ABHINAV, Satyam, Harmeet, Jatin, VIBHURESHI, Gurnoor

Components of Wood Ash

Introduction

Ash is a common substance we see around us. It is obtained by burning wood, cattle dung cakes, incense sticks, coconut shells, natural fibers etc. It is grayish in color, and is generally defined as the solid residue that remains after burning a material, after other products of combustion have escaped as gases. Ash, as we know, is used in a large number of applications such as cleaning utensils, making soap, as fertilizer and for pest control in agricultural soils, and to control bacterial growth in rotting materials. Can we also use it for washing clothes?

Can we say that wood ash is a single substance or it has many substances in it? Different colour (white black and grey) and different shades in ash indicates it most probably has multiple substances in it. Separations of substances from a mixture has been one of the very important processes for chemists to purify or to obtain "Pure" substances. The extracted pure substances are useful in production of new materials, medicines, household substances, or raw materials for industries.

In this unit, we will try to explore components of wood ash and separate them on the basis of their solubility in water and lime juice.

Materials Required

1. Wood Ash (If wood ash is not available, then take a piece of wood and burn it in open air till it is completely burnt. Let it cool down and use it.)
2. Juice of 3-5 Lemon, squeezed and filtered through a strainer
3. Funnel and filter paper (or a coarse cloth and a tea-strainer)
4. 4-5 beakers (100 or 250 mL) or any other similar containers
5. Glass rod, or spoon, or spatula
6. Test tubes, test tube stand
7. Litmus paper (red and blue), and turmeric powder
8. a dirty piece of cloth

Task 1: Let us think a bit

1. Can you think and list some ways in which wood ash is used in your homes or surroundings?

In Gardening of fowits and for Cosmetics.

2. What do you think ash is made of?

Ash is made up of burning of Wood

3. Do you think ash is soluble in water? Give reason for your answer.

We think ash is not Soluble in water it floats on water if we add Ash in the Water.

4. If water is mixed with ash, would the water wash be acidic, basic, or remain neutral?

Neutral

5. Ash is gray in color.
Which of the following white substances will remain white in color after they have been burnt in a fire/flame for a long time:
Salt, Sugar, Baking soda, Camphor, White sand, Lime.
White Sand

6. If a mixture of salt, sugar, camphor and white sand is taken and burnt, what would be the color of the ash obtained?
Grey and Black

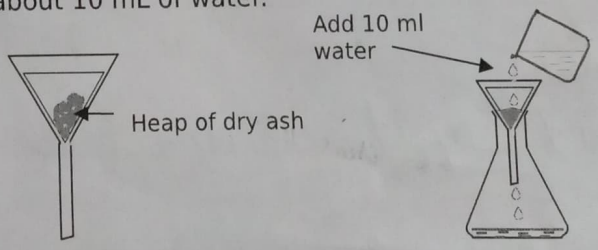
Observe the ash sample visually.

7. What do you observe in the ash? Why do you think ash is grey in color?

Task 2: Ash & water

Do the following task in groups of 3-4 students. Collect the powdery part of the ash (avoid the big pieces from the ash). Take about 5 g (or a table spoonful) ash.

Step 1: Fold a filter paper and set it in a funnel (instead of filter paper, a clean white thick cloth kept on a tea strainer can also be used). Set this funnel/strainer on an empty beaker or a flask.
Step 2: Place the folded filter paper in the funnel.
Step 3: Add 5g of ash in the filter paper and gently tap the funnel to let the ash settle down.
Step 4: Mark the level of ash in the funnel for later comparison.
Step 5: Slowly add about 10 mL of water.

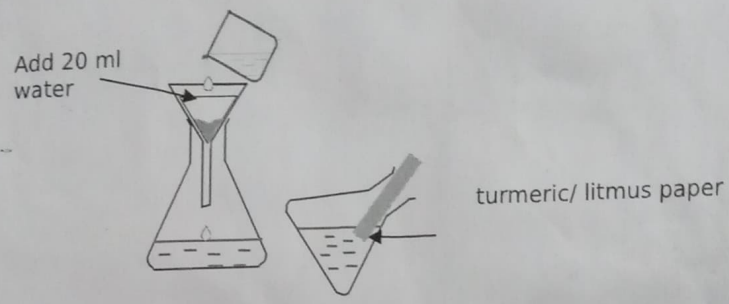


Q.1. Was water completely absorbed by the ash or did some of it come down the funnel? If sand was kept instead of ash, would sand also absorb the same amount of water?
Some of it come down the funnel, We think that Sand absorbs more water than ash.

Q.2. Do you think some part of the ash has dissolved in water? If yes, can you estimate how much (in terms of % volume)?

Yes 60% of

Step 5: Slowly pour another 20 mL water over the ash in the funnel. By this time, some water will start collecting in the beaker under funnel.

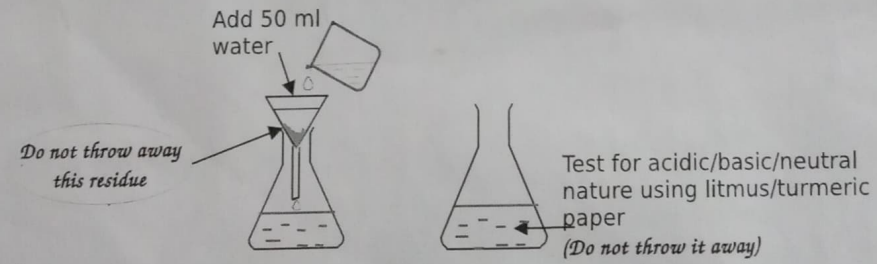


Step 6: Use litmus/turmeric paper to check if the water filtrate collected under the funnel is acidic/basic/neutral.

Q.3. Does this tell if anything from the ash has dissolved in water? If yes, what is the chemical nature of this water soluble substance in ash?

Yes, anything have from the has dissolved in water. Red litmus into blue.

Step 7: Remove the beaker/container containing the filtrate, and put another beaker/container under the funnel/strainer. Add 50 mL water to the funnel, stir the ash with gently a glass rod/spoon (should not tear the wet filter paper) and collect the filtrate. Repeat this step by adding another 50 mL of water. Check this filtrate with litmus/turmeric.



Q.4. Is something still dissolving from the ash? Would all the ash dissolve in water?

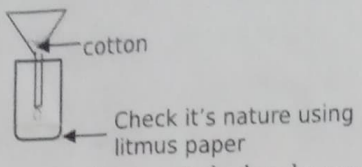
No, nothing is dissolving from the ash. No the all ash will not dissolve in water.

Step 8: If you feel more water needs to be added, add the water, let it filter and let the residue in funnel settle down.

Note: Do not throw the ash filtrate obtained in the above task. You will need it for further tasks.

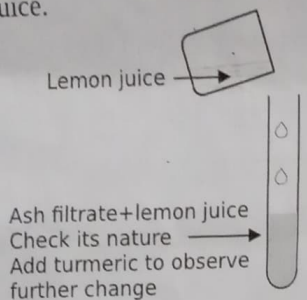
Task 3: Ash residue & Lemon juice

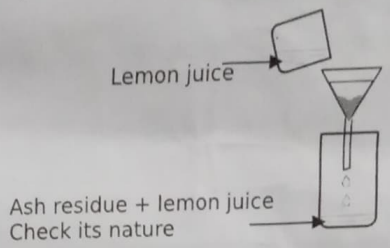
Step 1: Squeeze some lemons and strain the juice through a tea strainer or filter it through cotton. Check if this juice is acidic, basic or neutral.



Q.1. What observation is expected when lemon juice is added to the filtrate? What is expected when this is added to the solid remaining in the funnel?

Step 2: Take some ash filtrate in a test tube, add some lemon juice and note down the observations. Add some turmeric and see if there is change in acidity/basicity of the filtrate after adding lemon juice.





Step 3: Take the funnel containing the residual ash from task 2 and put another empty beaker under the funnel. Add lemon juice to the solid in funnel. Note what you observe (the change in colour, texture, any gases evolved, smell, heat) and what does this indicate.

When we add lemon juice in the test tube then the colour of phinoplin will disapear that means the lim water is acidic or neutral

Step 4: Check if the filtrate collecting in beaker below is acidic, basic or neutral.

It should be acidic or neutral.

Q.2. Is any part of ash dissolving in this lemon juice?

nothing

Q.3. With which of the following substances, would you observe the similar effect as observed on ash with Lemon Juice? Table Salt, Washing Soda, sand, coal, carbon, chalk powder

Step 5: Add about 20 mL more of lemon juice to the funnel. Keep adding the juice slowly and keep stirring till you observe no further dissolution/change taking place in remaining solid.

Step 6: Note the colour and texture of the solid remaining in funnel.

Q.4. Is the solid looking different now than the original ash taken. What does this change tell about the components that dissolved in water/lemon juice?

nothing

Q.5. Has the amount of solid in funnel decreased after adding the lemon juice?

Yes, the amount of solid in funnel decreased after adding the lemon juice.

Q.6. Can we obtain the dissolved components (in water and in lemon juice) from the filtrate back in their solid state? How?

Task 4: Ash Filtrate & Its Uses

First day: Take about 5 mL milk each in two separate test tubes. In one of them, add 3-4 mL of the ash filtrate collected in **Task 2.** Keep the other test tubes as it is as a reference. Cover the two test tubes with aluminium foil/paper and keep them aside for about 10 hours.

Q.1. What should happen to the milk in the two test tubes if you leave them for few hours?

When we leave milk in the two test tubes for few hours the solid particles will come up and the color of the milk will be transparent.

Second Day: Check the next day: what differences do you see in the two test tubes?

Q.2. What effect did ash filtrate have on the milk?

There is less than solid residue in 1st tuber and the 2nd tube in the more than solid residue

Cleaning Oil spots: Take a small piece of cloth and put 2-3 drops of cooking oil on it. Then dip this cloth in the ash filtrate and see if you can remove the oil stain from the cloth.

Yes, It can remove the oil stain from the cloth.