

Experiment 3

Calcium Carbonate in Eggshell

Student Handout

Purpose

To determine the percentage of CaCO_3 in eggshell.

Background

In the past, pesticides such as dichlorodiphenyltrichloroethane (DDT) have been used extensively. Their harmful effects on biological systems are gradually revealed. One effect on wild bird life is the weakening or thinning of the eggshell. The consequence is the breaking of the eggshell before hatching. Eggshell mainly consists of calcium carbonate. In the present investigation, we will determine the percentage of calcium carbonate in eggshell by acid/base titration.

Tasks

1. Design and draw a flowchart to show how you will perform the experiment with the materials provided.
 2. Consult your teacher for the feasibility of your design.
 3. Write down the step-by-step procedure including the precise weight and volume of the reagents used.
 4. Perform the experiment.
 5. Record the observations and collect all the necessary data for calculation.
 6. Prepare a report according to your teacher's instruction.
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Safety

Handle all chemicals with great care. Avoid direct contact of chemicals with skin. Dispose of chemical waste, broken glassware and excess materials according to your teacher's instruction.

Safety information on the chemicals used in the investigation can be found in the Material Safety Data Sheet (MSDS). Consult your teacher for details.



**EYE PROTECTION
MUST BE WORN**

Materials and Apparatus Available

~0.1 M NaOH solution



Ethanol



Phenolphthalein



0.2000 M HCl solution

Mortar and pestle
Analytical balance
Pipette
Burette

Beakers
Volumetric flasks
Funnel
Filter paper

*Special items may be provided upon request.

Questions for Further Thought

1. HCl and NaOH solutions are not primary standards and need to be standardised. Suggest a primary standard for the present experiment and explain briefly how to perform the standardisation.
 2. Write down the equation for the reaction involved before titration in the present experiment.
 3. Find out the chemical formula and structure of DDT.
 4. Find another toxic chemical which is harmful to the wildlife species. Briefly describe its effect(s) and application(s).
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References

1. <http://chem.lapeer.org/Chem1Docs/EggshellTitration.html>
 2. http://www.accessexcellence.org/AE/AEC/AEF/1996/tucker_eggshell.html
 3. I. Newton and I. Wyllie, *J. Appl. Ecology*, 1992, **29**, 476.
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