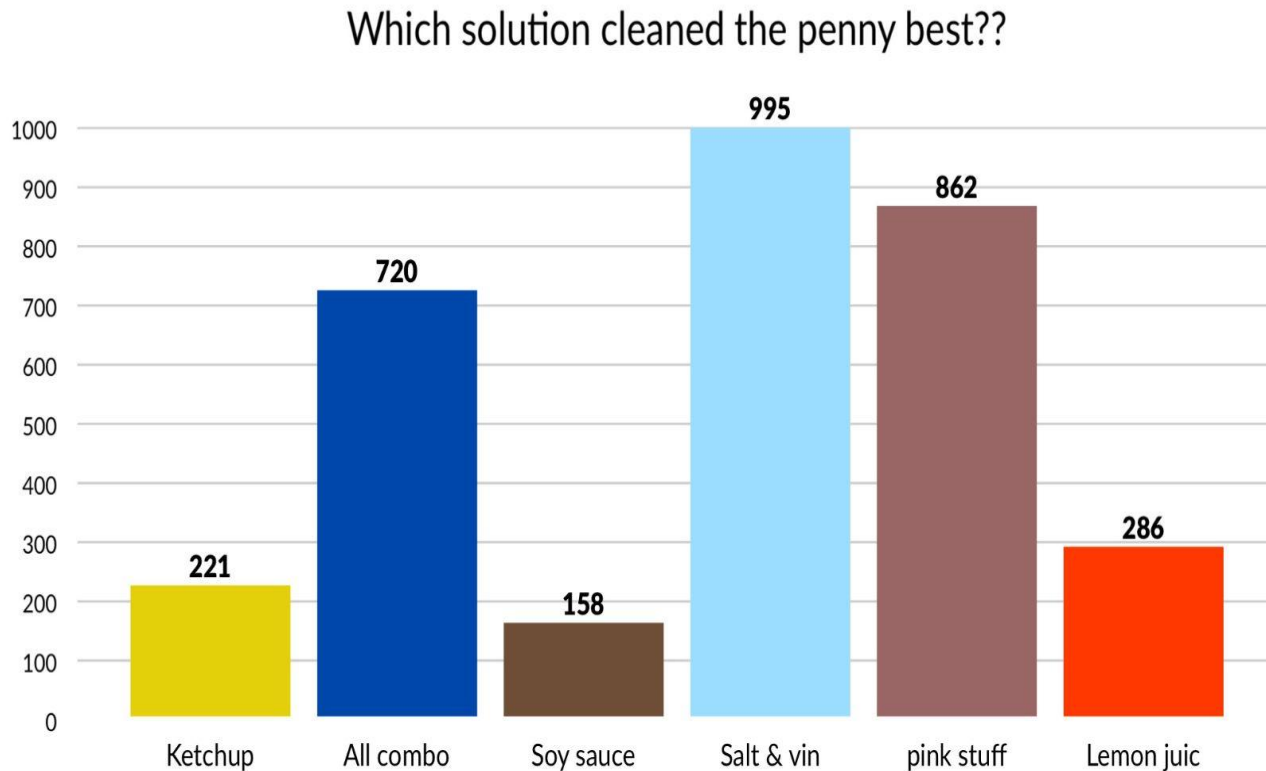
Variables

Controlled variables: The amount of liquid ($\frac{1}{4}$ cup), size of the plastic container (plastic cup 5.5oz), length of time (10 minutes).

independent variable: Cleaning solution (Salt & Vinegar, The pink stuff, Ketchup, Soy Sauce, combination of all solutions)

Dependent variable: The cleanliness of the penny.

Graph Chart



CHARTISTIC
2010

Ketchup

All Combo
(All Solutions)

Soy Sauce

Salt & Vinegar

Pink Stuff

Lemon Juice

***The amount of tarnish removed is measured from a scale of 0-1000**

Conclusion

My conclusion was correct. The Salt and Vinegar was the solution that removed the most tarnish from the penny. Really cool that my result did support my hypothesis. During my research I also read that ketchup also was a solution that would clean a penny best. To my surprise it actually took fifth place in the cleaning process out of six different solutions! There are stronger and weaker cleaning solutions when cleaning a penny. Different ingredients in the products either affect the penny or some do nothing at all. It must be how the copper and metal interact with what is in the solutions. I think the Salt and vinegar solution will now be a cleaning solution I use for heavy duty cleaning from now on.

Display

Research

Hypothesis

I think the vinegar and salt will clean the penny the best because when you put the vinegar and salt together it acts as an acid that can clean what is called copper oxide which in other words is the rust on the penny.

Materials

- 10 Pennies
- 10 Ziploc bags
- White Paper
- Aluminum Foil
- 100 mL Beaker
- 100 mL
- 100 mL Vinegar

Procedures

WHICH SUBSTANCE WILL CLEAN THE BEST??

Variables

Graph Chart

Substance	1st	2nd	3rd	4th	5th
Vinegar	2nd	5th	4th	1st	6th
Salt	3rd				

Conclusion

Bibliography

Substance	1st	2nd	3rd	4th	5th	6th
Vinegar	2nd	5th	4th	1st	6th	3rd
Salt	3rd					

Bibliography

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