

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?

(i) As fertilizer, (ii) washing utensils, (iii) Making Soap, (iv) for pest control in agricultural soils, (v) to control bacterial growth in rotting materials.

2. What do you think ash is made of?

Ash is made by burning wood, cattle dung cakes, incense sticks, coconut shells, natural fibres, etc.

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

No, we think ash is insoluble in water, because it is a heterogeneous mixture.

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

Remains neutral. acidic basic.

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.

salt, white sand, camphor

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

Blackish Brown

Observe the ash sample visually.

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

It contains different colour (white, black and grey). It is grey in colour because it is a mixture of different substances.

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.

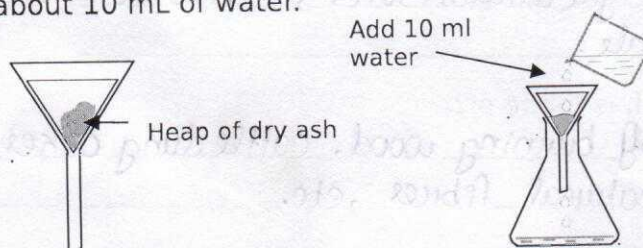
Step 1: Fold a filter paper and set it in a funnel (instead of filter paper, a clean white thick cloth kept on a tea strainer can also be used). Set this funnel/strainer on an empty beaker or a flask.

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.



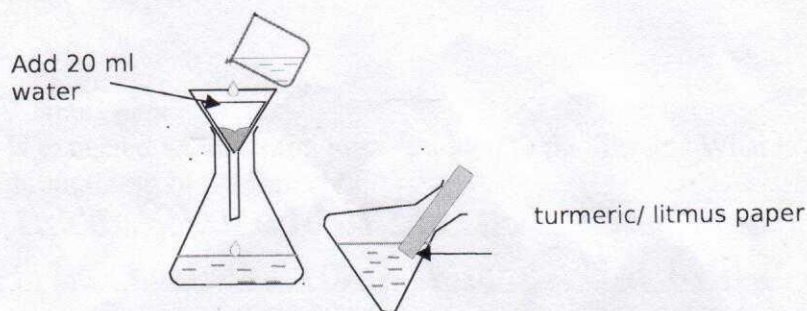
Q.1. Was water completely absorbed by the ash or did some of it come down the funnel? If sand was kept instead of ash, would sand also absorb the same amount of water?

Some of the water came down the funnel. No, sand would not absorb the same amount of water as the wood 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, 30 - 40 % Volume.

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.

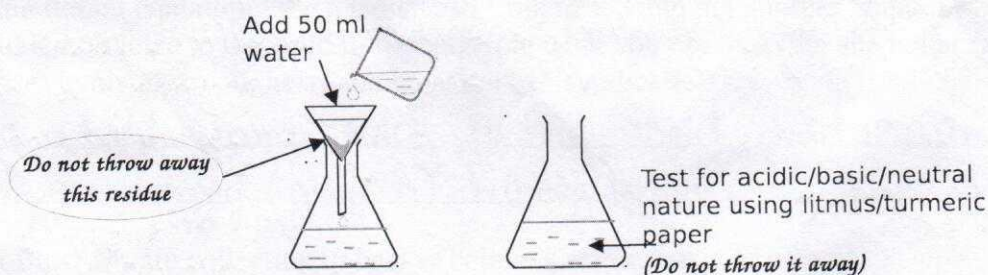


Step 6: Use litmus/turmeric paper to check if the water filtrate collected under the funnel is acidic/basic/neutral.

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?

Basic in Nature, when the ash has dissolved in water.

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

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.